Industrial & Labor Relations Review

Volume 61, *Issue* 4 2008 *Article* 6

The Effect of Minimum Wages on Immigrants

Pia M. Orrenius* Madeline Zavodny†

*Federal Reserve Bank of Dallas,

†Agnes Scott College,

The Effect of Minimum Wages on Immigrants

Pia M. Orrenius and Madeline Zavodny

Abstract

This study examines how minimum wage laws affect the employment and earnings of low-skilled immigrants and natives in the United States. Minimum wage increases might have larger effects among low-skilled immigrants than among natives because, on average, immigrants earn less than natives due to lower levels of education, limited English skills, and less social capital. Results based on data from the Current Population Survey for the years 1994–2005 do not indicate that minimum wages had adverse employment effects among adult immigrants or natives who did not complete high school. However, low-skilled immigrants may have been discouraged from settling in states that set wage floors substantially above the federal minimum.

KEYWORDS: minimum wages, immigrants

THE EFFECT OF MINIMUM WAGES ON IMMIGRANTS' EMPLOYMENT AND EARNINGS

PIA M. ORRENIUS and MADELINE ZAVODNY*

This study examines how minimum wage laws affect the employment and earnings of low-skilled immigrants and natives in the United States. Minimum wage increases might have larger effects among low-skilled immigrants than among natives because, on average, immigrants earn less than natives due to lower levels of education, limited English skills, and less social capital. Results based on data from the Current Population Survey for the years 1994–2005 do not indicate that minimum wages had adverse employment effects among adult immigrants or natives who did not complete high school. However, low-skilled immigrants may have been discouraged from settling in states that set wage floors substantially above the federal minimum.

The federal minimum wage increased to $5.85 from $5.15 in July 2007—the first increase in the federal wage floor in a decade—and was set to increase in two additional 70-cent increments over the next two years, reaching $7.25 an hour in July 2009. These increases bring new urgency to the debate over how minimum wages affect the labor market outcomes of low-skilled, low-wage workers. Heightening the urgency is the fact that an increasing number of states took matters into their own hands and imposed or raised state-level wage floors in recent years. Before the federal minimum wage rose in July 2007, 31 states and the District of Columbia had minimum wages that exceeded the federal rate of $5.15, which had been in effect since 1997. Standard competitive economic models predict that higher minimum wages result in less employment. Despite this prediction, recent research has reached disparate conclusions about the impact of minimum wage increases on employment.

Most studies of minimum wages in the United States examine the effect of the minimum wage on employment among groups that earn relatively low wages, such as teenagers and fast-food workers. Neumark and Wascher (2006) provide a survey of this literature. The fastest-growing low-wage, low-skilled group, however, is made up of immigrants (Sum et al. 2002). As of 2005, about 32% of foreign-born adults (aged 25 and older) in the United States did not have a high school diploma or equivalent. These immigrants account for about one-third of the total adult population without a high school diploma. The foreign-born comprise almost two-thirds of adults with less than a fifth-grade education and half of adults with at most an eighth-grade education (Census Bureau 2006). Because of differences in age and labor force participation rates, immigrants compose an even more disproportionate share of the low-skilled labor force: almost 44% of adults in the labor force who lack a high school diploma are foreign-born.

*Pia M. Orrenius is Senior Economist and Policy Advisor in the Research Department of the Federal Reserve Bank of Dallas and Research Fellow at IZA, and Madeline Zavodny is Associate Professor of Economics at Agnes Scott College and Research Fellow at IZA. The authors thank Rachel Friedberg for helpful comments on an earlier version of this paper.

The data and programs used for this paper are available from the authors on request. Contact Madeline Zavodny, Agnes Scott College, 141. E. College Ave., Decatur, GA 30030; mzavodny@agnesscott.edu.

Industrial and Labor Relations Review, Vol. 61, No. 4 (July 2008).
0019-7939/00/6104 $01.00

Despite the increasing share of the low-skilled labor force represented by foreign-born workers, virtually no research has investigated how minimum wages affect this group. The present study is our attempt to fill this gap. Using data from the period 1994–2005, we compare the effect of minimum wages on employment, hours worked, and earnings among adult immigrants and natives in the United States who did not have a high school diploma. For purposes of comparison with previous research, we also present results for teenagers.

The impact of minimum wages on immigrants is important not only because of the size and rapid growth of the low-skilled foreign-born work force but also because the impact on the foreign-born might be greater and longer-lasting than any impact on U.S.-born workers. Many of the native-born workers who earn near the minimum wage are teens or young adults, most of whom will experience substantial earnings growth as they age (Even and Macpherson 2000, 2004). A large number of adult immigrants who have little education may, in contrast, be mired in low-wage jobs for their entire working lives. The level of the minimum wage and its effect on earnings and employment therefore may play a large role in the standard of living, rate of assimilation, and settlement patterns of many low-skilled immigrants.

Theoretical Overview

Conventional economic theory predicts that higher minimum wages lead to higher average earnings and lower employment-to-population rates. The effects should be largest among groups that earn near the minimum wage, groups that are likely to include youths and low-skilled adults. However, some research suggests that higher minimum wages are not necessarily associated with lower employment rates even though they boost average hourly earnings (for example, Card 1992a, 1992b; Card, Katz, and Krueger 1994; Card and Krueger 1994; Katz and Krueger 1992). Potential explanations for these results include imperfectly competitive labor markets, decreases in hours per worker instead of in the number of workers, and improvements in the quality of workers and their productivity that offset the effects of higher wage mandates. For example, employers might substitute more-skilled workers for less-skilled workers as the wage floor increases, resulting in no net change in aggregate employment but changes across subgroups. Another possibility is that employment rates based on surveys of individuals remain unchanged despite minimum wage increases because some individuals work "under the table" for wages below the legal wage floor. Individuals could be pushed into subminimum-wage jobs when the wage floor rises, or they could already be working for less than the legal minimum and not be affected by increases in the minimum wage.

From a theoretical standpoint, the impact of minimum wages is likely to be larger among the foreign-born than among natives.[1] Immigrants at the low end of the skill distribution tend to have fewer years of education, less institutional knowledge, and worse English language skills than low-skilled natives. Commensurate with these differences, foreign-born workers who do not have a high school diploma earn 14% less than natives with similarly low educational attainment, and immigrants with a high school diploma earn 18% less than high-school-graduate natives (Council of Economic Advisers, *Economic Report of the President,* 2005). Low-wage immigrants, particularly those from non–English-speaking countries, have considerably lower returns to education and less U.S. labor market experience than low-wage natives (Chiswick et al. 2008). If immigrants are less productive than natives within the low-skilled group, then standard economic theories predict that immigrants should experience more adverse employment effects than natives when minimum wages increase.[2]

[1]We use the terms "immigrant" and "foreign-born" interchangeably in this article to refer to persons born outside the United States to parents who are not U.S. citizens. The data we use do not allow us to distinguish among illegal immigrants, legal permanent residents, and temporary migrants.

[2]For formal models of the varying effects of minimum wage increases across skill levels, see, for example, Connolly (2003) and Lang and Kahn (1998).

However, there are also reasons why employment effects could be smaller for immigrants than for natives. If immigrants are more likely to work in industries with less elastic labor demand or to work off-the-books, then minimum wage increases might have less of an effect on employment among immigrants than among natives. In particular, the presence of a substantial number of undocumented workers among the foreign-born labor force may boost the incidence of subminimum wages in the immigrant population.[3] Employers who are already breaking the law when (knowingly) hiring undocumented workers may also be more willing to flout other labor regulations, such as minimum wage laws. Although covered by minimum wage laws, undocumented workers paid less than the minimum wage are probably unlikely to seek legal redress for fear of revealing their undocumented status.

We are not aware of any previous research directly examining whether there are differences between immigrants and natives in the effects of minimum wages on employment and hours worked. Stylized facts suggest that immigrants are more likely to be affected by minimum wages than are natives. Results in Butcher and DiNardo (2002) and Chiswick, Le, and Miller (2008) suggest that the minimum wage compresses the bottom of the wage distribution more among immigrants than among natives. A recent OECD study found significantly more adverse effects of minimum wages and other labor market regulations on immigrants than on natives in a cross-section of OECD nations (Jean 2006). In particular, higher minimum wages were found to reduce female economic activity and male employment rates more among the foreign-born than among natives. Orrenius and Solomon (2006) found that the unemployment rates of immigrants—particularly young immigrants—relative to natives are higher in OECD countries with more labor market restrictions than in those with fewer such regulations. They also concluded that immigrants have relatively low employment rates compared with natives in countries with more labor market regulations.

