

IZA DP No. 10185

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September 2016

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ABSTRACT

The Effects of Minimum Wages on the Health of Working Teenagers*

This paper examines the effect of minimum wage increases on the self-reported health of teenage workers. We use a difference-in-differences estimation strategy and data from the Current Population Survey, and disaggregate the sample by race/ethnicity and gender to uncover the differential effects of changes in the minimum wage on health. We find that white women are more likely to report better health with a minimum wage increase while Hispanic men report worse health.

JEL Classification: I10, I18, J15, J16

Keywords: minimum wage, self-reported health, teenagers

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* The authors thank Katim Woldemariam and Tamerlane Asher for helpful research assistance. We are grateful to Andrew Freidson, Joe Sabia and session participants at the Eastern Economic Association, the Population Association of American 2016 annual meetings, and the ASHE 2016 annual meetings as well as seminar participants at AHRQ and the University of Kansas for helpful comments.

Introduction

The U.S. Federal minimum wage has been constant at \$7.25 since July 2009, during which time it has lost 11% of its purchasing power. Over this period, many states have increased or are discussing increasing their minimum wages. In January 2016, 14 states raised their minimum wages either through a vote or because their minimum wages are indexed to inflation. It is estimated that changes in the minimum wage affect 20 to 30 percent of the work force (Belman and Wolfson, 2014), and some policymakers have cited the positive health effects of higher minimum wages (Benzeval et al.2015; Bhatia 2014; Krisberg 2015), thus understanding its impacts is important.

A literature in labor economics explores the effects of raising the minimum wage on employment and these studies often focus on teenagers as they are a substantial part of the minimum wage work force (e.g. Allegretto et al., 2011; Neumark et al., 2014; BLS, 2016). A recent summary of the evidence suggests a higher minimum wage results in some job loss for the least-skilled workers including teenagers (Neumark, 2015), although that is not a consensus. (Allegretto et al., 2015). In contrast, Belman et al. (2015) note that there is general agreement that higher minimum wages are associated with higher wages and earnings for less-educated workers.

In this paper, we consider whether increases in minimum wages, through an income effect, impact the health of teenage workers who retain their jobs and receive pay increases.¹ We measure working teenagers' health using self-rated health status, a common indicator of individual's overall health, and employ a difference-in-differences identification strategy using data from the Current Population Survey (CPS) 1996-2014.

¹ It is also possible that workers could experience adverse health consequences after they lose their jobs due to minimum wage increases Schaller and Stevens (2015).

Focusing on teenagers' health is important because the teenage years are a vital stage for investment in health. Adverse health events/changes during this time period can have long-lasting effects on people's health (Sawyer et al., 2012). Money spent keeping teenagers healthy could mean substantial savings years later, which has important implications for policies targeting rising health care costs in the US.

Previous Literature

Several recent studies examine the effect of minimum wage increases on health-related outcomes. Several authors examine the 1999 national minimum wage increase in the UK. Kronenberg et al. (2015), using a differences-in-differences framework, find no significant effects while Reeves et al. (2014, 2016) find that the increases led to improved mental health but not other indicators of health. Lenhart (2015) finds that the increase in the minimum wage improved self-reported health and whether individuals suffer from certain health conditions. For the US, Strain et al. (2016) examine the effects of increases in minimum wages on both physical and mental health for employed and unemployed men and women between ages 21-54. They find that employed men have poorer physical health but fewer poor mental health days as minimum wages increase, while unemployed men only experience worsened physical health. They find no effects for women. Wheby et al., (2016) find that higher minimum wages lead to higher birthweights and they note that minimum wages increase prenatal care use and lead to a decline in smoking during pregnancy.

Other health-related work on the minimum wage examines the potential effects of minimum wage increases on obesity and alcohol use (Meltzer and Chen, 2011; Sabia et al., 2014). , Sabia and Nielson (2015) find no significant effects of raising minimum wages on low-

income populations in terms of health insurance coverage, doctor's visits, or sufficient resources to purchase food or eat a balanced meal.

