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# UNEQUAL HARM

Racial Disparities in the Employment  
Consequences of Minimum Wage Increases



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## Executive Summary

When the Great Recession's negative effect on the U.S. labor market was strongest, the national unemployment rate stood at 10.1 percent—a depth last seen in June 1983.

But the greatest amount of pain was felt by younger and more vulnerable workers—though not in equal amounts. For instance, the unemployment rate for 16-to-19 year-olds reached 27.1 percent at the recession's trough. For white teens, the figure was 25 percent; for black teens, it was close to 50 percent.

These staggering racial disparities in employment among young adults are nothing new. They've existed as far back as the early 1950s, when the federal government first started tracking these figures. A wide body of academic literature explores the reasons for this gap, but few studies have explicitly studied the effect of labor market wage mandates on minority groups, in part because of the lack of sufficiently comprehensive data.

In this new study, labor economists William Even (Miami University) and David Macpherson (Trinity University) overcome this problem by amassing a dataset from the years 1994 to 2010 that includes over 600,000 data observations—including a robust sample of minority young adults unprecedented in previous studies on the minimum wage.

By taking advantage of the “natural experiment” created by the substantial interstate variation in the minimum wage between 1994 and 2010, and carefully controlling for labor market and demographic differences, the authors provide conclusive answers to the crucial policy question of whether wage mandates have a disparate impact on minority groups.

Drs. Even and Macpherson focus on 16-to-24 year-old males without a high school diploma, a group that previous studies suggest are particularly susceptible to wage mandates. Among white males in this group, the authors find that each 10 percent increase in a federal or state minimum wage decreased employment by 2.5 percent; for Hispanic males, the figure is 1.2 percent. But among black males in this group, each 10 percent increase in the minimum wage decreased employment by 6.5 percent.

The effect is similar for hours worked: each 10 percent increase reduced hours worked by 3 percent among white males, 1.7 percent for Hispanic males, and by 6.6 percent for black males.

The authors put this disparity into context by estimating the job loss that occurred among these groups as a result of the Great Recession, and comparing it to the job loss that occurred during the same time due to increases in the minimum wage. Across all 50 states and the District of Columbia, approximately 34,300 black young adults lost their job due to the recession; during the same time period, 26,400 lost their job due to minimum wage increases that occurred.

But the picture grows even more troubling when the authors focus just on the 21 states fully affected by the federal minimum wage increases in 2007, 2008, and 2009. Approximately 13,200 black young adults in these states lost their job as a direct result of the recession; 18,500 lost their job as a result of the federal wage mandate—nearly 40 percent more than the recession. **In other words, the consequences of the minimum wage for this subgroup were more harmful than the consequences of the recession.**

The substantial disemployment effects that emerge from the data raise an important question: Why do black males suffer more harm from wage mandates than their white or Hispanic counterparts?

The authors find that they're more likely to be employed in eating and drinking places—nearly one out of three black young adults without a high school diploma works in the industry. Businesses in this industry generally have narrow profit margins and are more likely to be adversely impacted by a wage mandate. There's also substantial variation in regional location, as black young adults are overwhelmingly located in the South and in urban areas.

It's also likely that unobserved differences in skill level and job experience play a role. To the extent that these differences are concentrated among young men of a particular race or ethnicity, this group would have the greatest risk of losing jobs when the minimum wage is increased.

Minimum wage increases remain politically popular, which means they'll continue to be debated at the state and federal level for years to come. But the debate on the employment consequences of the minimum wage has been settled conclusively, and this research proves that those consequences are felt most by young black males.

—*Employment Policies Institute*

# UNEQUAL HARM

## Racial Disparities in the Employment Consequences of Minimum Wage Increases

### Introduction

Proponents of increasing the minimum wage generally argue that it will improve the standard of living for low income families. Numerous studies have shown, however, that minimum wage increases reduce employment. Consequently, a minimum wage hike can increase earnings for some workers and cause job loss and reduced earnings for others.

To better understand the effect of minimum wage increases, this study investigates whether the effect of minimum wages on the employment and hours of young, low skilled men differs by race. The effects of a minimum wage hike could differ by race for a few reasons. First, among young men without a high school diploma, there could be differences in skill levels, and those with the least skills would have the greatest risk of losing jobs when the minimum wage is increased. Second, we show that among young and low-skilled men, there are substantial racial differences in the types of jobs held and this may lead to substantial differences in the employment effects of a minimum wage hike. Finally, there are significant racial differences in geographic distribution. Since minimum wages bind by varying degrees across the states, this could lead to racial differences in the effects of a minimum wage hike.

The remainder of the study provides a brief background for some of the most relevant research, a discussion of the data, and closes with an empirical analysis of the impact of minimum wage increases on the employment and hours of low skilled young workers. A preview of the findings is as follows: First, minimum wage increases reduce both employment rates and hours worked most among young black men and least among young Hispanic men. Second, the federal minimum wage

hikes that occurred between 2007 and 2009 reduced employment among these young, low-skilled men by nearly as much as the Great Recession. Moreover, among black men, the employment effect of the Federal minimum wage increases exceeds the effect of the Great Recession.

### Background

The effects of minimum wages on the employment of low-skilled workers have been examined in dozens of studies over the past 20 years. Standard economic theory suggests that an increase in the minimum wage should reduce the employment of low-skill workers. However, the size of the disemployment effects has been a point of controversy. Some studies (e.g. Card and Krueger 1995; Addison et al. 2009; Dube et al. 2010) find little or no disemployment effects of minimum wage increases. However, a recent review of nearly 100 studies by Neumark and Wascher (2008) reveals that a sizeable majority of existing studies find disemployment effects. Some of the differences across studies can be attributed to differences in the group of workers examined, the timing and size of the minimum wage hikes, or the econometric methodology employed.

