Employment Policies INSTITUTE

The Effect of Minimum Wage Increases on Retail and Small Business Employment

by Joseph J. Sabia, University of Georgia
May 2006

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Overview

A recent study by the Fiscal Policy Institute (FPI) claims that increases in the minimum wage at the state level have had no adverse employment effects. Specifically, the FPI report concludes that states that raised their wage floor above the federal level did not experience declines in small business employment, and, in fact, actually experienced an increase in retail employment.

While the FPI study has been frequently cited by supporters of increases in the minimum wage, the study is based on faulty statistical methods, and its results provide an inaccurate picture of the effect of state-level minimum wage increases. This paper, by Dr. Joseph Sabia of the University of Georgia, presents a more careful and methodologically rigorous analysis of state-level minimum wage increases. His results confirm the consensus economic opinion that increases in the minimum wage decrease employment, particularly for low-skilled and entry-level employees.

Employment Results

Using government data from January 1979 to December 2004, the effect of minimum wage increases on retail and small business employment is estimated. Specifically, a 10 percent increase in the minimum wage is associated with a 0.9 to 1.1 percent decline in retail employment and a 0.8 to 1.2 percent reduction in small business employment.

These employment effects grow even larger for the low-skilled employees most affected by minimum wage increases. A 10 percent increase in the minimum wage is associated with a 2.7 to 4.3 percent decline in teen employment in the retail sector, a 5 percent decline in average retail hours worked by all teenagers, and a 2.8 percent decline in retail hours worked by teenagers who remain employed in retail jobs.

These results increase in magnitude when focusing on the effect on small businesses. A 10 percent increase in the minimum wage is associated with a 4.6 to 9.0 percent decline in teenage employment in small businesses and a 4.8 to 8.8 percent reduction in hours worked by teens in the retail sector.

Methodological Concerns in the Fiscal Policy Institute Report

The results in this report are all statistically significant. In both the small business and retail industry analyses conducted by FPI, however, no explicit tests for statistically significant differences in employment were presented. This is only one of the important differences between this study and the FPI report. Another is that while the FPI report chiefly examines employment changes over only two time periods (1998 and 2001), this study examines the effect of state minimum wage increases on employment across a significantly longer time period (1979-2004).

Even more troubling, the FPI analysis does not control for any changes in state-level socioeconomic or demographic characteristics that could affect both minimum wage hikes and changes in employment. For example, states may choose to raise their minimum wages when they anticipate strong economic growth in sectors that employ a large share of minimum-wage workers. If this is true, then estimates of the impact of the minimum wage on employment will be biased toward zero. Put another way, the FPI study does not hold "all else equal" in estimating the effect of the minimum wage.

By controlling for economic and demographic changes that may be associated with both the implementation of minimum wage increases and changes in teenage employment, this study is able to more credibly isolate the effect of minimum wage increases.

Conclusion

These findings provide consistent evidence that minimum wage increases result in a significant decline in retail and small business employment. This finding is robust across several model specifications. Furthermore, these findings refute many of the claims raised in the FPI study so often cited in favor of minimum wage increases at the state and federal levels. The differences between these studies are likely a result of the more careful and appropriate methodological methods utilized in this study.

Taken together with other recent work, the results of this study suggest that low-skilled employees will find themselves unable to escape adverse labor market consequences resulting from minimum wage increases. Instead of passing these politically popular but destructive mandates, policymakers should consider other programs to help the working poor such as the Earned Income Tax Credit. The EITC is a far more effective policy tool to reduce poverty among poor families. Moreover, the EITC has the advantage of avoiding the adverse employment effects described in this study.

The Effect of Minimum Wage Increases on Retail and Small Business Employment

Introduction

A recent study by the Fiscal Policy Institute (FPI) (2004) suggests that minimum wage increases do not have adverse employment effects. The authors of the FPI report conclude that states that increased their minimum wages above the federal minimum did not experience declines in small business employment, and, in fact, actually experienced an increase in retail employment. Along with the influential studies of Card et al. (1994) and Card and Krueger (1995), the findings of the FPI study challenge the widely shared view among labor economists that minimum wage hikes cause unemployment of low-skilled workers (Fuchs et al., 1998).

The results of the FPI study have been publicized in the mainstream media (see, for example, New York *Newsday*, 2006) and have been cited by numerous advocates of minimum wage increases at both the federal and state levels. In 2004, Dr. Jared Bernstein, a senior economist at the Economic Policy Institute, testified before the U.S. House Subcommittee on Workforce, Empowerment, and Government Programs. He claimed that a federal minimum wage hike would not have disemployment effects, citing the FPI study's results on retail and small business employment as evidence for his position. Bernstein stated that "between 1998 and 2001, the number of small business establishments grew twice as quickly in states with higher minimum wages (3.1% vs. 1.6%)" (Bernstein, 2004).