We contribute to this literature by examining the differential effects of minimum wages on health for various race/ethnicity and gender groups among working teenagers. There are good reasons to believe that the effects of increasing minimum wages may differ across these groups. First, it has been established that the minimum wage employment effects differ across race (e.g. Belman et al., 2015; and Neumark and Wascher, 2007a and 2007b). Second, there are substantial racial and ethnic differences in the types of jobs held by low-income workers (e.g. Even and Macpherson, 2011). 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 (Clemens and Wither, 2014). Evidence suggests that teens spend their money differently (Bachman et al., 2014). Furthermore, there are well-known differences in high school graduation rates across race/ethnicity and gender.² Thus, any analysis that does not disaggregate by race and gender risks potentially masking the differential effects of minimum wage changes. To this end, we examine six groups of teenagers: black women and men, Hispanic women and men, and white women and men.

Furthermore, to deal with the main empirical challenge in the literature on the effects of minimum wage --- finding a group most likely affected by the minimum wage, besides focusing on teenagers, we also use two education groups and two measures of changes in minimum wages. This will allow us to identify any heterogeneous health effects of changes in minimum

²See <http://nces.ed.gov/pubs2014/2014391.pdf> for data on high school graduation rates by race/ethnicity and gender.

wages for teenage workers. In what follows, we present our data, the empirical model, and then results. We conclude with a discussion of our findings.

Data

We use data from the March CPS (1996 - 2014) to measure the health of teenagers. In 1996, the CPS started asking self-reported health status. Our binary dependent variable is equal to one if self-reported health is fair or poor, zero otherwise³. Fosse and Haas (2009) find self-reported health of adolescents to be a valid measure of their physical health and emotional well-being. We also control at the individual level for marital status, head of household status and age.

We gather data on the prevailing minimum wage rate in each state over 1996-2014. During this period, the federal minimum wage changed five times due to two legislative changes (1996-1997, and 2007-2009) and states changed 338 times (including the federal minimum wage changes). Some states have regular changes in the minimum wage because they index to inflation and others introduce legislation or make constitutional changes.

We calculate the minimum wage as the greater of the state minimum wage (if one exists) or the federal minimum wage. We collect the state minimum wages from the January Monthly Labor Review. We deflate the minimum wages and all other dollar values using the CPI-U with the base years of 1982-1984. We also use the ratio of the minimum wage to the state's average wage as an alternative measure on the assumption that those who reside in states with higher average wages may not find minimum wage changes to be binding.

We control for a number of state-level factors that might be correlated with minimum wages and self-reported health. In particular, we include the percent of the state's workforce covered by a collective bargaining agreement, the percent that is a member of a union, the state

³ It is based on the respondent's self-report of their own health measured on a Likert scale where 1=excellent, 2=very good, 3=good, 4= fair, and 5=poor.

unemployment rate and the percent of the state's population below the poverty line to control for economic and labor market conditions. We also control for the cutoff for Medicaid eligibility (expressed as a percentage of the poverty level), state mental health parity laws and state expansion of dependent health insurance coverage prior to the 2010 Affordable Care Act to control for access to health insurance for low-income workers. Furthermore, we include the maximum AFDC/TANF benefits for a family of three to control for differences in the state-level generosity of public transfer programs and state cigarette taxes. We combine this state-level data with the individual-level data from the March CPS.

We also use data from the CPS merged-outgoing rotation groups, which have a larger sample size and a more consistent measure of earnings than the March supplement, to verify if there is indeed an income effect through which increases in minimum wage influence health.

Table 1 presents the sample means for our six race/ethnicity and gender subgroups for our two education groups: those with at most a HS diploma (1A) and those without a HS diploma (1B). We limit our sample to working teens to separate potential effects of dis-employment on health. In both panels, we find that blacks and Hispanics are much more likely to report fair or poor health than whites and that within race women are more likely to report poor health than men. As expected, teens are not likely to be married and very few are the head of their households.

Empirical Model

We estimate the following equation:

$$(1) \quad y_{ist} = \alpha + \gamma_1 MW_{st} + \gamma_2 Z_{it} + \gamma_3 X_{st} + \theta_s + \tau_t + \varepsilon_{ist}$$

where y_{ist} is our dependent variable for individual i , residing in state s at year t ; MW_{st} is the minimum wage (or the ratio of the minimum wage to the state's average wage); Z_{it} is a vector of individual controls; X_{st} is a vector of state-specific time-varying economic and policy controls; θ_s is the time-invariant state effect; τ_t is the time-invariant year effect, and ε_{ist} is an error term.⁴ Standard errors are clustered by state.

