

ILLINOIS TEENS AND THE MINIMUM WAGE

The Impacts of Minimum
Wage Hikes, 2004-2013



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**ILLINOIS TEENS AND THE MINIMUM WAGE:
THE IMPACTS OF MINIMUM WAGE HIKES, 2004-2013
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1. INTRODUCTION

Work experience is important both for young employees and for employers. Workers who gain experience laboring in their first professional occupations are able to develop practical skills that are necessary in the workplace but are generally not taught in classrooms. All else equal, employers value more experience to less and higher levels of completed schooling to lower, because the acquired human capital skills tend to correlate with better abilities and increased maturity. Policies, which increase work experience for young workers can thus be beneficial to the economy. At the same time, steps must be taken to ensure that employers do not exploit young workers who are especially powerless in wage negotiations.

One regulatory tool for protecting all workers from wage abuse is the establishment of a federal and state minimum wage law. Through a variety of legislative and ballot means, as of January 1, 2015, state minimum wage levels increased in 20 states. Wage floors in 29 states now exceed the \$7.25 an hour required under federal law (NCSL, 2014). According to the Economic Policy Institute, the new laws will cover roughly 60 percent of the nation's workforce (Abramsdec, 2014).

In November 2014, Illinois voters overwhelmingly approved a non-binding resolution to raise the state's minimum wage to \$10.00. The minimum wage is a strong labor market policy that prevents mistreatment of employees and allows young workers to earn a disposable income or to save for college. As a binding wage floor, however, the minimum wage could slightly reduce employment opportunities for young workers.

This Economic Commentary is a follow up to a March 17, 2014 Research Report conducted jointly by the Illinois Economic Policy Institute (ILEPI) and the University of Illinois Labor Education (LEP) Program, *Minimum Wage, Maximum Benefit: How a \$10 Wage Floor Impacts All Workers and the Economy* (Manzo & Bruno, 2014). On May 20, 2014, ILEPI Policy Director Frank Manzo IV participated in a discussion on *Chicago Tonight* about the benefits of raising Illinois' minimum wage with Ted Dabrowski, Vice President of Policy for the Illinois Policy Institute. During the conversation, Mr. Dabrowski commented that the minimum wage is "a policy about how to handle youth and those people who are starting out for the first time in their job" and that a hike to \$10.00 per hour "will hurt Illinois... the youth in particular" (*Chicago Tonight*, 2014). Illinois teens experienced a 24.4 percent unemployment rate from 2008 to 2011, up from 16.2 percent in the pre-recession years of 2002 to 2007. The solution, according to the Illinois Policy Institute, is to completely "abolish the minimum wage" (Dabrowski, 2012).

While research has clearly documented that millions of adults rely on minimum wage jobs, this joint ILEPI-LEP Economic Commentary investigates the causal effects of raising the state's minimum wage on teen workers. In the ten year period from 2004 through 2013, the adult minimum wage was gradually increased from \$5.50 to \$8.25 in Illinois (WHD, 2014). Minimum wage hikes occurred in 2005 (to \$6.50), 2008 (to \$7.50), 2009 (to \$7.75), 2010 (to \$8.00) and 2011 (to \$8.25). The minimum wage is applicable to employers of four or more employees, and state law permits workers under 18 years old to be paid \$0.50 per hour less than the adult minimum wage to incentivize youth employment (IDOL, 2014). By utilizing Illinois' wage hikes over the

past decade, this report asks, “What does a \$1 increase in the nominal minimum wage do to teen earnings, employment, and hours?”

The report is divided into six sections. Section 2 presents summary statistics on teen workers in Illinois, comparing the youth to the overall Illinois workforce. Sections 3 and 4 provide analysis of the effect of a \$1 increase in the minimum wage on teen earnings and teen employment variables, respectively. Additional impacts of minimum wage hikes are considered in Section 5, including responses by both employers and potential teen employees. Subsequently, Section 6 discusses benefits and costs of raising the minimum wage in Illinois and recaps key findings. Note that an Appendix with referenced regression results also follows.

2. TEEN WORKERS COMPARED TO THE OVERALL WORKFORCE IN ILLINOIS

This paper uses data from the Current Population Survey Outgoing Rotation Groups (CPS-ORG), which is collected, analyzed, and released by the U.S. Department of Labor Bureau of Labor Statistics (BLS). CPS-ORG data reports person-level information on 25,000 respondents nationwide each month. The records include data on wages, unionization, hours, industry of employment, and occupation, as well as other demographic, geographic, education, and work variables. The 10-year dataset from 2004 to 2013 captures information on 98,839 individuals in Illinois, including 60,436 employed residents. Of these respondents, 7,172 are teens between the ages of 16 and 19. A total of 2,279 individuals in this subgroup of teens had a job. The BLS provides analytic weights to match the sample to the actual total U.S. population 16 years of age or greater for each year. Note that, in analyses of teen employment, a sample size of 2,279 would equate to a +/-2.1 percent margin of error in a standard poll. All data was extracted from the user-friendly Center for Economic and Policy Research Uniform Data Extracts and utilizes the wage recommended by the National Bureau of Economic Research’s “Annual Earnings File” (Center for Economic and Policy Research, 2013).

Summary statistics indicate that teen residents have significantly different characteristics compared to the overall population in Illinois (Figure 1). On average, there were 723,000 people between the ages of 16 and 19 in Illinois every year from 2004 to 2013. In comparison with the total Illinois population, these teens were noticeably more male, less Caucasian, more African-American and Latino or Latina, more likely to be American citizens, and less likely to be foreign-born immigrants. Over three-quarters (76.2 percent) of teens were enrolled in a school and 16.1 percent had any college experience.