[3]Mehta et al. (2002) indicated that about 10% of undocumented immigrants (and 3% of documented immigrants) interviewed in the Chicago area in 2001 reported being paid less than the minimum wage.

Data

We use annual state-level data to examine how minimum wages were related to employment-to-population rates, average weekly hours worked, and average hourly earnings among the employed during the period 1994 to 2005. Our measure of the minimum wage is the annual average of the higher of federal and state minimum wages (the "effective minimum wage") in each state. For simplicity and comparability to most previous studies, the analysis does not incorporate legal subminimum wages (which apply to young or recently hired workers under the current federal law and some state laws); industry- or occupation-specific minimum wages (such as the tip credit minimum wage for some restaurant workers); city-level wage floors (which occurred in a few areas toward the end of our sample period); or "living wage" requirements.[4] The federal minimum wage increased twice early in our sample period, from $4.25 to $4.75 in October 1996 and to $5.15 in September 1997. The number of states with a minimum wage above the federal level at some point during the year ranged from a low of 8 in 1998 to a high of 17 in 2005. Appendix Table A1 lists the states that exceeded the federal minimum wage each year during our sample period.

Our employment, hours, and earnings measures are based on data from the Current Population Survey outgoing rotation groups (CPS ORG) for 1994–2005.[5] The CPS is a

[4]We also do not control for changes in the Earned Income Tax Credit (EITC) or for welfare reform, which might affect low-skilled workers' incentive to work. The year fixed effects capture any national-level effects of changes in such factors. See Neumark and Wascher (2007) for a study that combines the effects of minimum wages and the EITC among teens and young adults.

[5]Our approach implicitly assumes that representation of low-skilled immigrants (and natives) in the CPS does not change in response to changes in the minimum wage. If increases in the minimum wage drive the least-skilled workers into subminimum wage jobs and "into the shadows (and out of the CPS)," as hypothesized by Cortes (2004:10), then our results probably would

monthly survey of about 55,000 nationally representative households that focuses on labor market activity. Housing units are in the sample for four months, out for eight months, and then back in the sample for four months. When a housing unit is in the fourth and eighth survey waves (the outgoing rotation), the survey asks about individuals' earnings as well as about their employment status and hours worked.

We focus on three groups: less-educated adult natives, less-educated adult immigrants, and all teens (ages 16–19). Less-educated adults here are individuals aged 20–54 who did not have a high school diploma or equivalent. Immigrants are individuals who reported being born outside the United States and not being a U.S. citizen at birth.[6] We report results for teens to provide a benchmark for comparison with much of the minimum wage literature. Because of the small sample sizes for foreign-born teens in many states (most immigrants arrive in the United States when they are adults, not as children), we do not stratify the teen data by nativity. We present results for data stratified by sex as well as for the combined sexes because of concerns that immigrant women's labor force participation may differ from immigrant men's (see, for example, Schoeni 1998). As discussed below, examining the sexes separately yields some interesting results for teens as well as for less-educated adults. Previous research examining changes in the federal minimum wage has found evidence of adverse employment effects only among male teens (Bernstein and Schmitt 1998; Neumark and Wascher 2007), a result we corroborate.

We constructed annual state-level employment-to-population rates for these populations and state-level average hourly earnings among workers in these groups.[7] We also constructed average usual hours worked per week among all individuals and among only workers. The questions in the CPS ORG from which we constructed our measures are about employment, hours, and earnings during the survey week, not during the previous year. We deflated earnings and the minimum wage using the annual average of the consumer price index for urban wage earners (CPI-W).

As Table 1 shows, 1.4% of workers earned exactly the effective minimum wage, 3.3% earned less than the minimum wage, and 8.5% earned above the wage floor but within 125% of the minimum wage. The fractions of workers earning exactly, less than, and slightly above the minimum wage were all higher among immigrants than among natives, higher among teens than among low-skilled adults, and higher among women than among men within age/education and nativity groups. For example, the shares of low-skilled adult immigrants who earned exactly, less than, and slightly more than the minimum wage were 5%, 7.6%, and 20.6%, respectively, versus 2.4%, 5.2%, and 15.6% for natives. Increases in minimum wages therefore should have had a larger impact among low-skilled immigrants than among low-skilled natives, assuming compliance with the law. The wage distributions in Table 1 also suggest that minimum wage effects should have been larger among teens than among low-skilled adults and larger among women than among men.

The finding that immigrants were more likely than natives to earn less than the minimum wage accords with some previous research. Using 1994 CPS ORG data, Trejo (1998) noted that 5.5% of immigrants and 3.8% of natives were earning less than the

be biased toward not finding effects of the minimum wage. However, Cortes found no evidence in support of that hypothesis.

[6]This approach does not count individuals born in Puerto Rico or other outlying areas of the United States (who are U.S. citizens at birth) as immigrants. Because such individuals are likely to differ substantially from individuals born in the United States, we exclude them from the data entirely.

[7]We used the survey population weights to construct the employment rates and average hours and the outgoing rotation group weights to construct average earnings. The earnings sample includes both workers paid hourly and workers paid at other frequencies; we calculated average hourly earnings for the latter as usual weekly earnings divided by usual weekly hours. We used the labor force status recode to determine employment status.

Table 1. Share of Workers Earning Exactly or Near the Minimum Wage and Employment Rates, by Demographic Group.

Group	*Exactly MW*	*Below MW*	*Within 125% of MW*	*Employment Rate*
All Workers	0.014	0.033	0.085	0.633
Immigrants	0.025	0.048	0.121	0.626
Natives	0.013	0.030	0.080	0.634
Not High School Graduate (Aged 20–54)	0.035	0.062	0.177	0.614
Immigrants	0.050	0.076	0.206	0.679
Men	0.039	0.057	0.173	0.857
Women	0.071	0.115	0.278	0.467
Natives	0.024	0.052	0.156	0.576
Men	0.013	0.033	0.103	0.676
Women	0.039	0.078	0.233	0.468
Teens (Aged 16–19)	0.086	0.117	0.382	0.416
Men	0.081	0.097	0.363	0.413
Women	0.092	0.136	0.402	0.419

Notes: Shown are the fractions of workers in the indicated age/education group earning exactly the minimum wage, less than the minimum wage, and more than the minimum wage but within 125% above the minimum wage, and the employment-to-population rate. Calculations are based on data from the CPS-ORG during the period 1994–2005, weighted using the outgoing rotation weights. Columns (1)–(3) only include individuals earning between $1 and $100 per hour.