This report adds to the existing literature on the consequences of minimum wage hikes by separately estimating the employment effects of minimum wage increases by race and Hispanic ethnicity. There are several reasons that we expect differences. First, a few earlier studies find larger effects for young black or Hispanic workers (e.g. Deere et al 1995; Burkhauser et al 2000; and Neumark and Wascher 2007). Second, our own examination of the data suggests that, among young men, there are sub-

stantial racial differences in the types of jobs held. Economic theory suggests that the employment effect of a wage increase will differ across job types depending on, for example, how easily capital can be substituted for labor, the elasticity of demand for the products produced, and the labor-intensity of the production process.

This study does not examine the employment effects of minimum wage hikes for young, low skilled women because of the complicated interactions between changes in the minimum wage, the Earned Income Tax Credit (EITC), and welfare reform that have occurred over the past 20 years. The EITC is aimed at low-income working families with children and single mothers make up a disproportionate share of EITC recipients.<sup>1</sup> For women, Neumark and Wascher (2007) find an interaction between the effects of the EITC and the minimum wage on employment that differs across race, education, and age groups. For some women, the EITC reduces negative employment effects from a minimum wage hike, whereas for other women, the effect is amplified. This study avoids the issues created by these complex interactions between the EITC and minimum wage by focusing on men only.

## The Data

The data for our analysis are drawn from the Current Populations Surveys (CPS) administered between January 1994 and December 2010. The study focuses on men aged 16 to 24 without a high school diploma. To improve sample sizes, we keep all 8 rotation groups from the CPS data. This yields a sample of 601,146 observations meeting the sample restrictions.

The two measures of employment we examine are employment status and hours worked. Employment status is based on whether an individual was employed for pay during the CPS reference week (the week containing the 12th day of the month). Hours worked is measured as the sum of usual hours worked on primary and secondary jobs. For workers who report that their usual hours worked are variable, the actual hours worked in the reference week worked is used.

Figure 1 on page 13 plots employment rates of 16-to-24 year-olds for three groups: whites, blacks and white Hispanics.<sup>2</sup>

Figure 2 plots weekly hours for these groups. The plots make two points clear. First, the employment rates for young men have been highest for Hispanics and lowest for blacks throughout the entire sample period (1994-2010). Second, for all three groups, the employment rates were relatively stable during the 1990s, but have fallen sharply since 2000.

One possible explanation for the decline in the employment rates of these young workers is the rising value of the minimum wage. Moreover, since many states have minimum wages above the federal level, racial differences in the distribution of the population across states could mean there are racial differences in the effective minimum wage. To examine the history of the applicable minimum wage by race for each person in our sample of 16-to-24 year-olds, we set the minimum wage equal to the greater of the state or federal minimum wage levels in the relevant time period. We then compute the weighted average of the minimum wage across the 51 states (50 states + Washington, D.C.) by race and Hispanic status using CPS sample weights for our sample of young men without a high school diploma.

Figure 3 presents a plot of this minimum wage by race and Hispanic status. From 1994 to 1998, racial differences in the average minimum wage were minimal. Beginning in 1998, racial differences in the average minimum wage began to appear. From 1998 through 2010, Hispanics faced the highest effective minimum wage, followed by whites, and then blacks. By 2010, the average minimum wages faced by our 16-to-24 year-old sample were \$7.55, \$7.45, and \$7.38 for Hispanics, whites, and blacks. Despite fairly dramatic differences in the geographic distribution of these different groups of workers (discussed below), these workers faced similar increases in the minimum wage over time. Nevertheless, the geographic differences could cause the minimum wages to bind to different degrees across race and ethnicity. For example, if blacks are more likely to be in states where the cost of living is lower, the minimum wage would be more binding for blacks since wages in general tend to be lower when the cost of living is lower.

In table 1, we provide additional evidence on racial and ethnic differences for our sample of young men. We also calculate the fraction of workers reporting an hourly wage that was within

<sup>1</sup>Holt (2006) reports that very low income individuals and married couples without children are also EITC-eligible, but the tax credit provided is much smaller than that provided for families with children. Only 2 percent of EITC payments in 2002 went to individuals or married couples without children. Also, the EITC-eligible population contains 3.5 times as many single mothers as single fathers.

<sup>2</sup>Throughout our paper, black Hispanics are included with blacks. This means that our group of Hispanics includes only white Hispanics.

**TABLE 1: Sample Means<sup>a</sup>**

	<b>Whites</b>	<b>Blacks</b>	<b>Hispanics</b>
<b>Percentage at Minimum Wage (+/- \$0.25)</b>	22.2%	27.4%	19.1%
<b>Below Minimum Wage (More than \$0.25 below)</b>	7.4%	8.2%	6.6%
<b>Age</b>	17.504	17.841	19.001
<b>Northeast</b>	18.4%	17.7%	12.4%
<b>Midwest</b>	28.0%	18.0%	8.7%
<b>South</b>	33.0%	56.7%	35.4%
<b>West</b>	20.6%	7.6%	43.5%
<b>State unemployment rate for adults (25 and above) with at least a high school diploma.</b>	5.1%	5.2%	5.5%
<b>Large metropolitan status</b>	70.7%	81.9%	88.1%
<b>State share of population aged 16 to 24 with less than a high school diploma</b>	4.4%	4.5%	4.6%
<b>Share of males aged 16 to 24 who have less than a high school diploma.</b>	33.4%	41.8%	48.2%
<b>State log real adult wage (December 2009)</b>	2.910	2.900	2.951
<b>Sample Size</b>	415,125	76,471	109,550

Notes:

<sup>a</sup>Data source is January 1994 to December 2010 Current Population Survey. The sample is restricted to males aged 16 to 24 with less than a high school diploma. Sample weights are used in all calculations.