Additionally, teen workers experienced employment outcomes that were inferior to the general workforce. Approximately three-in-ten teens (31.6 percent) had a job compared to six-in-ten Illinois residents (61.6 percent). The unemployment rate was also much higher for teens than adults from 2004 through 2013: 21.5 percent to 7.7 percent. Workers aged 16 to 19 also averaged a nominal hourly wage of \$8.56 per hour (unadjusted for inflation) and a 21.8-hour workweek over the ten years of analysis. By contrast, the respective figures for all Illinois workers were \$14.80 per hour and 34.3 hours. Furthermore, teens were less likely than adults to work in a public sector job (5.8 percent to 12.6 percent) and to be a union member (3.9 percent to 16.1 percent).

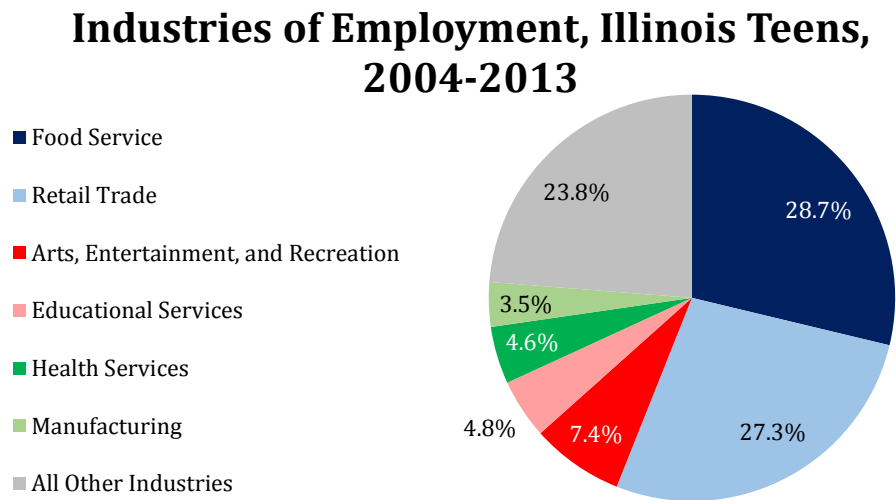
Employed teens primarily work in service industries and occupations in Illinois (Figure 2). Over half of all teen workers (56.0 percent) are employed in either the food service industry or the retail trade industry. The aggregated arts, entertainment, and recreation industry employs the third-most number of teen workers, at 7.4 percent. Approximately one out of every 20 teens works in educational (4.8 percent) and health services (4.6 percent) industries.

FIGURE 1: DESCRIPTIVE STATISTICS OF ILLINOIS TEENS VS. THE ILLINOIS POPULATION, 2004-2013

Variable	Teens in Illinois, Ages 16-19	Illinois Population, Ages 16-85
Observations	7,165	98,651
Weighted Average (Per Year)	722,597.9	9,888,665.7
<u>Demographics</u>		
Age	17.43	44.38
Male	49.89%	48.42%
Female	50.11%	51.58%
White, non-Latino	61.03%	68.94%
African-American	18.34%	14.04%
Latino or Latina	16.67%	11.99%
Citizen	94.77%	91.24%
Immigrant	7.13%	15.90%
<u>Educational Status</u>		
Enrolled in School	76.18%	9.30%
Less than a High School Degree	66.71%	15.33%
High School Degree or Equivalent	17.24%	29.21%
Some College, No Degree	15.41%	19.78%
Associate's Degree or More	0.64%	35.69%
<u>Workers</u>		
Employment Share	31.58%	61.57%
Unemployment Rate	21.47%	7.70%
Nominal Hourly Wage	\$8.56	\$14.80
Usual Hours Worked	21.81	34.31
Works for the Public Sector	5.78%	12.61%
Union Member	3.88%	16.07%

Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the total population 16 years of age or older. The total number of observations was 98,651 for Illinois, including 60,436 employed workers.

FIGURE 2: INDUSTRIES OF EMPLOYMENT, ILLINOIS WORKERS AGES 16 TO 19, 2004-2013

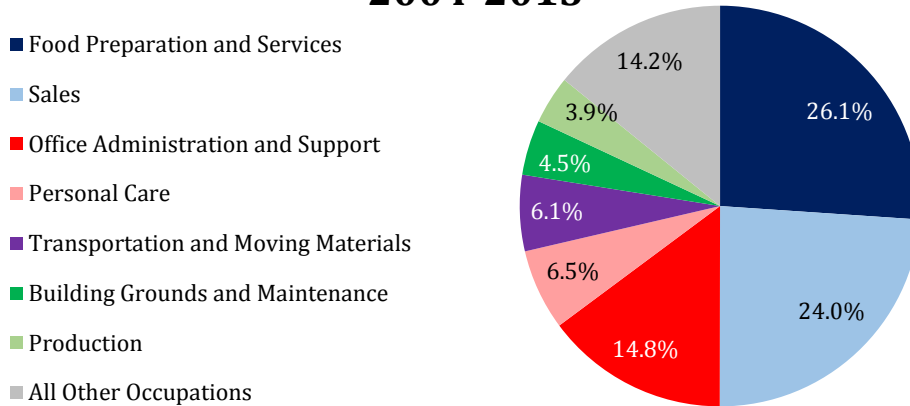


Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. The total number of observations was 2,279 employed teens.

Accordingly, food preparation and services occupations and sales occupations account for half of all teen jobs (50.1 percent). Office administration and support jobs (14.8 percent), personal care jobs (6.5 percent) and transportation and moving materials jobs (6.1 percent) round out the top five occupations of employment for teen workers in the state (Figure 3).