Results

In Table 2, we present the income and employment effects of changes in minimum wages for the six subgroups of teenage workers. We find that increases in minimum wages significantly increase the hourly earnings for whites (men and women) and Hispanic women but not for Hispanic men or black men and women, weekly earnings increase for white and black women, while Hispanic men are likely to suffer job losses.

In Table 3, we report the results for the effects of the minimum wage and the ratio of the state minimum wage to the state average wage on health. Among those who see higher earnings, white women reported better health while white men and Hispanic women did not report any change in health. Among those who did not see increases in earnings, only Hispanic men reported significant (and negative) change in health.

Our findings of heterogeneous income effects on health are not unprecedented (e.g. Averett and Wang, 2013), and multiple mechanisms could be at play. For example, Even and Macpherson (2011) note that Hispanic men are more likely than either black or white men to hold jobs in construction, which may pose more health strain than retail or food service. Our results in Table 2 further indicate that Hispanic men are likely to suffer job losses. Thus those

⁴ Some scholars use state-specific linear time trends to eliminate sources of bias due to state-specific unobservable factors but the inclusion of such trends substantially reduces available identifying variation (Sabia and Nielson, 2015). Thus, we estimate our models without these state-specific trends.

men who retain their jobs may have to work more intensively at their physically demanding jobs since capital may not be easily substituted in these industries, making the result of worse self-rated health for Hispanic male teenage workers plausible even without an income effect. When using the ratio, this result is just shy of statistical significance.⁵ It is also possible that among those teens with higher earnings, they spend their income in ways that can either enhance, detract or have no effect on their health such as on cars, alcohol or cigarettes (Bachman et. al, 2014; Sabia et al., 2014).

Conclusions

Policymakers are increasingly calling for higher minimum wages. By using subgroups thought to be differentially affected by the minimum wage, we have uncovered distinctive effects of minimum wage increases on income and the self-reported health of working teenagers. These heterogeneous effects may be explained given the differences across these groups in high school graduation rates, types of jobs held, their ability to gain work experience (Belman et al., 2015; Sabia and Neilson, 2015), and the different ways teens might spend additional earnings. Our work highlights the importance of looking at various subgroups when examining the income and health effects of minimum wages and therefore has important policy implications.

⁵ When we pool all races and men and women together we find no health effects, underscoring the importance of disaggregating by race and gender.

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Table 1A: Unweighted Means Working Aged 16-19: High School Grads or Less

Variable	White Men	White Women	Black Men	Black Women	Hispanic Men	Hispanic Women
Poor/Fair health	.0167	.0212	.0337	.0386	.0259	.033
Real Min Wage	3.0427	3.0477	3.0187	3.0186	3.1038	3.125
	(.3198)	(.322)	(.3052)	(.2973)	(.35)	(.3511)
Ratio (Min Wage/ State's Average Wage)	.3421	.3423	.3364	.3366	.3405	.3419
	(.0449)	(.0449)	(.0445)	(.0455)	(.0395)	(.039)
Age	17.6068	17.4793	17.7873	17.7754	17.9386	17.7673
	(1.0304)	(.9983)	(1.0284)	(.9998)	(1.0106)	(1.0112)
Never married	.9771	.9665	.9735	.9736	.9504	.9335
Separated/divorced/Widowed	.0055	.0076	.0125	.01	.0089	.0137
Poverty	12.186	12.0915	13.243	13.3553	13.4681	13.6125
	(3.0954)	(3.0765)	(3.3872)	(3.4415)	(3.1843)	(3.2774)
Unemployment Rate	5.4571	5.4742	5.7208	5.8527	5.8883	6.0819
	(1.7889)	(1.8034)	(1.757)	(1.8555)	(1.8713)	(1.9935)
Union Member	12.2011	12.35	11.2094	11.0914	11.9989	12.1513
	(5.6916)	(5.689)	(6.2458)	(6.2367)	(6.0726)	(5.9841)
% Represented by unions	13.6401	13.7963	12.6187	12.5041	13.4433	13.592
	(5.6684)	(5.6564)	(6.2607)	(6.2669)	(6.0912)	(5.9734)
AFDC/TANF benefits	437.1093	442.2261	371.836	368.1246	447.9453	458.075
	(159.4309)	(157.7816)	(157.6333)	(150.0709)	(190.0752)	(192.3187)
Medicaid Cutoff	188.3144	188.2293	191.6766	190.8111	200.0977	201.5884
	(45.4065)	(44.9227)	(37.2787)	(38.8556)	(51.0504)	(49.6087)
LTHS	.7461	.748	.6792	.6503	.715	.7461
	(.4353)	(.4342)	(.4669)	(.477)	(.4514)	(.4353)
Head of household	.0526	.055	.0714	.1228	.0914	.0995
	(.2232)	(.2279)	(.2575)	(.3283)	(.2882)	(.2993)
Observations	26166	24900	2073	2199	5306	4001