\$0.25 of the binding minimum wage. In our sample of young men, black workers were the most likely to be paid close to the minimum wage (27.4 percent) and Hispanics were the least likely (19.1 percent). Consequently, other things being the same, black workers would be the most likely to be affected by a minimum wage hike.

Among our sample of 16-to-24 year-olds without a high school diploma, the average age for Hispanic men (19.0) is greater than that for whites (17.5) or blacks (17.8). The higher average age could reflect the fact that Hispanics are less likely than whites or blacks to complete a high school diploma and therefore a larger fraction of those over 18 or 19 do not have a high school diploma. To the extent that older workers are more skilled, the minimum wage would be less binding and have a smaller effect in our sample of Hispanic men.

There are significant racial and ethnic differences in geographic location. Nearly 60 percent of young black men live in the south, whereas only about one-third of whites and Hispanics are similarly located. Hispanics are disproportionately located

in the west (43 percent), and whites are disproportionately located in the Midwest. Despite these pronounced differences in geographic location, the differences in labor market conditions between the races are quite small. The weighted average of adult wages, the unemployment rate of workers with at least a high school diploma and age 25 or older, and the share of the state's population that is in the 16-to-24 year-old age group without a high school diploma is quite similar across race and ethnicity.

In theory, the effect of an increase in wages on the quantity of labor demanded will be greater when it is easier to replace labor with capital; when labor is a larger fraction of a firm's total costs (i.e. labor intensive production); and when product demand is more elastic.<sup>3</sup> Consequently, if there are racial and ethnic differences in the types of jobs held, one might expect differential effects of a minimum wage hike. In table 2, the ten most common industries and occupations for our sample of 16-to-24 year-old workers is presented by race and ethnicity. The fraction of the sample employed in each industry and occupation is also provided.

<sup>3</sup>These are the Hicks-Marshall laws of derived demand and described in most textbooks in labor economics. See, for example, McConnell, Brue, and Macpherson (2010).

**TABLE 2: Largest Industries and Occupations, by Race/Ethnic Status<sup>a</sup>**

<b>Industries</b>					
<b>Whites</b>	<b>Percent</b>	<b>Blacks</b>	<b>Percent</b>	<b>Hispanics</b>	<b>Percent</b>
<b>Eating and drinking places</b>	24.5%	<b>Eating and drinking places</b>	31.2%	<b>Construction</b>	22.2%
<b>Grocery stores</b>	9.9%	<b>Grocery stores</b>	9.8%	<b>Eating and drinking places</b>	19.4%
<b>Construction</b>	9.8%	<b>Construction</b>	5.8%	<b>Landscape/horticultural services</b>	6.0%
<b>Misc. entertain./recreation services</b>	4.5%	<b>Department stores</b>	3.1%	<b>Agricultural production, crops</b>	4.8%
<b>Department stores</b>	2.7%	<b>Misc. entertain./recreation services</b>	2.9%	<b>Grocery stores</b>	3.6%
<b>Landscape/horticultural services</b>	2.6%	<b>Trucking service</b>	1.7%	<b>Meat products</b>	1.8%
<b>Agricultural production, livestock</b>	2.5%	<b>Personnel supply services</b>	1.6%	<b>Misc. entertain./recreation services</b>	1.6%
<b>Automotive repair/related services</b>	1.7%	<b>Landscape/horticultural services</b>	1.5%	<b>Automotive repair/related services</b>	1.6%
<b>Agricultural production, crops</b>	1.5%	<b>Hotels and motels</b>	1.4%	<b>Agricultural production, livestock</b>	1.4%
<b>Elementary and secondary schools</b>	1.2%	<b>Apparel &amp; accessory stores, ex. shoe</b>	1.4%	<b>Services to dwellings/buildings</b>	1.3%
<b>Occupations</b>					
<b>Cooks</b>	9.5%	<b>Cooks</b>	14.4%	<b>Cooks</b>	8.8%
<b>Cashiers</b>	7.6%	<b>Cashiers</b>	9.6%	<b>Construction laborers</b>	6.8%
<b>Stock handlers and baggers</b>	7.4%	<b>Stock handlers and baggers</b>	8.1%	<b>Groundskeepers/gardeners, ex. farm</b>	6.4%
<b>Misc. food preparation occs</b>	4.3%	<b>Janitors and cleaners</b>	5.3%	<b>Farm workers</b>	5.5%
<b>Groundskeepers/gardeners, ex. farm</b>	3.7%	<b>Misc. food preparation occs</b>	4.4%	<b>Carpenters</b>	4.2%
<b>Janitors and cleaners<sup>s</sup></b>	3.4%	<b>Laborers, except construction</b>	3.1%	<b>Misc. food preparation occs</b>	4.0%
<b>Waiters'/waitresses' assistants</b>	3.2%	<b>Freight, stock, &amp; material handlers, n.e.c.</b>	3.0%	<b>Cashiers</b>	3.6%
<b>Laborers, except construction</b>	3.1%	<b>Waiters'/waitresses' assistants</b>	2.9%	<b>Janitors and cleaners</b>	3.5%
<b>Farm workers</b>	3.0%	<b>Food counter, fountain and related occs</b>	2.6%	<b>Stock handlers and baggers</b>	3.0%
<b>Construction laborers</b>	2.8%	<b>Groundskeepers/gardeners, ex. farm</b>	2.4%	<b>Laborers, except construction</b>	2.9%

Notes:

<sup>a</sup>Data source is January 1994 to December 2010 Current Population Survey. The sample is restricted to males with less than a high school diploma aged 16 to 24. Sample weights are used in all calculations.