FIGURE 3: OCCUPATIONAL BREAKDOWN OF ILLINOIS WORKERS AGES 16 TO 19, 2004-2013

Occupations of Employment, Illinois Teens, 2004-2013



Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. The total number of observations was 2,279 employed teens.

3. THE IMPACT OF A \$1 INCREASE IN THE MINIMUM WAGE ON TEEN EARNINGS

Illinois teens generally work in low-paying jobs. Figure 4 illustrates the weighted breakdown of hourly earnings for the 2,279 respondent workers aged 16 to 19 from 2004 to 2013. Teen workers are categorized by their hourly earnings relative to the Illinois adult minimum wage in the survey year. About two-thirds of the teen workforce (64.5 percent) in Illinois earns an hourly income that is between 80 percent and 120 percent of the adult minimum wage, including 13.0 percent of teen workers who are paid exactly the minimum wage. Only 32.4 percent of teen workers earn more than 1.2 times the adult minimum wage. Note that increasing the adult minimum wage from \$8.25 per hour to \$10.00 per hour would be a 21.2 percent increase in the nominal value of the wage floor, so the hike would impact about two-thirds of all teens. Finally, 3.1 percent of teen employees actually made less than 80 percent of the legal wage floor—indicating illegal wage theft by some employers (Figure 4; Graph A in the Appendix).

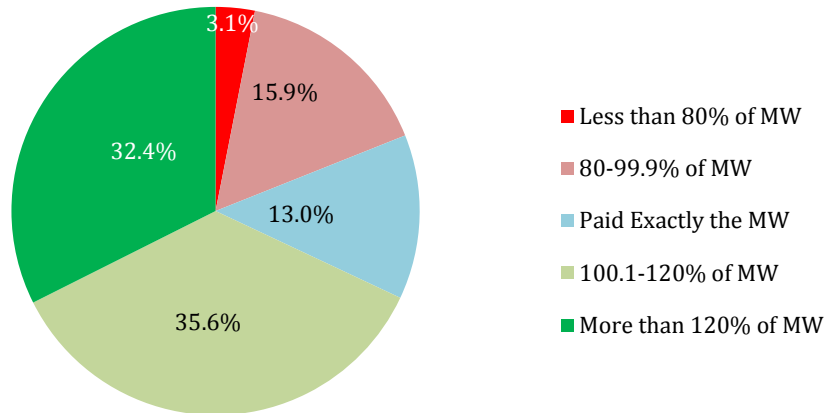
To understand the actual causal impact of a \$1 increase in the minimum wage rate on the average teen worker, it is critically important to control for other factors that may impact incomes, such as demographic variables, educational status, work variables (e.g., union membership and public sector employment), occupation of employment, and industry of employment (Figure 5). Accordingly, a regression analysis is performed to accomplish this aim. The overall conditions of the statewide labor market also should be accounted for, especially given the deep recession, which overwhelmed the middle years of the past decade.¹ Note that the

¹ The “business cycle index” is calculated as the employment rate of working-age Illinois residents 21 years old to 64 years old in a given year compared to the rate in the first year of analysis. Thus, for example, the business cycle index is 100.00 in 2004 and 102.96 in 2007, but 96.08 in 2013. The index means that the share of the population between 21 and 64 who had a job was 3.92 percent lower in 2013 than it was in 2004.

full regression analysis for all employed teen workers from 2004 to 2013 is available in Table A of the Appendix.

FIGURE 4: HOURLY WAGE RELATIVE TO THE LEGAL ADULT MINIMUM WAGE, ILLINOIS TEENS, 2004-2013

Hourly Wage of Illinois Teens, 2004-2013



Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. The total number of observations was 2,279 employed teens. See Appendix Graph A for more information.

The analysis reveals that raising the minimum wage by \$1 is statistically associated with a \$0.50 increase in the average teen worker’s hourly wage (Figure 5). The first (“simple model”) accounts for demographic, education, and work variables to find an impact of \$0.69 per hour on average. Once industry and occupation are factored in, however, the effect becomes \$0.50 per hour for the average teen worker. The result is the same regardless of whether labor market conditions (denoted in Figure 5 by “labor market slack,” which means an underutilization of productive workers) are included. The finding that the *average* teen worker receives about half of the full value of the minimum wage hike is relatively unsurprising, given that only 32.0 percent of teen workers earn exactly the adult minimum wage rate or less per hour (see Figure 4).

FIGURE 5: REGRESSION RESULTS OF \$1 MINIMUM WAGE INCREASE ON AVERAGE WAGE, 2004-2013

Variable	Effect on Nominal Hourly Wages		
	Simple Model	Full Model without Labor Market Slack	Full Model with Labor Market Slack
\$1 Minimum Wage Hike	\$0.6879	\$0.5040	\$0.4961
Business Cycle Index			No Effect
Observations	1,354	1,354	1,354
R ²	0.852	0.863	0.863

Source: Authors’ analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. See Appendix Table A for more information.

An additional analytical tool, called a quantile regression, permits evaluation of the impact of a \$1 minimum wage hike across the teen wage distribution. The results, displayed in Figure 6, demonstrate whether a minimum wage increase actually benefits those it is intended to help. In fact, a \$1 increase in the minimum wage is found to have larger impacts on the earnings of the lowest-paid teen workers. For individuals in the bottom 25th percentile of teen incomes (who earn at or below the adult minimum wage), a \$1 increase in the wage floor is statistically correlated with a \$0.71 increase in their average hourly wage. The comparable estimate for the median teen worker is an effect of \$0.49 per hour. The top 25 percent of teen earners (who have hourly

incomes that are at least 23.1 percent higher than the adult minimum wage) experience no positive or negative hourly earnings impact from the increase. Therefore, in terms of income effects, minimum wage hikes in Illinois have helped the teens whom needed it most (Figure 6).