In May 2005, United States Senator Ted Kennedy (D-MA) re-introduced legislation to raise the federal minimum wage from $5.15 to $7.25, and argued that minimum wage increases had no adverse employment effects in the retail industry:

> "History clearly shows that raising the minimum wage has not had any negative impact on jobs, employment, or inflation. In the four years after the last minimum wage increase passed, the economy experienced its strongest growth in over three decades. More than 11 million new jobs were added, at a pace of 232,000 per month. There were ten million new service industry jobs, including more than one and a half million retail jobs, of which nearly 600,000 were restaurant jobs." (Kennedy, 2005)

Several advocates of state minimum wage hikes have also cited the conclusions of the FPI study. In a legislative analysis of California Senate Bill 1162—which would raise the state minimum wage from $7.25 to $7.75—the Committee on Industrial and Labor Relations bolstered its support for a minimum wage hike by referring to "a recent Fiscal Policy Institute (FPI) study of state minimum wages [that] found no evidence of negative employment effects on small businesses" (CSCILR, 2004).

In February 2005, Steve Hill of the Maryland Budget and Tax Policy Institute testified before the Maryland Senate Finance Committee in support of a proposed minimum wage hike and cited the FPI study, stating, "Between 1998 and 2001, the number of small business establishments grew twice as quickly in states with higher minimum wages [and] retail employment grew 1.5 times more quickly in higher minimum wage states" (Hill, 2005).

In September 2005, economist Stephen Herztberg testified before the Pennsylvania Senate Labor and Industry Committee and cited the

"recent Fiscal Policy Institute study of state minimum wages [that] found no evidence of negative employment effects" to support his claim that the state minimum wage should be raised. Judith Conti, director of the D.C. Employment Justice Center, testified in support of a minimum wage in the District of Columbia by telling the D.C. Committee on Public Services:

> "There are many credible and well-documented studies that prove that modest raises in the minimum wage have a negligible impact on employment levels or the rate of businesses closing. Indeed, a raise in the minimum wage usually accomplishes the exact opposite. Workers who make more money have more money to invest in consumer goods. The whole community wins. An April 2004 Fiscal Policy Institute study showed that in states with a minimum wage above $5.15, rather than having to lay workers off, small businesses experienced higher employment than their counterparts in states with lower minimum wages." (Conti, 2005)

Thus, along with the studies of Card et al. (1994) and Card and Krueger (1995), the results of the FPI study have become an important talking point among advocates of state and federal minimum wage hikes. However, there are important theoretical and methodological problems with the FPI report that cast doubt on the conclusion that minimum wage hikes have no adverse effects on retail and small business employment.

This study presents a more careful analysis of the effect of minimum wage hikes during the 1980s, 1990s, and 2000s and finds that there are important adverse employment effects among low-skilled workers in the retail sector and in small businesses. Using Current Population Survey (CPS) data from January 1979 to December 2004, the effect of minimum wage increases on retail and small business employment is estimated. Teenagers are examined as a population of interest because they represent a group of low-skilled workers that are most likely to be directly affected by minimum wage hikes. This study examines the effect of minimum wage increases on the following employment outcomes:

- the share of individuals aged 16-64 employed in the retail industry;
- the share of individuals aged 16-64 employed in small businesses;
- the share of teenagers (age 16-19) employed;
- average hours worked by all teenagers;
- average hours worked by employed teenagers;
- the share of teenagers employed in the retail industry;
- average hours worked by teenagers in the retail industry;
- the share of teenagers employed in small businesses; and
- average hours worked by teenagers in small businesses.

Estimation results suggest consistent evidence of a significant negative relationship between minimum wage increases and retail and small business employment. A 10 percent increase in the minimum wage is associated with a 0.9 to 1.1 percent decline in the share of individuals aged 16-64 who are employed in the retail industry, and a 0.8 to 1.2 percent reduction in the share of individuals aged 16-64 employed in small businesses.

As expected, the effects of minimum wage hikes are larger in magnitude for low-skilled

workers. A 10 percent increase in the minimum wage is associated with a 2.7 to 4.3 percent decline in the ratio of teenagers employed in the retail sector, a 5 percent decline in average retail hours worked by all teenagers, and a 2.8 percent decline in retail hours worked by teenagers who remain employed in retail jobs. For small businesses, the disemployment effects are even larger. A 10 percent increase in the minimum wage is associated with a 4.6 to 9.0 percent decline in the ratio of teenagers employed in businesses with 100 or fewer employers, a 4.8 to 8.8 percent decline in average small business hours worked by all teenagers, and a 5.6 to 7.3 percent decline in average small business hours worked by teenagers who remain employed in small businesses.