For 16-to-24 year-old men without a high school diploma, the most common industry of employment is eating and drinking places for whites and blacks, but construction for Hispanics. Grocery stores place second in the rankings for white and black men, whereas they rank fifth for Hispanic men. For occupation, cooks are first in the rankings for all 3 groups, but farm work is much more common among Hispanics than whites or blacks. On the other hand, a job as a cashier is much less common among Hispanics. Clearly, there are significant racial and ethnic differences in job types that could lead to differences in the employment effects of a minimum wage hike. For example, the ability to replace labor with capital and the labor-intensity of the production process could differ substantially across jobs like cooks, cashiers, construction laborers, and farm workers.

## Empirical Model

To examine the effect of minimum wages on the employment and hours of our 16-to-24 year-old sample, we estimate models similar to those in Burkhauser et al. (2000), but pursue a two-step estimation process recommended by Bertrand et al. (2004) to properly control for interstate and intertemporal differences in personal characteristics. In the first stage of the estimation process, the variable of interest  $y_{ist}$  (e.g. employment or hours worked for person  $i$  in state  $s$  during period  $t$ ) is regressed on personal characteristics (age, education, sex, and marital status). The mean of the residuals is calculated by state and month to generate an aggregated measure of employment ( $\bar{Y}_{st}$ ).<sup>4</sup> This aggregated measure of employment removes any interstate or intertemporal variation in employment due to differences in the personal characteristics of workers. In the second stage, the aggregated data are used to estimate the following regression:

$$(1) \bar{Y}_{st} = \alpha_s + \gamma_t + (t * \lambda_s) + \log(\min_{st})\beta + X_{st}\delta + \varepsilon_{st}$$

Where  $\alpha_s$  represents a state-specific fixed effect,  $\gamma_t$  is a time specific fixed effect for each month in the data,  $\lambda_s$  allows for a separate linear time trend for each state,  $\min_{st}$  is the appli-

cable minimum wage (i.e. the greater of the state or federal minimum) and  $X$  represents other state-specific control variables that might affect employment of the relevant population. Following earlier work, these state-specific controls include the unemployment rate, the average adult wage, and the share of the population in the relevant subgroup.<sup>5</sup> To allow for serial correlation in the aggregated data, the standard errors in the model are corrected for clustering of errors by state. This allows for an arbitrary variance-covariance matrix of the residuals within states and is more flexible than specifying a specific type of serial correlation. Bertrand et al (2004) shows that a failure to correct for within-state correlation of errors causes standard errors to be understated; our own calculations confirm this. The elasticity of employment with respect to changes in the minimum wage is calculated as  $\beta/\bar{Y}$  where  $\bar{Y}$  is the overall mean of employment (or hours) for the relevant group. The above specification is estimated by race and ethnic group.<sup>6</sup>

Because the above specification includes date-specific fixed effects (i.e., a dummy variable for each month in the sample), the employment effects of minimum wage hikes in this model are identified by relating interstate differences in employment growth to interstate differences in the growth of minimum wages. If the only variation in the minimum wage was the result of changes at the federal level that affected all the states, our empirical model would not be able to disentangle the effect of minimum wage hikes from date-specific fixed effects. For ease of exposition, this estimate of the employment effect of minimum wage increases will be referred to as the “difference-in-difference,” or DD estimate.<sup>8</sup>

The above specification allows for state-specific linear time trends in employment. This is important because state passage of minimum wage increases could be correlated with state-specific employment trends. For example, if the states that raise minimum wages are also states that had above (below) average trend growth in employment, a failure to control for state-spe-

<sup>4</sup>The estimated effects of minimum wages would be unchanged if we rescaled the residuals so that they had an average value that matched the average level of employment across the states.

<sup>5</sup>See Burkhauser et al. (2000) and Couch and Wittenburg (2001).

<sup>6</sup>As an alternative to calculating standard errors adjusted for clustering by state, we considered bootstrapping methods suggested by Bertrand et al (2004) and found very similar results.

<sup>7</sup>In regression terminology, if there was no interstate variation in minimum wages, there would be perfect collinearity between the minimum wage variable and the data-specific fixed effects.

<sup>8</sup>Conventionally, “difference-in-difference” estimators refer to situations where there is a discrete change in some rule (treatment) in a treatment group, but no change in the control group. The DD estimator compares the change in the variable of interest (e.g. employment) before and after the treatment in the treatment and control states. Since our study uses minimum wage information for many years across many states, it does not fit the conventional definition of a diff-in-diff study, but it is similar to the approach in how the effect of the minimum wage hike is identified.

cific trends would cause the model to understate (overstate) the disemployment effects of minimum wage increases.

The second approach we use for estimating the effect of minimum wage hikes is to identify a within-state control group that should be unaffected by changes in the state’s minimum wage.<sup>9</sup> These control groups include older and more educated workers than our treatment group of 16-to-24 year-olds who have not received a high school diploma. This “difference-in-difference-in-difference” (DDD) identifies the effect of minimum wage

increases on employment by relating interstate differences in employment growth of the treatment and control groups to interstate differences in minimum wage growth.

As with the DD methodology, a two-step procedure is used. In the first step, separate regressions are estimated for the treatment and control group to remove any interstate or intertemporal variation in employment caused by differences in personal characteristics (age, education, marital status). In the second step, the residuals from the first stage regression are used as the