FIGURE 6: REGRESSION RESULTS OF \$1 MINIMUM WAGE INCREASE ON PERCENTILE WAGE, 2004-2013

Variable	Effect on Distribution of Hourly Wages, With Labor Market Slack		
	Bottom 25 th Percentile (100.0% of MW or Below)	Median Worker (107.7% of MW)	Top 25 th Percentile (123.1% of MW or Above)
\$1 Minimum Wage Hike	\$0.7143	\$0.4915	No Effect
Business Cycle Index	No Effect	No Effect	No Effect
Observations	1,354	1,354	1,354
R ²	0.171	0.126	0.143

Source: Authors' analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. See Appendix Table B for more information.

4. THE IMPACT OF A \$1 INCREASE IN THE MINIMUM WAGE ON TEEN EMPLOYMENT OUTCOMES

The impact that Illinois' minimum wage law has on employment outcomes is mixed. In *Minimum Wage, Maximum Benefit: How a \$10 Wage Floor Impacts All Workers and the Economy*, ILEPI and LEP found that a 10 percent increase in the minimum wage is associated with a decrease of 0.8 percentage points in the probability of being employed, although an effect of zero could not statistically be ruled out. Similarly, a 10 percent increase in the minimum was correlated with a zero to 1.0 percent decrease in average hours worked (see page 13 of Manzo & Bruno, 2014). Again, there was not enough statistical evidence to definitively conclude that higher minimum wages forced employers to cut hours. These results were very similar to general findings in the academic literature on the minimum wage (Card & Krueger, 1994; Doucouliagos & Stanley, 2009; Dube et al., 2010; Dolton & Rosazza Bondibene, 2012; Allegretto et al., 2013; Wolfson & Belman, 2013)

FIGURE 7: PROBIT RESULTS OF \$1 MINIMUM WAGE INCREASE ON PROBABILITY(EMPLOYED), 2004-2013

Variable	Effect on Probability of Being Employed	
	Full Model without Labor Market Slack	Full Model with Labor Market Slack
\$1 Minimum Wage Hike	-5.545%	No Effect
Business Cycle Index		1.767%
Constant	30.00%	30.00%
Observations	5,631	5,631
R ²	0.086	0.087

Source: Authors' analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are not adjusted in probit regressions. See Appendix Table C for more information.

Using the dataset on teen workers in Illinois, the employment effects of a higher minimum wage are once again inconclusive (Figure 7). Without taking into account the overall conditions of the labor market, a \$1 increase in the minimum wage was statistically associated with a 5.5 percentage-point reduction in the probability than any given teen worker is employed. However, four out of the five minimum wage hikes in Illinois from 2004 through 2013 were during or after the Great Recession. The legal adult minimum wage rate increased \$1.75 between the end of 2007 (\$6.50 per hour) and the beginning of 2011 (\$8.25 per hour). After controlling for business cycle conditions, a \$1 minimum wage had no statistical impact on the chances of any teen worker

having a job. Previous minimum wage increases in Illinois over the past decade have therefore had no negative impact on teen employment. Instead, a 1 percent decline in the employment rate for Illinois workers aged 21 to 64 resulted in a 1.8 percentage-point drop in employment for the teen population. Intuitively, this means that declines in teen employment— which is largely in the service occupations of stores and restaurants— were due primarily to decreased consumer demand from the working-age population in Illinois, which experienced unemployment rates above 9 percent.

Evaluations of hours worked per week yield similar results (Figure 8). In a simple model with demographic, education, and work variables, a \$1 minimum wage hike is actually correlated with a 0.89-hour increase in the average teen’s workplace. Once occupation and industry of employment are included in the analysis, however, the \$1 minimum wage hike is found to reduce the average teen’s hours by 0.6 hours per week, but the results are weak (i.e., only significant at the 10-percent confidence level). The full model with the business cycle index reveals that a \$1 increase in the minimum wage is not statistically related to any increase or decrease in usual hours worked per week. Instead, teen employment outcomes are causally linked to job prospects and spending habits in the larger economy. The claim that increases in the minimum wage from 2004 to 2013 had a negative impact on teen employment, on the other hand, can be rejected for lack of any substantial evidence.

FIGURE 8: REGRESSION RESULTS OF \$1 MINIMUM WAGE INCREASE ON HOURS WORKED, 2004-2013

Variable	Effect on Usual Hours Worked		
	Simple Model	Full Model without Labor Market Slack	Full Model with Labor Market Slack
\$1 Minimum Wage Hike	0.889 hours	-0.623 hours*	No Effect
Business Cycle Index			0.225 hours
Observations	1,354	1,354	1,354
R ²	0.811	0.848	0.849

Source: Authors’ analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. See Appendix Table D for more information.
 *Significant only at the 10% confidence-level.

5. ADDITIONAL RESPONSES TO A \$1 MINIMUM WAGE HIKE IN ILLINOIS

A minimum wage increase does not take place in a vacuum. Classical theories of economics predict that minimum wages create unemployment. These models, however, are static and make two precarious assumptions (among others). First, classical supply-and-demand models suggest that no workers actually experience an increase in their hourly earnings when the minimum wage goes up. In theory, employers who must now pay workers, for instance, \$10.00 per hour instead of \$8.25 per hour simply fire anyone currently making less than \$10.00. Second, since no one earns a higher income, the classical model implicitly holds consumer spending constant.