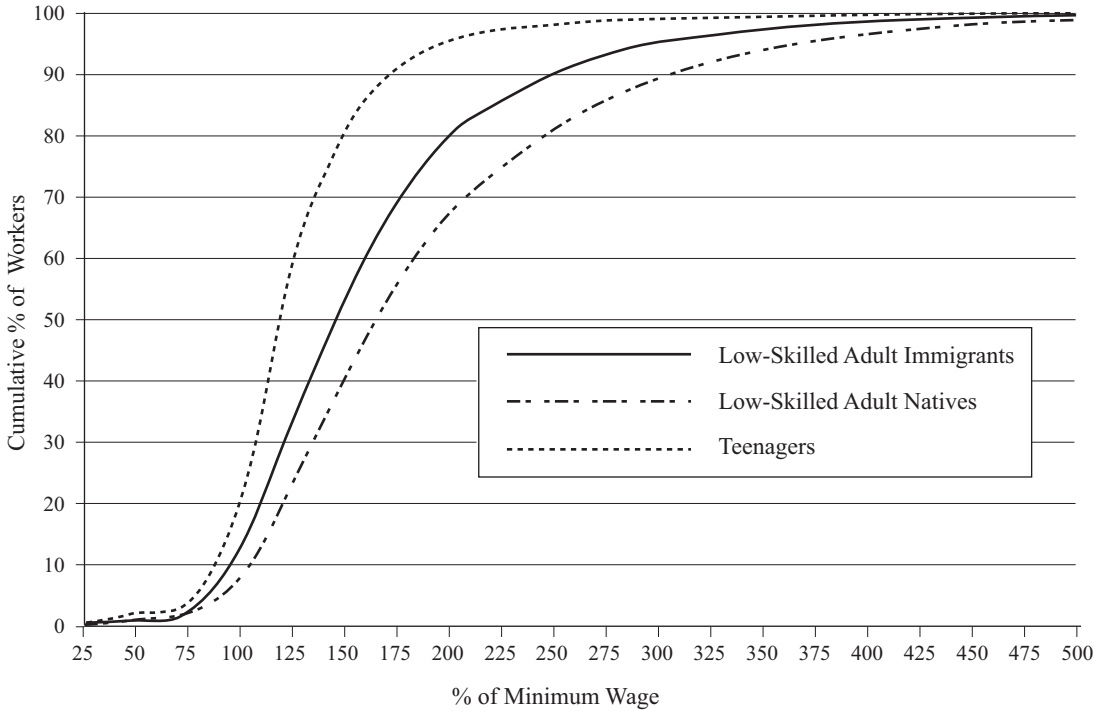
federal minimum wage. However, Fry and Lowell (1997) reported that immigrants were less likely than natives to earn below the federal minimum wage (2.3% versus 2.9%) in June 1988 and November 1989 CPS data. The difference may be due in part to declines in immigrant "quality" across cohorts, as discussed by Borjas (1985, 1995), since we use more recent data. In addition, our analysis incorporates state minimum wages that were above the federal level. This raises the effective minimum wage in several key states that had disproportionately large numbers of immigrants, most notably California.

Figure 1 shows the cumulative distribution of hourly earnings among low-skilled natives and immigrants and among all teens. As the descriptive statistics suggest, teens were considerably more likely than low-skilled adults to earn near the minimum wage. Among low-skilled adults, immigrants had a lower earnings distribution than natives. The figure suggests that relatively few low-skilled adult native workers were likely to be affected by minimum wage increases. During the period 1994–2005, the average increase in nominal minimum wages was less than 10% of the initial level; the federal increases that occurred in 1996 and 1997 were about 12% and 8% of the initial levels, respectively. Few adult natives, even among those who did not have a high school diploma, earned little enough to be affected by such small increases in the wage floor.

The various age/education and nativity groups we examine exhibit differences in employment rates as well as in earnings, as shown in the last column in Table 1. Although immigrants and natives as a whole both had employment-to-population rates of about 0.63, less-educated immigrants were more likely to be employed than were less-educated natives. This difference is driven by men; the employment rate among less-educated adult male immigrants was 18 percentage points higher than among less-educated adult male natives. Teens had lower employment rates than low-skilled adults. Employment rates were similar for male and female teens.

Low-wage workers were disproportionately young, female, and less-educated, as well as disproportionately foreign-born. Table 2 reports average characteristics for low-wage workers and for all workers. While immi-

Figure 1. Cumulative Distribution of Hourly Earnings Relative to the Minimum Wage.



grants accounted for about 13% of all workers during this period, they made up almost 23% of minimum wage workers and 19% and 18% of workers earning below and slightly above the minimum wage, respectively. Teenagers and workers who had not (yet, in some cases) graduated from high school were particularly overrepresented among low-wage workers. However, a substantial fraction of minimum wage workers were not young; almost one-half of low-wage workers were at least 25 years old.

Methods

Before examining employment and hours effects, we consider the impact of the minimum wage on average hourly earnings. If we fail to find evidence of positive effects on hourly earnings, there is little reason to expect disemployment effects. Because the federal minimum wage and most state minimum wages are set by legislatures and raised infrequently, inflation erodes the real value of the minimum wage over time, making it less binding.[8] In addition, given variation in wages across areas and sectors, minimum wages are not necessarily binding for all low-wage jobs.

We examine the relationship between real average hourly earnings and the real minimum wage using a basic panel data regression model,

$$(1) \qquad \ln Wage_{st} = \alpha + \beta \ln MW_{st} + \gamma BusCycle_{st} + \sigma S_s + \tau T_t + \varepsilon_{st},$$

where s indexes states and t years in annual state-level data. The coefficient on the real

[8]During the sample period, only Oregon and Washington had state minimum wages indexed to inflation, and those laws were passed during the 2000s. (As of 2007, Vermont's minimum wage increases by the smaller of 5% and the inflation rate, and Arizona, Florida and Missouri passed laws indexing their state minimum wages to inflation.)

Table 2. Characteristics of Low-Wage Workers.

	Workers Earning			
Description	*Exactly MW*	*Below MW*	*Within 125% of MW*	*All Workers*
Average Age	29.3	33.5	31.8	38.5
	(14.3)	(15.4)	(14.7)	(12.8)
Teen (Aged 16–19)	0.330	0.196	0.246	0.066
	(0.470)	(0.397)	(0.431)	(0.228)
Young Adult (Aged 20–24)	0.212	0.206	0.209	0.108
	(0.409)	(0.404)	(0.407)	(0.311)
Foreign Born	0.225	0.185	0.180	0.127
	(0.418)	(0.389)	(0.385)	(0.333)
Female	0.588	0.616	0.588	0.482
	(0.492)	(0.486)	(0.492)	(0.500)
Less Than High School Graduate	0.461	0.319	0.359	0.128
	(0.498)	(0.466)	(0.480)	(0.334)
High School Graduate, No College	0.278	0.304	0.328	0.316
	(0.448)	(0.460)	(0.469)	(0.465)
Some College, Not College Graduate	0.230	0.276	0.255	0.292
	(0.421)	(0.447)	(0.436)	(0.455)
Sample Size	26,407	63,427	162,616	1,948,815

Note: Shown are means (standard deviations) based on individual-level data from the CPS-ORG during the period 1994–2005 for workers earning between $1 and $100 per hour.

minimum wage variable, β, gives the elasticity of average hourly earnings with respect to the minimum wage. We estimate the wage model separately for less-educated native workers, less-educated foreign-born workers, and teens in order to examine how groups' average earnings are related to the minimum wage.

Some specifications include controls for state-level economic conditions. We use three controls for the business cycle: the natural log of real gross state product (GSP) per capita, initial unemployment insurance claims, and the real value of permits issued for privately owned residential construction (single-family homes, apartments, and condominiums). We include these variables as business cycle controls because they are indicators of current or "coincident" economic activity; the unemployment rate, which previous research often used to control for the business cycle, is, in contrast, a lagging indicator of economic activity. If the minimum wage is endogenous with respect to business cycle conditions, with states more likely to raise their wage floor when the economy is booming, then the estimated coefficient on the minimum wage variable in the earnings model will tend to be biased upward because wages would be increasing anyway due to the growing economy. Including the business cycle controls helps reduce this endogeneity bias.

The empirical model includes state and year fixed effects. The state fixed effects capture any time-invariant factors that affected average wages within each state, while the year fixed effects capture any time factors that were common across states, such as the national business cycle. Because we use the higher of state and federal minimum wages as the minimum wage variable, the model measures the effect of both state-level increases beyond the federal rate and federal increases in states that did not have minimum wages above the federal level. The standard errors are Huber-White corrected and clustered on the state to control for heteroskedasticity. In the earnings regressions, observations are weighted using the sum of the outgoing rotation weights within the state-year-group cell in the CPS ORG data.

The standard model of labor supply and

demand posits that imposition of a binding minimum wage will reduce employment by moving the equilibrium employment level back along the labor demand curve. The higher the minimum wage, the lower the employment level. Minimum wage studies are, in essence, measuring the elasticity of labor demand with respect to wages by using the minimum wage as an exogenous source of variation in wages.