**TABLE 3: Difference in Difference Results For Employment<sup>a</sup>**

	Whites		Blacks		Hispanics	
<b>Log (Minimum Wage)</b>	-0.0809 (-2.58)	-0.0624 (-1.58)	-0.128 (-1.74)	-0.119 (-1.50)	-0.0683 (-1.52)	-0.0800 (-1.50)
<b>Lag One year of Log (Minimum Wage)</b>		-0.0324 (-0.75)		-0.0171 (-0.31)		0.0184 (0.45)
<b>Unemployment Rate</b>	-0.668 (-3.69)	-0.662 (-3.65)	-0.657 (-2.11)	-0.653 (-2.09)	-0.834 (-3.27)	-0.837 (-3.26)
<b>Age 16 to 24 Less Than High School Share</b>	-0.603 (-1.91)	-0.601 (-1.90)	-0.0186 (-0.029)	-0.0143 (-0.022)	1.212 (2.10)	1.209 (2.09)
<b>Log Real Adult Wage</b>	0.00950 (0.64)	0.00957 (0.65)	-0.0130 (-0.49)	-0.0130 (-0.49)	-0.0386 (-2.10)	-0.0388 (-2.12)
<b>Constant</b>	0.526 (2.59)	0.611 (2.60)	0.776 (1.56)	0.827 (1.54)	0.495 (1.49)	0.450 (1.30)
<b>Include State-Specific Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Include State Specific Time Trend</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Include Year-Month Fixed Effects<sup>b</sup></b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	10,378	10,378	8,223	8,223	8,782	8,782
<b>R-squared</b>	0.68	0.68	0.23	0.23	0.27	0.27
<b>Employment Means</b>	0.382	0.382	0.208	0.208	0.506	0.506
<b>Minimum Wage Elasticity</b>	-0.212	-0.249	-0.617	-0.654	-0.135	-0.122
<b>F-test</b>	0.0128	0.0344	0.0876	0.224	0.134	0.303

Notes:

<sup>a</sup>Data source is January 1994 to December 2010 Current Population Survey. The sample is restricted to males aged 16 to 24 with less than a high school diploma. Sample weights are used in all regressions. T-statistics are in parentheses. Standard errors are calculated allowing for clustering by state. The first stage of the estimation process is the estimation of a regression of employment using individual-level data. The model includes controls for each possible age (9), education level (7), marital status (7), and metropolitan status. The mean of the residuals from the first stage regression is calculated by state and month and used as the dependent variable in the second stage regression shown in the table.

<sup>b</sup>The models include controls for 204 year-month combinations.

<sup>9</sup>Sabia and Burhauser (2008) follow a similar approach in their analysis of the minimum wage increases in New York between 2004 and 2006.

measure of employment or hours and the following regression is estimated:

$$(2) \bar{Y}_{ist} = \alpha_{is} + \gamma_{it} + (t * \lambda_{is}) + X_{ist} \delta + \log(\min_{st}) \beta_0 + T_i \log(\min_{st}) \beta_1 + \varepsilon_{ist}$$

where the *i* subscript indicates whether the observation is from the control (*i*=0) or treatment (*i*=1) group and *T<sub>i</sub>* is a dummy variable that equals one when the observation is from the treatment group (our sample of young low skilled workers). The specification allows for separate state-and time-fixed effects, as well as separate state-specific time trends for the control and treatment groups.

The DDD estimate of the employment effect of minimum wages is captured by the parameter  $\beta_1$  which is the differential effect of minimum wages on the control and treatment group. If the control group excludes workers affected by minimum wages, the expectation is that  $\beta_0$  would equal zero. However, it is possible that the timing of state specific minimum wage changes happens to coincide with other state-specific factors that affect the employment of both the control and treatment group in that state. By focusing on the differential effect of minimum wage changes on the employment of the control and treatment group, this DDD specification differences out any state-specific factors that happen to coincide with the mini-

**TABLE 4: Difference in Difference Results For Hours<sup>a</sup>**

	Whites		Blacks		Hispanics	
<b>Log (Minimum Wage)</b>	-2.613	-2.305	-3.512	-3.312	-3.494	-4.231
	(-3.32)	(-2.46)	(-1.46)	(-1.41)	(-2.06)	(-1.77)
<b>Lag One year of Log (Minimum Wage)</b>		-0.538		-0.361		1.153
		(-0.53)		(-0.18)		(0.55)
<b>Unemployment Rate</b>	-20.77	-20.69	-18.27	-18.20	-33.23	-33.44
	(-3.37)	(-3.37)	(-2.14)	(-2.13)	(-3.25)	(-3.25)
<b>Age 16 to 24 Less Than High School Share</b>	-11.63	-11.59	-7.972	-7.881	41.64	41.44
	(-1.14)	(-1.14)	(-0.34)	(-0.34)	(1.76)	(1.75)
<b>Log Real Adult Wage</b>	0.384	0.385	-0.751	-0.751	-0.516	-0.530
	(0.89)	(0.89)	(-0.97)	(-0.97)	(-0.67)	(-0.68)
<b>Constant</b>	15.19	16.60	22.12	23.19	4.904	2.072
	(2.85)	(2.69)	(1.36)	(1.23)	(0.40)	(0.16)
<b>Include State Specific Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Include State Specific Time Trend</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Include Year-Month Fixed Effects<sup>b</sup></b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	10378	10378	8221	8221	8776	8776
<b>R-squared</b>	0.66	0.66	0.22	0.22	0.27	0.27
<b>Hours Mean</b>	9.610	9.610	5.559	5.559	18.15	18.15
<b>Minimum Wage Elasticity</b>	-0.272	-0.296	-0.632	-0.661	-0.193	-0.170
<b>F-test</b>	0.00167	0.00610	0.152	0.345	0.0451	0.131

Notes:

<sup>a</sup>Data source is January 1994 to December 2010 Current Population Survey. The sample is restricted to age 16 to 24 males with less than a high school diploma. Sample weights are used in all regressions. T-statistics are in parentheses. Standard errors are clustered by state. The first stage of the estimation process is the estimation of a regression of hours using individual-level data. The model includes controls for each possible age (9), education level (7), marital status (7), and metropolitan status. The mean of the residuals from the first stage regression is calculated by state and month and used as the dependent variable in the second stage regression shown in the table.

<sup>b</sup>The models include controls for 204 year-month combinations.

minimum wage hikes and simultaneously affect the employment of both the treatment and control groups.