Classical economic theory, however, does not accurately describe reality. In the real world, some workers could be let go by a minimum wage hike but others do experience a wage increase, as demonstrated in Section 3 (see also Draca et al., 2008; Dube et al., 2010; Autor et al., 2010; and Cooper & Hall, 2013). Low-wage workers who receive a raise due to the hike have additional money to spend in the economy. A 2009 paper from the Federal Reserve Bank of Chicago found that “spending increases substantially after a minimum wage hike.” A \$1 increase in the minimum wage raises spending by \$744 to \$869 per year on average for families with a minimum

wage worker (Aaronson et al., 2009). This additional consumer demand creates new jobs, offsetting most, if not all, of the jobs lost by firms that cut employment as an initial response to the minimum wage increase. The fact that the real economy is *dynamic*, not static, is the primary reason why economic research tends to show no employment impacts due to minimum wage increases.

Both employees and employers respond to minimum wage hikes in other ways as well. University of California, Riverside economist Richard Sutch has found that an increase in the minimum wage could lead to an “educational cascade” effect. Some employers, faced with an inability to hire workers below the wage floor, may substitute capital for labor, reducing employment. In response, Sutch concludes that teenagers drop out of the labor force, go back to school, and acquire the education and skills necessary to raise their own productivity “to the level required to [re-]gain employment.” Some potential high school dropouts, for instance, decide to stay in school if their job prospects are even lower due to the minimum wage increase. The overall effect has been found to add 0.7 years of education to the average worker (Sutch, 2010).

Figure 9 evaluates Sutch’s claim for Illinois teens. In a probit regression which accounted for demographic variables and the highest level of educational degree for respondent teens, a \$1 increase in the minimum wage is found to increase the probability that any given Illinois teen is enrolled in a school by 1.5 percentage points. Nevertheless, once the conditions of the overall labor market are controlled for, there is no statistical evidence for Sutch’s claim. It is worth noting that the models, which do not take the business cycle into account, find a decrease in the employment rate and an increase in the school enrollment rate, so there is suggestive evidence that Sutch’s “educational cascade” does occur if employment effects are sufficiently negative. There is not, however, enough evidence to validate the “educational cascade” benefit of a higher minimum wage for Illinois teens.

On the employer side, companies have various “channels of adjustment” other than eliminating jobs or cutting hours (Schmitt, 2013). Employers may accept lower profits or pass on higher labor costs to consumers through small price increases, though research which supports these explanations is minimal (Draca et al., 2008; Card & Krueger, 1994; Wadsworth, 2010). Employers may also change the internal wage structure by compressing wages (Schmitt, 2013).

FIGURE 9: PROBIT RESULTS OF \$1 MINIMUM WAGE INCREASE ON PROBABILITY(IN SCHOOL), 2004-2013

Variable	Effect on Probability of Being in Enrolled in School	
	Model without Labor Market Slack	Model with Labor Market Slack
\$1 Minimum Wage Hike	1.508%	No Effect
Business Cycle Index		No Effect
Constant	77.01%	77.01%
Observations	5,638	5,638
R ²	0.064	0.064

Source: Authors’ analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are not adjusted in probit regressions. See Appendix Table E for more information.

Figure 10 presents CPS-ORG data on the wage distribution of teen workers in Illinois over periods with different minimum wage rates. In addition to the wage distribution, “compression ratios” are calculated to demonstrate the degree of income inequality among teens. In this analysis, a compression ratio is the wage of the highest-paid teens divided by the wage of the lowest-paid teens and a ratio of 1.0 indicates perfect wage equality. A “90-10” ratio reveals how

many times more the top 10 percent of teen workers earns than the bottom 10 percent of teen workers; a “75-25” ratio is the same figure for the top 25 percent compared to the bottom 25 percent.

FIGURE 10: WAGE DISTRIBUTION OF ILLINOIS TEEN WORKERS ACROSS NOMINAL MINIMUM WAGE RATES

Minimum Wage (Years)	Earnings Distribution: Percentile					Average	Compression Ratio	
	10 th	25 th	Median	75 th	90 th		90/10	75/25
\$5.50 (2004)	\$5.50	\$6.00	\$7.00	\$8.00	\$10.00	\$7.41	1.82	1.33
\$6.50 (2005-2007)	\$6.00	\$6.50	\$7.50	\$8.50	\$11.25	\$8.23	1.88	1.31
\$7.50 (2008)	\$7.00	\$7.50	\$7.75	\$8.75	\$10.25	\$8.46	1.46	1.17
\$7.75 (2009)	\$7.25	\$7.75	\$8.00	\$9.00	\$12.00	\$8.93	1.66	1.16
\$8.00 (2010)	\$7.50	\$8.00	\$8.25	\$9.00	\$11.00	\$9.12	1.47	1.13
\$8.25 (2011-2013)	\$7.35	\$8.00	\$8.50	\$9.25	\$11.55	\$9.29	1.57	1.16
<i>Change: 2013 vs. 2004</i>	<i>+\$1.85</i>	<i>+\$2.00</i>	<i>+\$1.50</i>	<i>+\$1.25</i>	<i>+\$1.55</i>	<i>+\$1.88</i>	<i>-0.25</i>	<i>-0.18</i>

Source: Authors' analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the actual population. Note: the data are not adjusted for inflation.

In general, the data suggest that employers do compress wages as a result of higher minimum wage rates (Figure 10). Since 2004, the minimum wage has increased by \$2.75 per hour, unadjusted for inflation. Simultaneously, teen wages have increased by \$1.88 per hour on average. The lower-end of the wage distribution experienced the largest hourly income gains, with the bottom 10 percent and bottom 25 percent of teen earners respectively making \$1.85 and \$2.00 more per hour in 2013 than in 2004. Nominal wages for the top 10 percent of teen earners, on the other hand, grew by just \$1.55 per hour over the same time. As a result, the 90-10 inequality ratio has decreased by 0.25 (13.7 percent) and the 75-25 index has fallen by 0.18 (13.5 percent). Combined with the quantile effects found in Figure 6, these findings demonstrate that employers may change the internal wage structure instead of letting workers go.