The basic regression model we use to examine employment effects is similar to the earnings model:

$$(2) \qquad \ln Emp/Pop_{st} = \alpha + \beta \ln MW_{st} + \gamma BusCycle_{st} + \sigma S_s + \tau T_t + \varepsilon_{st},$$

where s indexes states and t years in annual state-level data. The left-hand-side variable is the employment rate for a particular age/education/nativity group. The minimum wage variable, *MW,* is the real effective minimum wage. We take the natural log of both variables of interest, the employment rate and the minimum wage, so the estimated coefficients can be interpreted as elasticities. As in the wage regressions, the model controls for the business cycle, since it might confound the effect of the minimum wage on employment. The business cycle controls (which are the same as those used in the earnings regression model) also reduce any endogeneity bias that would occur if minimum wage increases are cyclical; this would tend to bias up (toward zero) the estimated coefficient on the minimum wage variable in employment models, because it would attenuate the negative effect of minimum wage increases. The employment regression model includes state and year fixed effects, and the standard errors are Huber-White corrected and clustered on the state. Observations are weighted using the sum of the survey population weights within the state-year-group cell in the CPS ORG data.

The above model is a reduced form specification that estimates the relationship between the employment rate and the real minimum wage. It does not capture how binding the minimum wage is. We therefore also estimate a variant that uses the relative minimum wage instead of the real minimum wage. Following Neumark and Wascher (2006) and Keil, Robertson, and Symons (2001), we specify this model as

$$(3) \qquad \ln Emp/Pop_{st} = \alpha + \beta \ln(MW_{st}/Wage_{st}) + \rho \ln(Wage_{st}) + \gamma BusCycle_{st} + \sigma S_s + \tau T_t + \varepsilon_{st},$$

which includes both the log of the relative minimum wage and the log of the real average wage. The variable *Wage* is the real average wage among adults aged 20–54 in a state and year; it does not vary across age/education/nativity groups. The goal of this specification is to control for the cost of low-wage workers (who are hired at or near the minimum wage) relative to the cost of other workers. As the minimum wage increases relative to the average wage among prime-age workers, employers are expected to substitute more prime-age, skilled workers for relatively younger, less-skilled workers, creating larger disemployment effects.

We use similar models to examine the effect of the minimum wage on average usual weekly hours worked. For each age/education/nativity group, the hours models are estimated in a sample restricted to workers and in the entire survey population (which includes non-workers with zero hours worked). The sample of workers captures whether businesses react to higher minimum wages by increasing hours among remaining workers—such as by substituting full-time workers for part-time workers—or by cutting average hours instead of reducing employment levels. Those results are best interpreted together with the employment results; finding no disemployment effects but a decline in hours might have different distributional implications from finding a negative employment effect but an increase in hours among individuals who remain employed. The regressions that include all individuals, not just workers, aim at capturing the effect of the minimum wage on total hours worked, which implicitly incorporates employment effects.

We show the robustness of our main results to using a specification that controls for the business cycle with the unemployment rate, similar to Neumark and Wascher (1992). This specification sometimes adds

Table 3. Effect of the Minimum Wage on Average Hourly Earnings.

	Both Sexes		*Men*		*Women*	
Group	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Less-Educated Immigrants	0.220*** (0.062)	0.150** (0.071)	0.219*** (0.055)	0.162** (0.068)	0.244*** (0.091)	0.158* (0.090)
Less-Educated Natives	0.031 (0.082)	–0.022 (0.080)	0.065 (0.091)	–0.024 (0.073)	–0.067 (0.075)	–0.043 (0.106)
All Teens	0.214*** (0.026)	0.184*** (0.035)	0.223*** (0.038)	0.221*** (0.043)	0.203*** (0.047)	0.140** (0.054)
Business Cycle Controls	No	Yes	No	Yes	No	Yes

Notes: Shown are estimated coefficients on the natural log of the real minimum wage from OLS regressions. The dependent variable is the natural log of the average real hourly earnings for workers in the indicated group. Each coefficient is from a separate regression. All regressions include state and year fixed effects; some specifications add business cycle controls (the natural log of real gross state product per capita, the real contract value of residential building permits, and the number of initial unemployment claims). Less-educated adults are aged 20–54 and do not have a high school diploma; teens are aged 16–19. The number of observations in each regression is a maximum of 612, representing the 50 states and D.C. during the period 1994–2005. Robust, clustered standard errors are in parentheses. Observations are weighted using the sum of the outgoing rotation weights for each cell.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

a variable measuring the size of the group examined as a fraction of the population aged 16–64 to control for any labor supply or cohort size effects. We also examine the robustness of our main results for teens to controlling for the fraction of teens enrolled in school.

Results

Earnings Effects

The regression results suggest that minimum wages boosted earnings among low-skilled immigrants and among teens but not among low-skilled natives.[9] As Table 3 shows, a 10% increase in the minimum wage was associated with a 2.2% increase in average hourly earnings among immigrant men and a 2.4% increase among immigrant women when the model does not control for the business cycle. As expected, minimum wages were generally procyclical, and controlling for state-level economic conditions reduces the estimated effect of the minimum wage; the effect of a 10% increase was to raise less-educated immigrants' average hourly earnings by about 1.6% among both men and women. The estimated coefficients for less-educated adult natives, in contrast, are both much smaller in magnitude (and sometimes negative) and statistically insignificant. This result is not surprising given the distribution of earnings relative to the minimum wage among natives who did not have a high school diploma, as discussed above.

The estimated earnings effect is largest among teens, with an elasticity of about 0.18, in estimates that combine the sexes and control for business cycle effects. This result appears to be driven by male teens; the estimated elasticity of average hourly earnings with respect to the minimum wage is considerably larger among male teens than among female teens when we control for the business cycle (0.22 and 0.14, respectively).

As a specification check, we also estimated the earnings regression among workers who had at least a college degree. These workers should not have been affected by changes in the minimum wage, so a statistically significant coefficient on the minimum wage variable in the earnings regression would suggest a problem with our specification. As expected, we found no relationship between

[9]The results are similar (although generally slightly larger in magnitude) when only workers paid hourly are included in the sample.

Table 4. Effect of the Minimum Wage on Employment Rates.

	Both Sexes		*Men*		*Women*	
Group	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
A. Real Minimum Wage						
Less-Educated Immigrants	0.026 (0.048)	–0.060 (0.053)	0.073** (0.036)	0.025 (0.045)	0.029 (0.097)	–0.100 (0.122)
Less-Educated Natives	0.231 (0.140)	0.093 (0.088)	0.195* (0.116)	0.058 (0.067)	0.231 (0.143)	0.114 (0.138)
All Teens	–0.001 (0.124)	–0.181* (0.094)	0.003 (0.125)	–0.194** (0.094)	–0.004 (0.133)	–0.163 (0.116)
B. Relative Minimum Wage						
Less-Educated Immigrants	0.075 (0.047)	–0.028 (0.078)	0.100*** (0.035)	0.065 (0.060)	0.049 (0.086)	–0.175 (0.157)
Less-Educated Natives	0.202 (0.181)	0.011 (0.118)	0.181 (0.150)	–0.007 (0.077)	0.139 (0.198)	–0.001 (0.192)
All Teens	0.023 (0.127)	–0.165* (0.092)	0.006 (0.115)	–0.214*** (0.073)	0.046 (0.145)	–0.107 (0.129)
Business Cycle Controls	No	Yes	No	Yes	No	Yes

Notes: Shown are estimated coefficients on the natural log of the real minimum wage or the natural log of the relative minimum wage (the minimum wage divided by the average wage) from OLS regressions. The dependent variable is the natural log of the employment-to-population rate for each group. Each coefficient is from a separate regression. All regressions include state and year fixed effects; some specifications add business cycle controls (the natural log of real gross state product per capita, the real contract value of residential building permits, and the number of initial unemployment claims). Regressions in panel B also include the natural log of the real average wage. Less-educated adults are aged 20–54 and do not have a high school diploma; teens are aged 16–19. The number of observations in each regression is a maximum of 612, representing the 50 states and D.C. during the period 1994–2005. Robust, clustered standard errors are in parentheses. Observations are weighted using the sum of the final weights for each cell.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

average hourly earnings and the minimum wage among college-educated workers.[10]

Employment Effects

The results do not indicate that higher minimum wages had adverse effects on employment rates among low-skilled adults. As the top panel in Table 4 shows, employment among neither low-skilled adult immigrants nor natives was significantly negatively associated with the real minimum wage. The estimated coefficients among low-skilled adult men are positive but, controlling for state-level economic conditions in column (4), statistically insignificant. Given the absence of positive wage effects, it is not surprising that we do not find adverse employment effects among natives. Table 3 does indicate positive wage effects among immigrants, but the results in Table 4 indicate that these wage increases did not cause statistically significant employment losses. As expected, including controls for general economic conditions to reduce endogeneity bias lowers the estimated coefficients on the minimum wage variable in all of the specifications.