## Employment and Hours Elasticities

The DD estimates of the determinants of employment rates are presented in table 3. The regressions are estimated separately for each of the three racial/ethnic groups (white, black, Hispanic).<sup>10</sup> For each sub-group, we present estimates with and without a 12-month lag of the minimum wage to allow for the possibility that minimum wages act with a lagged effect.<sup>11</sup> Since all the lagged values of the minimum wage are statistically insignificant at the 0.10 level, the discussion here will focus on the results that exclude the lags.<sup>12</sup> Also, since the state-specific time trends are significantly different from zero at the 0.05 level in all the models and samples we consider, we focus on the models that include these trends.

The estimated elasticities of employment with respect to changes in the minimum wage are -0.62 for black men, -0.21 for white men, and -0.13 for Hispanic men. As indicated by the p-values at the bottom of the table, the elasticities for men are significantly different from 0 for whites and blacks, but not for Hispanics. The estimates imply that a 10 percent increase in the minimum wage would reduce employment of 16-to-24 year-old men without a high school diploma by 6.2 percent for blacks, 2.1 percent for whites, and 1.3 percent for Hispanics.

In table 4, we present estimates of the DD for average weekly hours. The measure of average hours worked includes people who are not currently employed, so observations with zero hours worked are included when computing average hours. For men, the elasticities for hours worked are similar but slightly larger in absolute terms than that for employment. This is consistent with several other studies that find hours elasticities are greater than employment elasticities.<sup>13</sup>

Since the elasticity of hours worked approximately equals the elasticity of employment plus the elasticity of hours conditional on working, average hours for those who continue to work after a minimum wage hike drops slightly. If a minimum wage

hike is more likely to cause lay-offs of part-time than full-time workers, average hours conditional on employment would rise unless hours for full-time workers are cut as the part-time workers are laid off.

As noted earlier, the DD estimation identifies the effect of minimum wage hikes by relating interstate differences in employment growth to interstate differences in minimum wage growth. A critical assumption in the DD model is that unobserved factors that affect a state's employment growth for the treatment group (16-to-24 year-olds without a high school diploma) are not correlated with passage of minimum wage increases. The DDD approach provides a robustness test of this assumption by computing the differential effect of minimum wage increases on a control and treatment group.

The advantage of the DDD method relative to the DD method is its ability to difference out the effect of state-specific factors that might be correlated with minimum wage hikes and simultaneously affecting state-wide employment for both the control and treatment group. To estimate the DDD model, we use three different control groups that we expect should be unaffected by minimum wage hikes. All three control groups contain workers aged 30 to 54 but have different restrictions in terms of the level of education. The three education groupings are (1) all education levels; (2) those with a high school diploma or some college; or (3) those with a high school diploma only. The control group for a specific race or ethnic group includes only those of the same race or ethnicity. For example, when estimating the DDD specification for white males, the control group is made up of 30-to-54 year-old white males.

Table 5 provides DDD estimates of elasticities and the associated p-values for both employment and hours. The results from the DD estimation are repeated to facilitate comparison. The pattern and magnitude of the estimated elasticities is quite similar with the DDD and DD results. Both the DD and DDD methods suggest that employment and hours elasticities are highest for black men no matter and this is independent of which control group is used in the DDD model.

<sup>10</sup>Our Hispanic group includes only white Hispanics. Black Hispanics are included in the black sample.

<sup>11</sup>Baker et al. (1999) and Burkhauser et al. (2000) also allow for lagged effects.

<sup>12</sup>Henceforth, statistical significance will be based upon a .10 significance level unless specifically stated otherwise.

<sup>13</sup>Studies that find hours elasticities are greater than employment elasticities for teens include Couch and Wittenberg (2001) and Sabia (2006). Neumark et al (2004) find a similar result for a sample of low wage workers that includes adults.

**TABLE 5: Difference in Difference in Difference Log Minimum Wage Results<sup>a</sup>**

Control Group	Employment			Hours		
	Whites	Blacks	Hispanics	Whites	Blacks	Hispanics
Age 30 to 54, All	-0.188	-0.690	-0.146	-0.234	-0.548	-0.196
	(0.031)	(0.070)	(0.152)	(0.018)	(0.261)	(0.080)
Age 30 to 54, High School or Some College	-0.209	-0.893	-0.150	-0.265	-0.804	-0.198
	(0.019)	(0.025)	(0.137)	(0.014)	(0.124)	(0.084)
Age 30 to 54, High School	-0.269	-0.797	-0.235	-0.385	-0.619	-0.309
	(0.005)	(0.054)	(0.027)	(0.004)	(0.269)	(0.014)
Difference in Difference Results	-0.212	-0.617	-0.135	-0.272	-0.632	-0.193
	(0.013)	(0.088)	(0.134)	(0.002)	(0.152)	(0.045)

Notes:

<sup>a</sup>Data source is January 1994 to December 2010 Current Population Survey. The sample is restricted to age 16-to-24 males with less than a high school diploma. Sample weights are used in all regressions. P-values for significance of the log minimum wage coefficient are in parentheses. Standard errors are clustered by state. The models include controls for the unemployment rate, real adult wage, age 16-to-24 less-than-high-school-graduate share of the population, state, year-month fixed effects, and state-specific time trends. The model also includes all of these controls interacted with treatment group status. The first stage of the estimation process is the estimation of a regression of hours using individual-level data. The model includes controls for each possible age (9), education level (7), marital status (7), and metropolitan status. The mean of the residuals from the first stage regression is calculated by state and month and used as the dependent variable in the second stage regression shown in the table.

One measure of the validity of the underlying assumptions required for the DD is whether the minimum wage has any significant effect on the employment or hours of the control group. If it does, this would suggest that the timing of state minimum wage hikes may be correlated with factors that are driving state-wide employment for both the control and treatment group. In the 18 different specifications considered (employment and hours for three racial/ethnic groups and three control groups), the minimum wage has no significant effect on the control group except in one case—the employment regression for blacks when the control group includes black men aged 30 to 54 with a high school diploma or some college. In that one case, the minimum wage has a statistically significant positive effect on employment. The estimated coefficient in that case is 0.084. Not surprisingly, this is also the case where the employment elasticity is largest for black men.