6. CONCLUSIONS AND IMPLICATIONS FOR ILLINOIS TEENS

The Illinois Economic Policy Institute (ILEPI) and the University of Illinois Labor Education Program (LEP) have previously recommended raising the Illinois minimum wage to \$10.00 per hour and indexing it to the chained-Consumer Price Index. The minimum wage hike would grow the state's total labor income by \$5.4 billion dollars, lift over 60,000 workers out of poverty, and reduce wage inequality (Manzo & Bruno, 2014). To maintain an incentive to hire young workers, however, the analysis recommended that the minimum wage for workers under 18 years old be increased to \$9.00 per hour and set at \$1.00 less than the adult minimum wage as it changes with inflation.

In any case, the only conclusive effect on teens is that every \$1 increase in the nominal minimum wage boosts hourly incomes by about \$0.50 on average. Minimum wage increases are intended to help the two-thirds of the teen workforce (64.5 percent) in Illinois that earns hourly incomes between 80 percent and 120 percent of the current minimum wage. The policy works as intended:

a \$1 increase in the minimum wage raises the lowest-paid teens' incomes by \$0.71 per hour, higher than the \$0.50 average effect. The result is that wages are both raised and compressed.

The impact that a minimum wage hike has on employment outcomes is inconclusive. Lifting the wage floor by \$1 is associated with a 0 to 5.5 percent decrease in the teen employment rate but a 0 to 0.89 hour increase in the average teen's workweek. Over the past decade, minimum wage hikes had no statistically significant negative impact on teen employment in Illinois. The data do suggest that a higher minimum wage may encourage more teens to enroll in school programs, but the effect only occurs if there are negative effects on employment.

Raising the Illinois minimum wage to \$10.00 per hour and the under-18 minimum wage to \$9.00 per hour would therefore help, rather than hurt, teen workers in Illinois. The average teen would experience an hourly earnings increase, with the lowest-paid receiving the highest raise. Employment effects, if any, would likely be small. These positive benefits would contribute toward the \$5.4 billion total gain in labor income and a reduction in poverty in Illinois. Thus, to improve labor market outcomes for teen workers, the minimum wage should not be abolished; it should be increased and indexed to inflation.

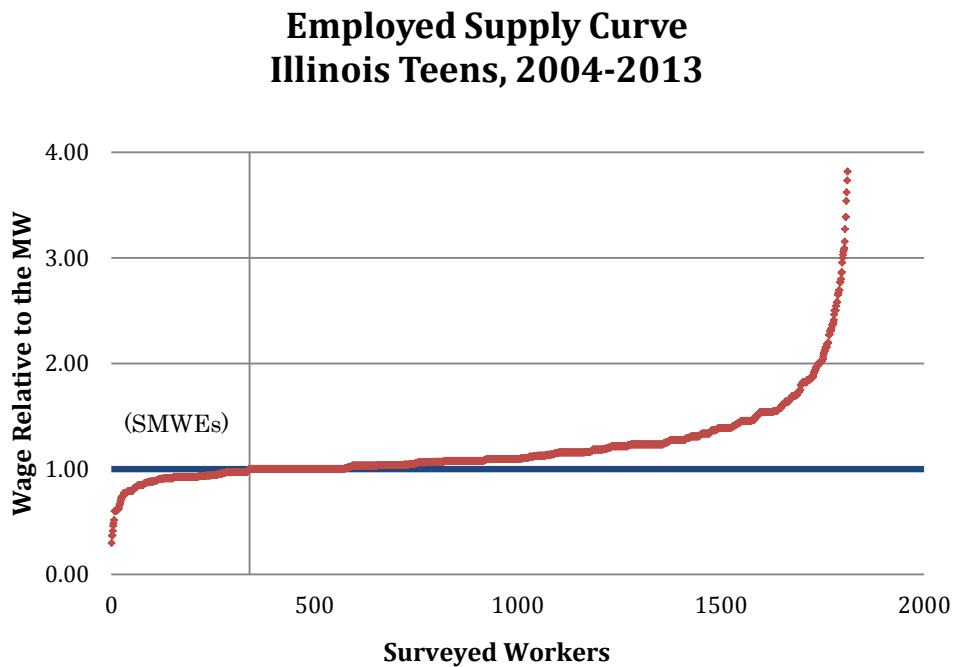
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APPENDIX

Graph A: Employed Supply Curve of Illinois Teen Workers, Including Sub-Minimum Wage Earners, 2004-2013



Source: Authors' analysis of CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Responses are *not* weighted to match the population. Supply curve is capped at 4 times the minimum wage in the graph, but the highest reported teen wage was \$82.42 per hour, 9.99 times the adult minimum wage in the survey year (2013). Respondents to the left of the vertical axis (18.6 percent) earned less than the adult minimum wage and are labeled as SMWEs, or "sub-minimum wage earners."