The results do indicate adverse employment effects among teens, with a 10% increase in the minimum wage reducing teen employment by about 1.8% when we control for state-level economic conditions. This estimate is similar to the results reported in previous studies that have found adverse effects among teens in analyses combining the sexes (for example, Burkhauser, Couch, and Wittenburg 2000; Neumark and Wascher 1992, 1994). The result is again driven by

[10]The estimated coefficient in a regression pooling these highly educated natives and immigrants was 0.017 (0.032).

male teens, among whom a 10% increase in the minimum wage reduced employment by about 1.9%. The results do not indicate a statistically significant effect among female teens. Our finding that the minimum wage had a more adverse employment effect among male teens than among female teens is similar to results reported by Bernstein and Schmitt (1998) and Neumark and Wascher (2007).[11]

We find similar results when using the relative minimum wage to measure the level of the wage floor. As shown in the bottom panel of Table 4, the estimated coefficients of the relative minimum wage variable are fairly similar in magnitude and statistical significance to the estimated coefficients of the real minimum wage variable. As with the real minimum wage results, the adverse employment effects of higher relative minimum wages are concentrated among male teens in the specifications that control for the business cycle. In results not shown here, the estimated coefficients on the real average wage variable are typically negative and statistically significant. Keil at al. (2001) reported a similar result from their relative minimum wage specification.

Hours Effects

Another possible effect of higher minimum wages is changes in hours worked. As discussed above, average hours could have increased or decreased among the sample of workers, while we expect to find a decrease in average hours worked among the population as a whole in response to higher minimum wages. Previous research has reached mixed conclusions about the effect of minimum wage increases on average hours (Couch and Wittenberg 2001; Neumark, Schweitzer, and Wascher 2004; Zavodny 2000).

The results suggest that, like employment, average hours worked did not fall among low-skilled immigrants when the real minimum wage increased.[12] As the top panel of Table 5 shows, there was no statistically significant relationship between average hours and the minimum wage among low-skilled immigrants who worked. In addition, average hours among low-skilled immigrants as a whole, including nonworkers, were not significantly associated with the minimum wage, as shown in the bottom panel of the table. The results also do not indicate statistically significant effects on average hours among low-skilled natives, which again is not surprising given the lack of earnings effects.

The results do indicate that changes in the real minimum wage led to changes in average hours among employed teens. When the minimum wage increased, average hours tended to increase among male teens who worked and to fall among female teens who worked. The estimated responses to a 10% increase in the real minimum wage are a 1% increase in male teen workers' average hours (although this is significant only at $p = 0.11$) and a 1.3% decrease in female teen workers' average hours. The latter result explains our failure to find adverse employment effects among female teens—their hours were cut instead. There was also a negative effect on average hours among female teens as a whole (panel B), while there was no statistically significant negative effect among all male teens. However, our earlier results did indicate a negative overall employment effect among male teens.

Robustness of Results

Our results thus far suggest that teens experienced adverse effects from higher minimum wages, either in the form of employment losses among men or hours cuts among women. We find no evidence of statistically significant employment or hours reductions among low-skilled adult immigrants, despite positive effects on hourly earnings. We find no effects on average earnings, employment, or hours among low-skilled adult natives. We

[11]However, Pabilonia (2002) found a more adverse effect among women than men when examining workers aged 14–16 using data from the National Longitudinal Survey of Youth, 1997.

[12]For brevity, we only present hours results for the real minimum wage specifications. Results using the relative minimum wage are similar.

Table 5. Effect of the Minimum Wage on Average Hours Worked.

	Both Sexes		*Men*		*Women*	
Group	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
A. Employed Individuals						
Less-Educated Immigrants	0.001 (0.020)	–0.006 (0.024)	0.027 (0.023)	0.008 (0.032)	–0.057 (0.035)	–0.033 (0.044)
Less-Educated Natives	0.014 (0.029)	–0.012 (0.027)	0.019 (0.021)	–0.004 (0.021)	–0.007 (0.048)	–0.029 (0.063)
All Teens	0.072 (0.059)	–0.009 (0.043)	0.184*** (0.069)	0.092 (0.074)	–0.065 (0.061)	–0.129*** (0.043)
B. All Individuals						
Less-Educated Immigrants	–0.002 (0.071)	–0.111 (0.076)	0.091 (0.056)	0.018 (0.071)	–0.072 (0.109)	–0.202 (0.139)
Less-Educated Natives	0.237 (0.179)	0.079 (0.122)	0.205 (0.141)	0.052 (0.088)	0.232 (0.198)	0.090 (0.209)
All Teens	0.028 (0.169)	–0.232* (0.120)	0.130 (0.180)	–0.164 (0.159)	–0.101 (0.174)	–0.313** (0.119)
Business Cycle Controls	No	Yes	No	Yes	No	Yes

Notes: Shown are estimated coefficients on the natural log of the real minimum wage from OLS regressions. The dependent variable is the natural log of average usual weekly hours worked among employed individuals (panel A) or all individuals (panel B) for each group. Each coefficient is from a separate regression. All regressions include state and year fixed effects; some specifications add business cycle controls (the natural log of real gross state product per capita, the real contract value of residential building permits, and the number of initial unemployment claims). Less-educated adults are aged 20–54 and do not have a high school diploma; teens are aged 16–19. The number of observations in each regression is a maximum of 612, representing the 50 states and D.C. during the period 1994–2005. Robust, clustered standard errors are in parentheses. Observations are weighted using the sum of the final weights for each cell.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

examine the robustness of these results to three variations on our main specification: using the unemployment rate to control for state-level economic conditions; controlling for the relative population size of the age/education/nativity group; and, among teens, controlling for the school enrollment rate.

The results are, in general, robust to these changes (see Appendix Table A2). The employment rate among low-skilled adult male natives is positively associated with the real minimum wage when the unemployment rate is included, and the employment rate among low-skilled adult male immigrants is positively associated with the real minimum wage when the relative population size is added to the specification that includes the unemployment rate. The negative employment effects among male teens become smaller in magnitude and significance when the unemployment rate and then the relative population size are included in the regression.

Again, we focus above on results that use other variables to control for the business cycle because the unemployment rate, unlike employment, lags economic activity. The negative hours result among female teen workers is sensitive to including the enrollment rate, but we note concerns that enrollment may be endogenous with respect to the minimum wage.

The full effect of changes in the minimum wage may not occur immediately but rather with a lag. To investigate this possibility, we include a one-year lag of the real minimum wage in the earnings, employment, and hours regressions. Neumark and Wascher (1992), Baker et al. (1999), and Burkhauser et al. (2000), among others, have used a similar approach in state-level panel data. The results are not shown here because we do not find that the one-year lag of the real minimum wage is significantly negatively associated with employment rates or average hours, with one exception: employment

among low-skilled adult immigrant women. The results for the sum of the estimated coefficients of the current and lag minimum wage variables are also not different from the current minimum wage results shown in the tables: higher minimum wages, we find, led to lower employment among male teens and lower hours among female teens, but did not have a statistically significant effect on low-skilled adult immigrants or natives.

The gender asymmetry in the teen results is striking. Female teens were more likely to earn near the minimum wage but experienced smaller wage effects from minimum wage increases. Female teens appear to have experienced a cut in hours, while male teens appear to have lost jobs entirely when the minimum wage rose. Gender differences in industry and occupation, such as females being more likely to hold tipped jobs that usually were not directly affected by minimum wage hikes, are one potential reason for these asymmetries.

Another potential explanation is gender differences in enrollment behavior: young women were more likely than young men to be enrolled in school. Regressions of the log of the fraction of teens aged 16–19 enrolled in school (either full-time or part-time) on the log of the real minimum wage, the business cycle controls, and state and year fixed effects indicate that higher minimum wages reduced the fraction of female teens enrolled in school but had no statistically significant effect among male teens. Of course, this simple regression does not control for the fact that employment, hours, and enrollment are all jointly determined. Reasons for the gender difference in the effects of the minimum wage on enrollment and labor force outcomes are an interesting area for research but beyond our focus on immigrants here.