In summary, both the DD and DDD estimates suggest that the employment and hours effects of a minimum wage increase for 16-to-24 year-old men without a high school diploma are large

for blacks and smallest for Hispanics. Across specifications, the effects for black men are in a range of two to four times as large as those for white or Hispanic men. Consequently, the male employment losses associated with a minimum wage increase will be borne disproportionately by black men.

## The Effects of 2007-2010 Minimum Wage Increases

In January 2007, the federal minimum wage was \$5.15 and 22 states had a minimum wage that matched the federal level.<sup>14</sup> As of January 2007, the other 29 had passed laws resulting in a minimum ranging from \$6.15 to \$7.93. Between July 2007 and July 2009, the federal minimum wage was increased in three increments of \$0.70 each pushing the federal minimum from \$5.15 to \$7.25. Several states also passed minimum wage hikes over this period. By December of 2010, 36 states had a minimum wage matching the federal level of \$7.25. The remaining 15 states had minimum wages ranging from \$7.30 to \$8.55.<sup>15</sup>

<sup>14</sup>The 22 states were Alabama, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Nebraska, New Hampshire, New Mexico, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, and Wyoming.

**TABLE 6: A Comparison of Employment Loss from Minimum Wage Hikes versus the Great Recession<sup>a</sup>**

	Employment in 2010	Employment loss from minimum wage hike (a)	(a) as a % of Employment in 2010	Employment Loss from Great Recession (b)	(b) as a % of Employment in 2010	(a)/(b)
<b>50 States + D.C.</b>						
<b>White</b>	955,746	57,783	6.0%	127,944	13.4%	45.2%
<b>Black</b>	130,936	26,445	20.2%	34,333	26.2%	77.0%
<b>Hispanic</b>	467,940	16,396	3.5%	62,932	13.4%	26.1%
<b>Total</b>	<b>1,554,622</b>	<b>100,624</b>	<b>6.5%</b>	<b>225,209</b>	<b>14.5%</b>	<b>44.7%</b>
<b>21 States where Federal Minimum Was Binding in 2007 and 2010</b>						
<b>White</b>	327,245	37,104	11.3%	39,757	12.1%	93.3%
<b>Black</b>	57,069	18,463	32.4%	13,228	23.2%	139.6%
<b>Hispanic</b>	182,998	10,777	5.9%	15,704	8.6%	68.6%
<b>Total</b>	<b>567,312</b>	<b>66,344</b>	<b>11.7%</b>	<b>68,689</b>	<b>12.1%</b>	<b>96.6%</b>

Notes:

<sup>a</sup>Data source is January 1994 to December 2010 Current Population Survey. The sample is restricted to males aged 16 to 24 with less than a high school diploma. The employment loss due to the minimum wage is measured as the change in employment if the minimum wage had remained constant at its January 2007. The employment loss due to the Great Recession is measured as the change in employment if the unemployment rate had remained constant at its average 2007 level.

We use the 2007-2010 changes in the minimum wages at the state and federal level to illustrate the racial and ethnic disparities in the consequences of minimum wage hikes. As our counterfactual, we consider what employment would be if each state's minimum wage had remained at the January 2007 value. The effect of the federal minimum wage hikes is computed by using our DD model of employment to predict the change in employment that would occur if the minimum wage was rolled back to the counterfactual minimum wage. To put these numbers into perspective, we compare the magnitude of these job losses to the effect of the 2007-2009 "Great Recession".

To estimate the effect of the Great Recession, we calculate the change in employment for each race if the 2010 state adult unemployment rate matched the average unemployment rate for the state in 2007.<sup>16</sup> Due to racial and ethnic differences in the

geographic location, the recession had slightly different effect on the state unemployment rates. Between 2007 and 2010, the percentage point increase in the average state adult unemployment rate was 4.8 for whites, 5.0 for blacks, and 5.3 for Hispanics in our sample.

The simulation results are presented in table 6. Across the 51 states, the average minimum wage faced by our group of 16-to-24 year-olds rose from \$6.30 to \$7.46 between 2007 and 2010. Had the minimum wage in each state stayed at the January 2007 level, we estimate that employment of 16-to-24 year-old men without a high school diploma would be 6.5 percent for all three racial/ethnic groups combined. The effects were most pronounced for black men where we estimate employment was reduced by 20.2 percent. The employment loss was considerably smaller for whites (6.0 percent) and Hispanics (3.5 percent).

<sup>15</sup>The states and their minimum wage are Alaska (\$7.75), California (\$8.00), Connecticut (\$8.25), District Of Columbia (\$8.25), Illinois (\$8.25), Maine (\$7.50), Massachusetts (\$8.00), Michigan (\$7.40), Nevada (\$8.25), New Mexico (\$7.50), Ohio (\$7.30), Oregon (\$8.40), Rhode Island (\$7.40), Vermont (\$8.06), and Washington (\$8.55).

<sup>16</sup>For unemployment, the counterfactual is the average unemployment rate for the 2007 calendar year to account for any seasonality in unemployment rates.

The simulations also imply that the higher unemployment associated with the Great Recession caused significant job losses in our 16-to-24 year-old male sample. Between 2007 and 2009, we estimate that the average of state adult employment rate rose by 4.9 percent. If the Great Recession had not occurred and the unemployment rate had remained at 2007 levels, we estimate that employment for our sample of 16-to-24 year-old men would be 14.5 percent higher. The effects of the Great Recession were not equally distributed across racial and ethnic groups. We estimate that the recession reduced employment in our sample of young men by 26.2 percent for blacks and 13.4 percent for both Hispanics and whites.