TABLE A: OLS REGRESSION OF IMPACT OF \$1 MW INCREASE ON AVERAGE WAGE, ILLINOIS TEEN WORKERS, 2004-2013

Wage_NBER	Hourly Wages					
	<u>Simple Model</u>		<u>W/ Occ and Ind</u>		<u>Full Model</u>	
	Coefficient	(St. Err.)	Coefficient	(St. Err.)	Coefficient	(St. Err.)
\$1 MW increase	0.688***	(0.107)	0.504***	(0.125)	0.496***	(0.133)
Business cycle index					-0.004	(0.024)
Female	-0.548***	(0.202)	-0.383*	(0.215)	-0.382*	(0.215)
Citizen	1.709**	(0.735)	0.850	(0.802)	0.892	(0.845)
Chicago MSA	-0.285	(0.219)	-0.261	(0.222)	-0.258	(0.223)
Public sector employment	-0.447	(0.435)	-0.613	(0.520)	-0.609	(0.521)
Union membership	0.017	(0.510)	0.006	(0.532)	0.002	(0.533)
White, non-Latino	1.070*	(0.556)	0.447	(0.587)	0.460	(0.593)
African-American	0.937	(0.630)	0.474	(0.655)	0.491	(0.663)
Latino or Latina	1.231**	(0.607)	0.677	(0.635)	0.687	(0.638)
Immigrant	1.626**	(0.676)	0.685	(0.724)	0.723	(0.760)
Less than HS	0.848	(0.820)	-0.356	(0.941)	-0.302	(0.995)
High school	2.038**	(0.832)	0.600	(0.946)	0.655	(1.002)
Some college, no degree	2.056**	(0.837)	0.775	(0.775)	0.826	(0.999)
Occupation Dummies	N		Y		Y	
Industry Dummies	N		Y		Y	
Constant	Suppressed		Suppressed		Suppressed	
R ²	0.852		0.863		0.863	
Observations	1,354		1,354		1,354	
Weighted	Y		Y		Y	

Three asterisks (***) indicate significance at the 1% level, two asterisks (**) indicates significance at the 5% level, and one asterisk (*) indicates significance at the 10% level. Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the total population 16 years of age or older. Note: "Business cycle index" = (employment/population in year n)/(employment/population in 2004) for working age Illinois residents between 21 years old and 64 years old. The business cycle index is 100.0 in 2004 and 96.08 in 2013. For full regression outputs in a .txt format, please contact author Frank Manzo IV at fmanzo@illinoiseipi.org.

TABLE B: QUANTILE REGRESSION OF IMPACT OF \$1 MW INCREASE ON AVERAGE WAGE, ILLINOIS TEEN WORKERS, 2004-2013

Wage_NBER	Hourly Wages					
	<u>Bottom 25 Percentile</u>		<u>Median Worker</u>		<u>Top 25 Percentile</u>	
	Coefficient	(St. Err.)	Coefficient	(St. Err.)	Coefficient	(St. Err.)
\$1 MW increase	0.714***	(0.140)	0.492***	(0.173)	-0.050	(0.412)
Business cycle index	-0.000	(0.035)	-0.294	(0.043)	-0.117	(0.103)
Female	-0.064	(0.073)	-0.020	(0.090)	-0.059	(0.214)
Citizen	-0.098	(0.286)	0.850	(0.353)	-0.410	(0.844)
Chicago MSA	0.524	(0.075)	0.141	(0.093)	0.282	(0.222)
Public sector employment	-0.010	(0.176)	-0.274	(0.217)	-0.541	(0.519)
Union membership	-0.400**	(0.180)	-0.126	(0.222)	0.080	(0.531)
White, non-Latino	0.445**	(0.200)	0.185	(0.248)	0.181	(0.591)
African-American	0.419*	(0.224)	0.335	(0.277)	0.181	(0.661)
Latino or Latina	0.370*	(0.215)	0.075	(0.266)	-0.031	(0.636)
Immigrant	-0.113	(0.257)	0.393	(0.317)	0.208	(0.758)
Less than HS	1.192***	(0.336)	0.725*	(0.415)	-0.540	(0.992)
High school	1.576***	(0.338)	1.226***	(0.418)	0.786	(0.998)
Some college, no degree	1.667***	(0.338)	1.459***	(0.417)	0.720	(0.997)
Occupation Dummies	Y		Y		Y	
Industry Dummies	Y		Y		Y	
Constant	-3.480	(4.551)	4.373	(5.628)	20.835	(13.44)
R ²	0.171		0.127		0.143	
Observations	1,354		1,354		1,354	
Weighted	Y		Y		Y	

Three asterisks (***) indicate significance at the 1% level, two asterisks (**) indicates significance at the 5% level, and one asterisk (*) indicates significance at the 10% level. Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the total population 16 years of age or older. Note: "Business cycle index" = (employment/population in year n)/(employment/population in 2004) for working age Illinois residents between 21 years old and 64 years old. The business cycle index is 100.0 in 2004 and 96.08 in 2013. For full regression outputs in a .txt format, please contact author Frank Manzo IV at fmanzo@illinoisepi.org.

TABLE C: PROBIT REGRESSION OF IMPACT OF \$1 MW INCREASE ON PROB(EMPLOYED), ILLINOIS TEEN WORKERS, 2004-2013

Prob(Employed)	Employment Rate		Employment Rate	
	<u>No Labor Market Slack</u>		<u>Yes Labor Market Slack</u>	
	AMEs	(St. Err.)	AMEs	(St. Err.)
\$1 MW increase	-0.055***	(0.007)	0.012	(0.023)
Business cycle index			0.018***	(0.006)
Female	0.018	(0.012)	0.018	(0.012)
Citizen	-0.062	(0.046)	-0.063	(0.046)
Chicago MSA	-0.113***	(0.013)	-0.113***	(0.013)
White, non-Latino	0.117***	(0.029)	0.119***	(0.029)
African-American	-0.085***	(0.032)	-0.084***	(0.032)
Latino or Latina	0.050	(0.031)	0.051*	(0.031)
Immigrant	-0.023	(0.041)	-0.024	(0.041)
Less than HS	-0.264***	(0.060)	-0.263***	(0.060)
High school	-0.074	(0.061)	-0.073	(0.061)
Some college, no degree	-0.068	(0.061)	-0.066	(0.061)
Constant	0.300	(0.006)	0.300	(0.006)
R ²	0.086		0.087	
Observations	5,631		5,631	