Standard deviations of continuous variables in parentheses. Data from March CPS 1996-2014. Not shown are sample means for dependent care coverage, mental health parity, cigarette taxes.

Table 1B: Unweighted Means Working Aged 16-19: Less than High School

Variable	White Men	White Women	Black Men	Black Women	Hispanic Men	Hispanic Women
Poor/Fair health	.0171	.0202	.0314	.0356	.0267	.034
Real Min Wage	3.0327	3.042	3.007	3.0058	3.0831	3.1108
	(.3155)	(.3196)	(.2986)	(.2905)	(.3437)	(.3496)
Ratio (Min Wage/ State's Average Wage)	.3415	.3418	.3366	.337	.3396	.3417
	(.0447)	(.0452)	(.0434)	(.0462)	(.0397)	(.0396)
Age	17.2823	17.1387	17.4297	17.3692	17.6943	17.4134
	(.9389)	(.8601)	(.9814)	(.9236)	(1.024)	(.9578)
Never married	.982	.9795	.9787	.9839	.956	.9459
Separated/divorced/widowed	.005	.0059	.0092	.007	.0082	.0136
Poverty	12.1105	12.0105	13.1517	13.325	13.4519	13.5058
	(3.0882)	(3.0638)	(3.3851)	(3.475)	(3.2402)	(3.322)
Unemployment Rate	5.3947	5.4285	5.6257	5.7916	5.7774	5.978
	(1.7398)	(1.7751)	(1.7123)	(1.829)	(1.7903)	(1.9114)
Union Member	12.199	12.3318	11.0935	11.0594	11.88	12.0279
	(5.6883)	(5.6366)	(6.21)	(6.3058)	(6.1146)	(5.9129)
% Represented by unions	13.6405	13.7787	12.5036	12.4589	13.3362	13.4833
	(5.6605)	(5.5963)	(6.2378)	(6.3319)	(6.1414)	(5.8925)
AFDC/TANF benefits	435.5146	441.4989	365.3388	364.3266	440.1418	451.3678
	(156.2078)	(155.0561)	(152.2832)	(148.7065)	(185.7039)	(188.4258)
Medicaid Cutoff	187.4222	188.0994	189.9471	188.7899	198.0644	200.2038
	(44.5856)	(44.6891)	(35.4512)	(37.3738)	(49.0343)	(48.9955)
Head of household	.033	.0323	.0483	.0776	.0746	.0791
	(.1786)	(.1769)	(.2145)	(.2677)	(.2628)	(.2699)
Observations	19522	18626	1408	1430	3794	2719

Standard deviations of continuous variables in parentheses. Data from March CPS 1996-2014. Not shown are sample means for dependent care coverage, mental health parity, cigarette taxes.