During the Great Recession, there were 10 states that increased their minimum wage by \$0.50 or less; and 21 states had increases matching the federal hike from \$5.15 to \$7.25. If the comparison of job loss is restricted to the 21 states where the full effect of the 2007-2009 federal hikes was realized, the percentage point reduction in employment for our sample of young men is estimated to be 11.3 percent for whites, 32.4 percent for blacks, and 5.9 percent for Hispanics. The effect of the Great Recession in these same 21 states was employment loss of 12.1 percent for whites, 23.2 percent for blacks, and 8.6 percent for Hispanics.

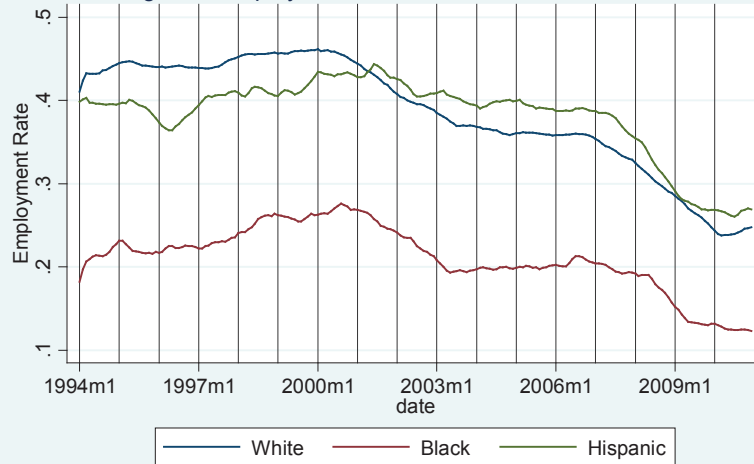
Consequently, when the analysis is restricted to the states where the full effect of the federal minimum wage was realized, the job losses caused by the Great Recession are greater

than those caused by the minimum wage hikes for whites and Hispanics. For blacks, however, increases in the minimum wage reduced employment by almost 40 percent more than the Great Recession.

## Summary and Conclusions

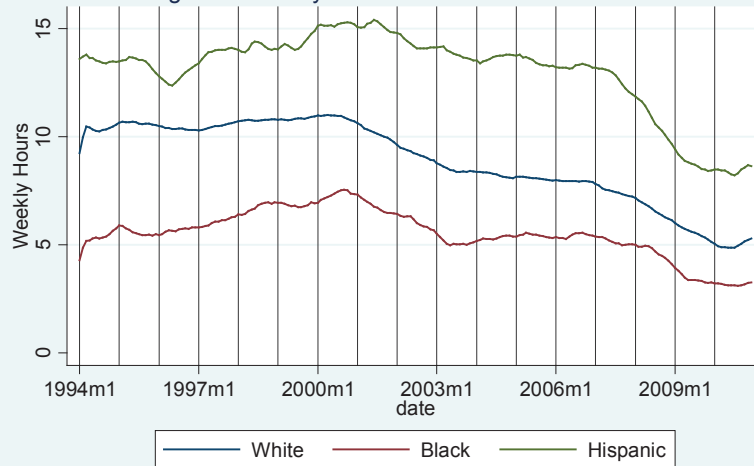
This study shows that, among 16-to-24 year-old men without a high school diploma, the employment loss caused by a minimum wage hike is greatest among black men and smallest among Hispanics. We discussed several possible reasons for these differentials including racial or ethnic differences in jobs skills and experience, geographic distribution, and the types of jobs held. The study also estimates that, in the states where the 2007-2009 minimum wage hikes were binding, the employment losses from the minimum wage hikes were similar in size to the losses caused by the Great Recession. However, the relative size of the effects differed across the races. Compared to the effect of the Great Recession, the minimum wage hikes caused fewer job losses among white and Hispanic men, but relatively larger job losses for black men. Overall the study suggests that the minimum wage hikes are especially harmful to the employment prospects of young, low-skilled, black men. In the states where the federal minimum wage hikes of 2007-2009 were binding, the increases in the federal minimum wage did more damage to the employment prospects of black men than the Great Recession.

Figure 1. Employment Rates for 16-24 Year Old Males.



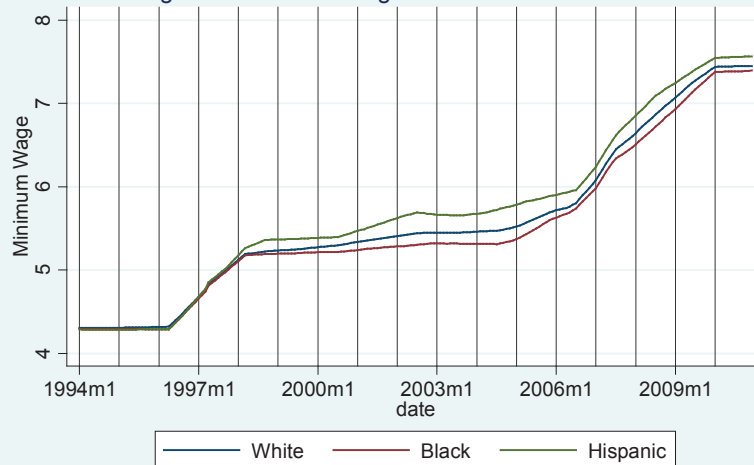
Sample restricted to those less than 12 years of education. Black sample includes Hispanics who are black. Employment rates are calculated as 12 month moving average.

Figure 2. Weekly Hours for 16-24 Year Old Males.



Sample restricted to those less than 12 years of education. Black sample includes Hispanics who are black. Weekly hours are calculated as 12 month moving average.

Figure 3. Minimum Wage for 16-24 Year Old Males.



Sample restricted to those less than 12 years of education. Black sample includes Hispanics who are black. Minimum wages are calculated as 12 month moving average.



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