Undocumented Immigrants and the Minimum Wage

As discussed earlier, increases in the minimum wage might have no effect on undocumented immigrants if their employers do not obey minimum wage laws. Our estimated positive wage effects among immigrants may overstate the total effect on low-skilled immigrants if the CPS does not include undocumented immigrants and those workers are relatively unaffected by minimum wage increases. Although previous studies indicate that the CPS does include undocumented immigrants (Bean et al. 1998; Hanson 2006), this group is likely underrepresented in the surveys. Estimates suggest that in the late 1990s, the CPS probably missed between one-quarter and one-third of illegal immigrants (Passel and Fix 2001). Post-2000, the undercount is generally believed to be much improved, with the CPS covering about the same share of the illegal immigrant population—about 90%—as did the 2000 Census (Passel, Van Hook, and Bean 2004).

In order to examine the effect of the minimum wage on undocumented immigrants, we estimated the labor force outcomes regressions separately for low-education immigrants from Latin America and from Asia. Latin American countries accounted for at least 80% of undocumented immigrants present in the United States in 2000 (INS 2003; Passel, Capps, and Fix 2004), so the fraction of low-education immigrants who were undocumented is likely to have been higher among Latin Americans than among Asians. Interestingly, we found a statistically significant positive relationship between the minimum wage and hourly earnings among Latin Americans but not among Asians. Much as with our results above, we did not find evidence of statistically significant negative effects on employment or hours for immigrants from either region.

Mobility and the Minimum Wage

Our failure to find adverse employment or hours effects of higher minimum wages on low-skilled adult immigrants is at odds with the conventional competitive labor market model. If minimum wages raise average earnings among workers, the competitive model predicts that the equilibrium quantity of labor hired should fall. Yet we do not find evidence that this occurred. One potential explanation of our results within the framework of a competitive labor market model is that low-skilled immigrants' locational choices may be influenced by the minimum wage.

Low-skilled immigrants who have little safety net, particularly the undocumented, may move to another state or even return home if they lose their jobs when the minimum wage increases. Indeed, recent work by Bean et al. (2007) suggests that undocumented immigrants were more likely than low-education natives or legal immigrants to move across states during 1995–2000.[13] Also, newly arriving low-skilled immigrants may be less likely to settle in states with higher minimum wages if their employment prospects are worse in such states. Such endogenous locational choice would explain our finding of positive wage effects yet no disemployment impact from higher minimum wages.

To address this issue, we examine whether higher minimum wages were related to the skill composition of the population within a state and to the distribution of low-skilled workers across states. If a higher minimum wage in a state caused low-skilled immigrants who lost their jobs to leave that state (either to move to another state or to leave the United States) or discouraged other low-skilled immigrants from moving to that state, we should observe that the fraction of a state's population represented by low-skilled immigrants was negatively associated with the level of the real minimum wage. Further, we should find that the average education level among immigrants was positively associated with the real minimum wage within a state, and that the fraction of immigrants without a high school diploma was negatively associated with the real minimum wage. We should also observe that low-skilled immigrants were more likely to live in states with lower minimum wages.

We examine these hypotheses using state-level panel data models similar to those estimated above. Instead of labor market outcomes, the left-hand-side variable is low-skilled immigrants (or natives) aged 20–54 as a fraction of the state population aged 16–64; average years of education among adult immigrants (or natives) living in a state; the fraction of adult immigrants (or natives) within a state who did not have a high school diploma or equivalent; or the fraction of low-skilled adult immigrants (or natives) who lived in a given state.[14] All of these variables are derived from the CPS ORG data for 1994–2005 and are annual, state-level averages. The right-hand-side variables are the natural log of the real minimum wage, the business cycle controls, and state and year fixed effects. The standard errors are clustered on the state. To avoid giving undue influence to larger states, particularly California, we do not weight the state-year observations in these regressions.[15]

The results suggest that minimum wages influenced low-skilled immigrants' location patterns. As shown in Table 6, there is a statistically significant negative relationship between the real minimum wage and the fraction of the state population comprised of low-skilled adult immigrants (panel A). The fraction comprised of low-skilled adult natives, in contrast, is positively associated with the minimum wage; this result is consistent with low-skilled natives moving away from states with more low-skilled immigrants (Borjas 2006) or with state legislatures raising the minimum wage when the share of native-born voters who had little education and low wages increased.

Further, the average years of education among adult immigrants was positively associated with the minimum wage (panel B). This suggests that raising the minimum wage caused less-educated immigrants to leave (or not move to) a state or attracted relatively well-educated immigrants. We do not find the same pattern for adult natives. In addition, the fraction of adult immigrants who did not have a high school diploma was

[13]Neuman and Tienda (1994) also found a negative relationship between legal status at entry and internal migration among immigrants who applied for legalization through the 1986 amnesty.

[14]The last variable is the distribution of low-skilled individuals across states each year. In cases where the CPS reports education in categories (for example, grades 1–4), we imputed years of schooling as the median number of years within the category.

[15]Dropping California does not materially change the results. The results are generally qualitatively similar but smaller in magnitude if the observations are weighted using state populations.

Table 6. Compositional Effects of the Minimum Wage.

Group	*Both Sexes*	*Men*	*Women*
A. Fraction of State Population Aged 16–64 Composed of:			
Less-Educated Adult Immigrants	–0.015**	–0.009**	–0.005*
	(0.007)	(0.004)	(0.003)
Less-Educated Adult Natives	0.014*	0.004	0.011**
	(0.008)	(0.005)	(0.004)
B. Average Years of Education among:			
Adult Immigrants	2.145***	2.089**	2.164***
	(0.762)	(0.935)	(0.648)
Adult Natives	–0.113	–0.162	–0.066
	(0.102)	(0.114)	(0.105)
C. Fraction That Does Not Have a High School Diploma among:			
Adult Immigrants	–0.195**	–0.192**	–0.176**
	(0.075)	(0.089)	(0.068)
Adult Natives	0.020*	0.013	0.028**
	(0.010)	(0.012)	(0.011)
D. Fraction of Individuals without a High School Diploma Living in a State:			
Adult Immigrants	–0.032*	–0.036*	–0.026*
	(0.017)	(0.019)	(0.014)
Adult Natives	0.002	0.003	–0.002
	(0.001)	(0.003)	(0.003)

Notes: Shown are estimated coefficients on the natural log of the real minimum wage from OLS regressions. In panel A, the dependent variable is the fraction of the state population aged 16–64 comprised of immigrants (or natives) aged 20–54 who do not have a high school diploma. In panels B and C, the sample is restricted to immigrants or natives aged 20–54; in panel D, the sample is further restricted to individuals who do not have a high school diploma. Each coefficient is from a separate regression. All regressions include state and year fixed effects and business cycle controls (the natural log of real gross state product per capita, the real contract value of residential building permits, and the number of initial unemployment claims). The number of observations in each regression is a maximum of 612, representing the 50 states and D.C. during the period 1994–2005. Robust, clustered standard errors are in parentheses.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

negatively associated with the real minimum wage; the opposite pattern held for female adult natives (panel C). The distribution of low-skilled immigrants across states also appears to have been inversely related to effective minimum wages, while the distribution of low-skilled natives was not related to the minimum wage (panel D)

Migration-induced changes in population composition could explain why higher minimum wages boosted average wages among low-skilled immigrants without creating adverse employment or hours effects. Higher minimum wages might have encouraged low-skilled immigrants to leave one state and move to another or to leave the United States. For low-skilled immigrants remaining within that state, the smaller number of competing workers may have mitigated any adverse employment effects that minimum wage increases would otherwise have caused. As noted by Ottaviano and Peri (2005), among others, recent immigrants tend to be more substitutable for other immigrants than for natives, so a reduction in the number of low-skilled immigrants in a state (or a reduction in their growth rate) would be expected to have a greater effect

on immigrants' labor market outcomes than on natives' outcomes.