Table 2: Income Effect Results: Workers Age 16-19⁶

VARIABLES	Workers 16-19 High School Grad or less				Workers 16-19 Less than HS			
	Ln hourly earnings paid by the hour	Ln weekly earnings	Usual hours	Working	Ln hourly earnings paid by the hour	Ln weekly earnings	Usual hours	Working
	White Men				White Men			
Ln min wage	0.141***	0.125	0.738	-0.066**	0.180***	0.218**	1.756	-0.075*
	(0.027)	(0.082)	(1.348)	(0.032)	(0.021)	(0.104)	(1.425)	(0.037)
Observations	50,174	53,778	48,234	146,302	34,689	37,017	32,980	116,416
R-squared	0.141	0.264	0.276	0.113	0.096	0.184	0.220	0.086
	Black Men				Black Men			
Ln min wage	0.042	0.340	-0.975	-0.012	-0.009	0.415	1.593	-0.020
	(0.088)	(0.215)	(4.128)	(0.055)	(0.077)	(0.297)	(6.304)	(0.046)
Observations	4,102	4,357	3,821	23,400	2,714	2,852	2,467	19,195
R-squared	0.189	0.234	0.260	0.084	0.125	0.154	0.194	0.050
	Hispanic Men				Hispanic Men			
Ln min wage	0.003	-0.057	-0.388	-0.147**	0.073	-0.031	-2.154	-0.191***
	(0.054)	(0.148)	(3.316)	(0.059)	(0.047)	(0.154)	(3.381)	(0.054)
Observations	7,503	8,307	7,617	28,451	5,139	5,685	5,191	23,308
R-squared	0.128	0.199	0.190	0.164	0.127	0.218	0.221	0.141
	White Women				White Women			
Ln min wage	0.165***	0.114*	0.593	-0.011	0.184***	0.128**	0.300	-0.033
	(0.026)	(0.057)	(0.860)	(0.025)	(0.026)	(0.057)	(0.924)	(0.026)
Observations	47,728	50,012	44,221	133,095	33,170	34,557	30,301	104,643
R-squared	0.081	0.218	0.257	0.095	0.071	0.116	0.166	0.073
	Black Women				Black Women			
Ln min wage	0.091	0.338**	4.108	-0.021	0.087	0.365*	5.356	-0.017
	(0.058)	(0.157)	(2.908)	(0.051)	(0.099)	(0.195)	(3.303)	(0.066)
Observations	4,354	4,561	4,006	22,421	2,789	2,893	2,506	17,671
R-squared	0.122	0.217	0.226	0.076	0.102	0.104	0.133	0.044
	Hispanic Women				Hispanic Women			
Ln min wage	0.276***	0.223	-1.630	0.010	0.336***	0.140	-3.638*	-0.007
	(0.075)	(0.133)	(1.562)	(0.037)	(0.076)	(0.149)	(2.001)	(0.026)
Observations	5,827	6,195	5,600	25,913	3,757	3,966	3,581	20,702
R-squared	0.126	0.203	0.226	0.094	0.126	0.170	0.227	0.059

⁶ Results obtained using the CPS MORG from 1996-2014. Covariates include those shown in table 1. Clustered standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Regressions are weighted.

Table 3: March CPS Health Outcome OLS Results for Workers Age 16 - 19

	High School Grad or less	Less than HS		High School Grad or less	Less than HS
	Poor/Fair	Poor/Fair		Poor/Fair	Poor/Fair
White Men					
Min wage	0.008	0.007	Ratio	0.066	0.055
	(0.005)	(0.006)		(0.048)	(0.055)
Observations	24,114	17,971		24,114	17,971
R-squared	0.008	0.010		0.008	0.010
Black Men					
Min wage	-0.003	0.009	Ratio	-0.021	-0.065
	(0.025)	(0.026)		(0.186)	(0.244)
Observations	1,928	1,307		1,928	1,307
R-squared	0.057	0.071		0.057	0.071
Hispanic Men					
Min wage	0.036*	0.033*	Ratio	0.225	0.196
	(0.018)	(0.019)		(0.138)	(0.151)
Observations	4,948	3,516		4,948	3,516
R-squared	0.021	0.035		0.021	0.035
White Women					
Min wage	-0.017**	-0.016*	Ratio	-0.117**	-0.134**
	(0.008)	(0.009)		(0.054)	(0.064)
Observations	22,884	17,150		22,884	17,150
R-squared	0.011	0.015		0.011	0.015
Black Women					
Min wage	-0.016	-0.004	Ratio	-0.030	-0.007
	(0.019)	(0.027)		(0.225)	(0.260)
Observations	2,045	1,322		2,045	1,322
R-squared	0.054	0.085		0.054	0.085
Hispanic Women					
Min wage	-0.013	-0.042	Ratio	-0.126	-0.314
	(0.021)	(0.026)		(0.178)	(0.203)
Observations	3,732	2,528		3,732	2,528
R-squared	0.030	0.044		0.030	0.044

Clustered standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Covariates include those shown in table 1. Regressions are weighted.