Three asterisks (***) indicate significance at the 1% level, two asterisks (**) indicates significance at the 5% level, and one asterisk (*) indicates significance at the 10% level. Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. AMEs are the “average marginal effects” or “average partial effects,” and are the important figures in this output. Probit regressions report the (positive or negative) direction of the effect that a factor has on the binary variable of interest and whether the output is statistically significant. AMEs are used to determine the magnitude of statistically significant factors. Note: “Business cycle index” = (employment/population in year n)/(employment/population in 2004) for working age Illinois residents between 21 years old and 64 years old. The business cycle index is 100.0 in 2004 and 96.08 in 2013. For full regression outputs in a .txt format, please contact author Frank Manzo IV at fmanzo@illinoisepi.org.

TABLE D: OLS REGRESSION OF IMPACT OF \$1 MW INCREASE ON HOURS WORKED, ILLINOIS TEEN WORKERS, 2004-2013

Usual Hours Worked	Work Week					
	Simple Model		W/ Occ and Ind		Full Model	
	Coefficient	(St. Err.)	Coefficient	(St. Err.)	Coefficient	(St. Err.)
\$1 MW increase	0.889***	(0.308)	-0.623*	(0.308)	-0.181	(0.357)
Business cycle index					0.225	(0.064)
Female	-1.864***	(0.583)	-1.505***	(0.583)	-1.551***	(0.575)
Citizen	5.010**	(2.119)	-4.464**	(2.119)	-6.958***	(2.259)
Chicago MSA	-0.487	(0.632)	-0.698	(0.632)	-0.856	(0.596)
Public sector employment	-1.140	(1.253)	3.099**	(1.253)	2.856**	(1.392)
Union membership	1.761	(1.470)	-0.441	(1.470)	-0.265	(1.424)
White, non-Latino	5.695***	(1.602)	1.992	(1.602)	1.248	(1.585)
African-American	9.641***	(1.815)	5.249***	(1.815)	4.300***	(1.772)
Latino or Latina	8.831***	(1.749)	4.381**	(1.749)	3.780**	(1.705)
Immigrant	7.556***	(1.946)	-1.111	(1.946)	-3.275	(2.031)
Less than HS	1.275	(2.361)	-7.460***	(2.361)	-10.486***	(2.659)
High school	9.171***	(2.397)	-0.414	(2.397)	-3.487	(2.677)
Some college, no degree	7.025***	(2.410)	-1.781	(2.410)	-4.675*	(2.671)
Occupation Dummies	Y		Y		Y	
Industry Dummies	Y		Y		Y	
Constant	Suppressed		Suppressed		Suppressed	
R ²	0.811		0.848		0.849	
Observations	1,354		1,354		1,354	
Weighted	Y		Y		Y	

Three asterisks (***) indicate significance at the 1% level, two asterisks (**) indicates significance at the 5% level, and one asterisk (*) indicates significance at the 10% level. Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. Statistics are adjusted by the outgoing rotation group earnings weight to match the total population 16 years of age or older. Note: "Business cycle index" = (employment/population in year n)/(employment/population in 2004) for working age Illinois residents between 21 years old and 64 years old. The business cycle index is 100.0 in 2004 and 96.08 in 2013. For full regression outputs in a .txt format, please contact author Frank Manzo IV at fmanzo@illinoisepi.org.

TABLE E: PROBIT REGRESSION OF IMPACT OF \$1 MW INCREASE ON PROB(IN SCHOOL), ILLINOIS TEEN WORKERS, 2004-2013

Prob(Employed)	School Enrollment Rate		School Enrollment Rate	
	<u>No Labor Market Slack</u>		<u>Yes Labor Market Slack</u>	
	AMEs	(St. Err.)	AMEs	(St. Err.)
\$1 MW increase	0.015**	(0.007)	0.020	(0.022)
Business cycle index			0.001	(0.005)
Female	0.028***	(0.011)	0.028***	(0.011)
Citizen	0.057	(0.042)	0.040	(0.042)
Chicago MSA	0.057***	(0.013)	0.057***	(0.013)
White, non-Latino	-0.068**	(0.029)	-0.068**	(0.029)
African-American	-0.080***	(0.030)	-0.080***	(0.030)
Latino or Latina	-0.098***	(0.030)	-0.098***	(0.030)
Immigrant	-0.036	(0.037)	-0.036	(0.037)
Less than HS	0.235***	(0.054)	0.235***	(0.054)
High school	-0.001	(0.055)	-0.001	(0.055)
Some college, no degree	0.226	(0.056)	0.226	(0.055)
Constant	0.770	(0.005)	0.300	(0.005)
R ²	0.064		0.064	
Observations	5,638		5,638	

Three asterisks (***) indicate significance at the 1% level, two asterisks (**) indicates significance at the 5% level, and one asterisk (*) indicates significance at the 10% level. Source: CPS-ORG, Center for Economic and Policy Research Uniform Data Extracts, 2004 to 2013. AMEs are the “average marginal effects” or “average partial effects,” and are the important figures in this output. Probit regressions report the (positive or negative) direction of the effect that a factor has on the binary variable of interest and whether the output is statistically significant. AMEs are used to determine the magnitude of statistically significant factors. Note: “Business cycle index” = (employment/population in year n)/(employment/population in 2004) for working age Illinois residents between 21 years old and 64 years old. The business cycle index is 100.0 in 2004 and 96.08 in 2013. For full regression outputs in a .txt format, please contact author Frank Manzo IV at fmanzo@illinoisepi.org.