We also used data from the March CPSs to examine whether minimum wages affected the average education level of individuals who moved across states. The March CPS asks individuals for their place of residence one year ago.[16] Based on these responses, we created a sample of individuals aged 20–54 who moved across states. We regressed the average numbers of years of education among out-movers from a given state on that state's minimum wage, the business cycle controls, and state and year fixed effects, or

$$(4) \qquad Educ_{st} = \alpha + \beta \ln MW_{st} + \gamma BusCycle_{st} + \sigma S_s + \tau T_t + \varepsilon_{st}.$$

As in the earlier mobility regressions, to keep large states from driving the results, we do not weight the state-year observations.

The results indicate that a higher minimum wage in a state was associated with a significantly lower average education level among immigrants leaving that state but not among natives who did so; the estimated coefficient on the minimum wage variable is –5.187 (2.592) for immigrants and –1.061 (1.219) for natives. We caution that this sample includes only individuals who moved across states within the United States, not those who left the United States, and therefore may not capture the true effect of higher minimum wages on mobility. But the results are consistent with the population composition results shown in Table 6 and suggest that minimum wages likely affected locational choices among low-skilled immigrants.

Immigrants and natives may not move directly in response to state or federal changes in minimum wages, but firms in low-wage industries may be more likely to open or expand establishments in states with lower effective minimum wages. Immigrants responding to firms' locational choices, and natives reacting to immigrants' locational choices (Borjas 2006), could also underlie the patterns we observe in the population composition and in the distribution of low-skilled immigrants across states. Another possibility for our results, however, is that employers who had large numbers of low-skilled immigrant workers exerted political pressure to prevent state minimum wage increases. Such reverse causality could also underlie the negative relationship between minimum wages and the presence of large numbers of less-educated immigrants.

Conclusion

The standard model of competitive labor markets predicts that minimum wages raise earnings and reduce employment probabilities for workers who are at the bottom of the wage distribution. Along with teens and young adults, the foreign-born account for a large share of low-wage workers in the United States, and the size of the foreign-born work force has been rising in recent years. Immigrant workers may be particularly affected by minimum wage increases given their relatively low levels of human capital, such as less formal education and limited English proficiency, and lack of institutional knowledge.

The results of our analyses of state-level data indicate that higher minimum wages boosted average hourly earnings among adult immigrants who did not have a high school diploma or equivalent education. However, we do not find evidence of adverse employment or hours effects among this group. We do find evidence of a decline in work among teens, with a difference by gender in whether employment or hours changed in response to higher minimum wages.

Our failure to find an adverse employment effect among low-skilled adult immigrants despite a positive wage effect could result from employers substituting those workers for teens when the minimum wage increased. In addition, immigrants' locational choices could have responded to changes in minimum wages. We find some evidence that

[16]We used data from the 1994–2005 March CPS except for 1995, when the survey asked about place of residence 5 years ago. We only included individuals who moved across states and who were in households in their first 4 months-in-sample in the CPS. Because the sample is small (since it only includes individuals who moved across states), we did not estimate the regression separately for men and women.

this may have occurred, as the educational composition of immigrants within states and the distribution of low-skilled immigrants across states were related to minimum wage levels.

The period we examine, 1994–2005, marks an era when immigrants began settling in large numbers in new parts of the United States in addition to going to traditional gateways like California, New York, and Texas. As the United States in the 1990s experienced the largest inflow of foreign-born people ever in its history, North Carolina and Georgia were the states that experienced the greatest percentage gains in foreign-born population.[17] Notably, these two states did not increase their minimum wage beyond the federal level during that period. If firms that hire low-wage immigrants increased employment more in states with lower effective minimum wages, immigrants likely responded by moving to those states. The effect of minimum wages on locational choices among firms that hire immigrants versus natives is a promising subject for future research.

The large increase in the federal minimum wage that is set to occur in 2008 and 2009 will provide an opportunity for economists to examine the effects of a sizable increase in minimum wages across most of the country. The three-step increase in the federal minimum wage to $7.25 per hour from $5.15 exceeds the state minimum wages as of January 2007 in all states except California, Connecticut, Hawaii, Massachusetts, Oregon, Rhode Island, Vermont, and Washington. By creating a relatively high national wage floor, the proposed increase would reduce firms' opportunity to move to areas with low state minimum wages or to expand operations in those areas, possibly leading to larger disemployment effects among immigrants than those found here.

[17]See http://www.census.gov/prod/2003pubs/c2kbr-34.pdf.

Appendix Table A1
States that Exceeded the Federal Minimum Wage

State	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*
Alaska	X	X	X	X	X	X	X	X	X	X	X	X
California				X	X	X	X	X	X	X	X	X
Connecticut	X	X	X	X	X	X	X	X	X	X	X	X
Delaware			X	X		X	X	X	X	X	X	X
D.C.	X	X	X	X	X	X	X	X	X	X	X	X
Hawaii	X	X	X	X	X	X	X	X	X	X	X	X
Illinois											X	X
Iowa	X	X	X									
Maine									X	X	X	X
Massachusetts			X	X	X	X	X	X	X	X	X	X
Minnesota												X
New Jersey	X	X	X	X								X
New York												X
Oregon	X	X	X	X	X	X	X	X	X	X	X	X
Rhode Island	X	X	X	X		X	X	X	X	X	X	X
Vermont		X	X	X	X	X	X	X	X	X	X	X
Washington	X	X	X	X	X	X	X	X	X	X	X	X
Wisconsin												X

Notes: The federal minimum wage rose from $4.25 an hour to $4.75 an hour in October 1996 and to $5.15 an hour in September 1997. Shown are states that exceeded the federal minimum wage at any time during the year(s) indicated.

Appendix Table A2
Robustness Checks

	Hourly Earnings			*Employment-to-Population*			*Hours among Workers*		
Group	*Both*	*Men*	*Women*	*Both*	*Men*	*Women*	*Both*	*Men*	*Women*
A. Use Unemployment Rate to Control for Business Cycle									
Less-Educated Immigrants	0.208*** (0.065)	0.210*** (0.055)	0.212** (0.096)	–0.021 (0.042)	0.039 (0.041)	–0.054 (0.127)	–0.005 (0.023)	0.016 (0.024)	–0.051 (0.046)
Less-Educated Natives	0.017 (0.087)	0.047 (0.091)	–0.070 (0.086)	0.139 (0.083)	0.108* (0.063)	0.137 (0.113)	–0.006 (0.027)	0.004 (0.020)	–0.033 (0.054)
All Teens	0.212*** (0.031)	0.217*** (0.042)	0.203*** (0.052)	–0.103 (0.072)	–0.097 (0.077)	–0.109 (0.091)	0.032 (0.036)	0.142*** (0.051)	–0.104** (0.047)
B. Add Control for Fraction of Population Aged 16–64									
Less-Educated Immigrants	0.228*** (0.071)	0.208*** (0.057)	0.275** (0.105)	0.017 (0.053)	0.077** (0.038)	–0.067 (0.146)	–0.014 (0.023)	0.004 (0.024)	–0.063 (0.051)
Less-Educated Natives	0.034 (0.094)	0.070 (0.098)	–0.063 (0.094)	0.089 (0.081)	0.099 (0.062)	0.096 (0.112)	–0.001 (0.028)	0.006 (0.020)	–0.030 (0.055)
All Teens	0.206*** (0.033)	0.219*** (0.043)	0.199*** (0.053)	–0.115 (0.078)	–0.120 (0.085)	–0.119 (0.093)	0.028 (0.038)	0.130** (0.051)	–0.102** (0.047)
C. Add Enrollment Rate									
All Teens	0.200*** (0.036)	0.210*** (0.043)	0.209*** (0.056)	–0.128 (0.082)	–0.186** (0.089)	–0.099 (0.102)	0.012 (0.037)	0.062 (0.042)	–0.064 (0.056)

Notes: Shown are estimated coefficients on the natural log of the real minimum wage from OLS regressions. The dependent variable is the natural log of real average hourly earnings, the natural log of the employment-to-population rate, or the natural log of average usual weekly hours worked among employed individuals in the indicated group. Each coefficient is from a separate regression. All regressions include state and year fixed effects. Less-educated adults are aged 20–54 and do not have a high school diploma; teens are aged 16–19. Robust, clustered standard errors are in parentheses. The number of observations in each regression is a maximum of 612, representing the 50 states and D.C. during the period 1994–2005. Observations are weighted using the sum of the outgoing rotation (earnings) or final (employment and hours) weights for each cell.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

REFERENCES

Baker, Michael, Dwayne Benjamin, and Shuchita Stanger. 1999. "The Highs and Lows of the Minimum Wage Effect: A Time-Series Cross-Section Study of the Canadian Law." *Journal of Labor Economics,* Vol. 17, No. 2 (April), pp. 318–50.

Bean, Frank D., Jennifer Van Hook, James Bachmeier, and Mark A. Leach. 2007. "Internal Migration in the Young Adult Foreign-Born Population of the United States, 1995–2000." Mimeo, University of California, Irvine.

Bernstein, Jared, and John Schmitt. 1998. "Making Work Pay: The Impact of the 1996–97 Minimum Wage Increase." Economic Policy Institute, Washington, D.C.

Borjas, George J. 1985. "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants." *Journal of Labor Economics,* Vol. 3, No. 4 (October), pp. 463–89.

____. 1995. "Assimilation and Changes in Cohort Quality Revisited: What Happened to Immigrant Earnings in the 1980s?" *Journal of Labor Economics,* Vol. 13, No. 2 (April), pp. 201–45.

____. 2006. "Native Internal Migration and the Labor Market Impact of Immigration." *Journal of Human Resources,* Vol. 41, No. 2 (Spring), pp. 221–58.

Burkhauser, Richard V., Kenneth A. Couch, and David C. Wittenberg. 2000. "A Reassessment of the New Economics of the Minimum Wage Literature with Monthly Data from the Current Population Survey." *Journal of Labor Economics,* Vol. 18, No. 4 (October), pp. 653-80.

Butcher, Kristin F., and John DiNardo. 2002. "The Immigrant and Native-Born Wage Distributions: Evidence from United States Censuses." *Industrial and Labor Relations Review,* Vol. 56, No. 1 (October), pp. 97–121.

Card, David. 1992a. "Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage." *Industrial and Labor Relations Review,* Vol. 46, No. 1 (October), pp. 22-37.

____. 1992b. "Do Minimum Wages Reduce Employment? A Case Study of California, 1987–89." *Industrial and Labor Relations Review,* Vol. 46, No. 1 (October), pp. 38–54.

Card, David, Lawrence F. Katz, and Alan B. Krueger. 1994. "Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws: Comment." *Industrial and Labor Relations Review,* Vol. 47, No. 3 (April), pp. 487–97.

Card, David, and Alan B. Krueger. 1994. "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania." *American Economic Review,* Vol. 84, No. 4 (September), pp. 772–93.

Census Bureau. 2006. "Educational Attainment in the United States, 2005." http://www.census.gov/population/www/socdemo/education/cps2005.html (Table 10).

Chiswick, Barry R., Anh T. Le, and Paul W. Miller. 2008. "How Immigrants Fare across the Earnings Distribution in Australia and the United States." *Industrial and Labor Relations Review,* Vol. 61, No. 3 (April), pp. 353–73.

Connolly, Helen. 2003. "Are Low-Educated Workers Disproportionately Affected by a Change in the Minimum Wage?" Working Paper 03-01, Northeastern University.

Cortes, Kalena E. 2004. "Wage Effects on Immigrants from an Increase in the Minimum Wage Rate: An Analysis by Immigrant Industry Concentration." IZA Discussion Paper No. 1064.

Couch, Kenneth A., and David C. Wittenburg. 2001. "The Response of Hours of Work to Increases in the Minimum Wage." *Southern Economic Journal,* Vol. 68, No. 1 (January), pp. 171–77.

Council of Economic Advisers. 2005. *Economic Report of the President.* Executive Office of the President, Washington, D.C.

Even, William E., and David A. Macpherson. 2000. "Rising above the Minimum Wage." Employment Policies Institute, Washington, D.C.

____. 2004. "Wage Growth among Minimum Wage Workers." Employment Policies Institute, Washington, D.C.

Fry, Richard, and B. Lindsay Lowell. 1997. "The Incidence of Subminimum Pay among Native and Immigrant Workers." *Population Research and Policy Review,* Vol. 16, No. 4 (August), pp. 363–81.

Jean, Sébastien. 2006. "The Labor Market Integration of Immigrants in OECD Countries." Organization for Economic Cooperation and Development Working Party 1 manuscript: www.oecd.org/dataoecd/25/14/36789352.ppt.

Katz, Lawrence F., and Alan B. Krueger. 1992. "The Effect of the Minimum Wage on the Fast-Food Industry." *Industrial and Labor Relations Review,* Vol. 46, No. 1 (October), pp. 6–21.

Keil, Manfred, Donald Robertson, and James Symons. 2001. "Minimum Wages and Employment." Mimeo, Claremont Colleges.

Lang, Kevin, and Shulamit Kahn. 1998. "The Effect of Minimum-Wage Laws on the Distribution of Employment: Theory and Evidence." *Journal of Public Economics,* Vol. 69, No. 1 (July), pp. 67–82.

Mehta, Chirag, Nik Theodore, Iliana Mora, and Jennifer Wade. 2002. "Chicago's Undocumented Immigrants: An Analysis of Wages, Working Conditions, and Economic Contributions." University of Illinois at Chicago Center for Urban Economic Development.

Neuman, Kristin E., and Marta Tienda. 1994. "The Settlement and Secondary Migration Patterns of Legalized Immigrants: Insights from Administrative Records." In Barry Edmonston and Jeffrey S. Passel, eds., *Immigration and Ethnicity: The Integration of America's Newest Arrivals,* pp. 187–226. Washington, D.C.: Urban Institute.

Neumark, David, Mark Schweitzer, and William Wascher. 2004. "Minimum Wage Effects throughout the Wage Distribution." *Journal of Human Resources,* Vol. 39, No. 2 (Spring), pp. 425–50.

Neumark, David, and William Wascher. 1992. "Employment Effects of Minimum and Subminimum Wage Laws: Panel Data on State Minimum Wage Laws." *Industrial and Labor Relations Review,* Vol. 46, No. 1

(October), pp. 55–81.
____. 1994. "Employment Effects of Minimum and Subminimum Wage Laws: A Reply to Card, Katz, and Krueger." *Industrial and Labor Relations Review,* Vol. 47, No. 3 (April), pp. 497–512.
____. 1996. "The Effects of Minimum Wages on Teenage Employment and Enrollment: Evidence from Matched CPS Surveys." In Solomon W. Polachek, ed., *Research in Labor Economics*, Vol. 15, pp. 25–63. Greenwich, Conn.: JAI Press.
____. 2006. "Minimum Wages and Employment: A Review of the Evidence from the New Minimum Wage Research." NBER Working Paper No. 12663 (November).
____. 2007. "Minimum Wages, the Earned Income Tax Credit, and Employment: Evidence from the Post-Welfare Reform Era." NBER Working Paper No. 12915.
Orrenius, Pia, and Genevieve Solomon. 2006. "How Labor Market Policies Shape Immigrants' Opportunities." Federal Reserve Bank of Dallas Economic Letter 1 (July).
Ottaviano, Gianmarco I. P., and Giovanni Peri. 2005. "Rethinking the Gains from Immigration: Theory and Evidence from the U.S." NBER Working Paper No. 11672.
Pabilonia, Sabrina W. 2002. "The Effects of Federal and State Minimum Wages upon Teen Employment and Earnings." Mimeo, Bureau of Labor Statistics.
Schoeni, Robert F. 1998. "Labor Market Assimilation of Immigrant Women." *Industrial and Labor Relations Review,* Vol. 51, No. 3 (April), pp. 483–504.
Sum, Andrew, Neeta Fogg, and Paul Harrington. 2002. "Immigrant Workers and the Great American Job Machine: The Contributions of New Foreign Immigration to National and Regional Labor Force Growth in the 1990s." Center for Labor Market Studies, Northeastern University.
Trejo, Stephen J. 1998. "Immigrant Participation in Low-Wage Labor Markets." Mimeo, Department of Economics, University of California, Santa Barbara.
Zavodny, Madeline. 2000. "The Effect of the Minimum Wage on Employment and Hours." *Labour Economics,* Vol. 7, No. 6 (November), pp. 729–50.