The results of this study cast doubt on the Fiscal Policy Institute's claim that raising the minimum wage will have no adverse effects on low-skilled employment in retail or small businesses. These findings suggest that state minimum wage increases have adverse effects on employment in retail and small businesses. Moreover, the results suggest that teenagers —a group of low-skilled workers most likely to be adversely affected by minimum wage hikes—experience important declines in employment and hours worked due to minimum wage increases. Taken together with other research by labor economists (Abowd, Kramarz, Lemieux, and Margolis, 2004; Burkhauser, Couch, and Wittenburg, 2000a; Burkhauser, Couch, and Wittenburg, 2000b; Deere, Murphy, and Welch, 1995; Neumark and Wascher, 1994; Neumark et al., 2001; Neumark et al., 2004, 2005; Burkhauser, Couch, and Glenn, 1996; Burkhauser and Sabia, 2004), this finding suggests that raising the minimum wage is a poor policy tool to aid low-skilled workers.

Empirical Literature

The "new economics of the minimum wage" literature was forged by Card et al. (1994) and Card and Krueger (1995). Using Current Population Survey (CPS) data from 1979 to 1992, these authors found that state minimum wage increases did not have adverse employment effects. Following these highly publicized series of papers, many researchers have used the CPS to estimate the impacts of minimum wage increases on the employment of low-skilled workers (Abowd, Kramarz, Lemieux, and Margolis, 2004; Burkhauser, Couch, and Wittenburg, 2000; Deere, Murphy, and Welch, 1995; Neumark and Wascher, 1994; Neumark et al., 2002; Neumark et al., 2004, 2005). Most of these studies have found that raising the minimum wage is associated with a reduction in the employment of low-skilled workers, including teenagers, restoring a general consensus among labor economists that minimum wage hikes have adverse employment effects (Fuchs et al., 1998).[1]

A recent FPI study (2004), however, finds its inspiration in earlier studies by Card and Krueger (1995), with the twist of focusing on the relationship between minimum wage increases and employment in retail and small businesses. The authors focus on retail and small businesses because, they argue, such sectors have large concentrations of low-skilled laborers that are expected to be most adversely affected by minimum wage hikes. Using data from the U.S. Commerce Department's County Business Patterns in 1998 and 2001, the authors compare the change in small business employment in states that raised the minimum wage with the change in small business employment in states that did not raise the minimum wage, and find no difference in small business employment. Moreover, when the authors compare the change in retail employment, they concluded that "retail

employment grew by 6.1 percent in minimum wage states versus 1.9 percent in other states." However, in both the small business and retail industry analyses, no explicit tests for statistically significant differences in employment were presented.

There are several important shortcomings with the FPI study, which are addressed in the current study. First, while the FPI report chiefly examines employment changes over two time periods (1998 and 2001), this study examines the effect of state minimum wage increases on employment across a longer time period: 1979-2004. Both the greater sample size and the greater within-state variation in minimum wages enhance the statistical power of this study.

Second, the FPI analysis does not control for any changes in state-level socioeconomic or demographic characteristics that could affect both minimum wage hikes and changes in employment. For example, states may choose to raise their minimum wages when they anticipate strong economic growth in sectors that employ a large share of minimum wage workers. If this is true, then estimates of the impact of the minimum wage on employment will be biased toward zero. Put another way, the FPI study does not hold "all else equal" in estimating the effect of the minimum wage. The current study includes several state-specific and national control variables designed to better hold all else equal in estimating the effect of minimum wage increases. By controlling for economic and demographic changes that may be associated with both the implementation of minimum wage increases and changes in teenage employment, this study is able to more credibly isolate the effect of minimum wage increases. These control variables include the state-specific prime male age unemployment rate, the average wage rate of adults, the share of the state population that are teenagers, whether the national economy is in a recession, seasonal employment trends, unobserved national trends, state-specific unobserved linear trends, and time-invariant unobserved state-specific characteristics.[2]

Third, the FPI study uses the overall retail or small business employment rate as the dependent variable. While it is true that the concentration of low-skilled workers in both retail and small businesses warrants special attention to these sectors, the presence of skilled workers in these sectors creates an important problem. Minimum wage increases are not expected to directly impact the employment rates of non-minimum wage workers. Moderately- or highly-skilled workers, for example, will not be directly affected by state minimum wage hikes. Thus, the FPI report may find no difference in overall employment rates between states that raised their minimum wage and states that did not, because adverse employment effects may simply be "masked" by the inclusion of skilled workers in the employment measure. This problem is amplified by the limited statistical power of the report's evaluation design. Rather than examine the overall employment rate in these sectors, it may be more appropriate to examine the employment of workers most likely to be affected by the minimum wage—low-skilled workers. The current study examines the effect of minimum wage increases on the labor market outcomes of a group of low-skilled workers that is likely to be affected by such policy changes: teenagers. Examining the outcomes of teenagers will allow an examination of whether the FPI results "masked" adverse employment effects experienced by low-skilled workers in retail and small businesses. This study uses state-specific minimum wage rates rather than grouping all states with minimum wages higher than the federal minimum together and treating them identically.

Fourth, the FPI study assumes that every state with a minimum wage higher than the federal minimum wage will have the same effect

on all workers. But since each of these states has a different minimum wage, it is inappropriate to group such states together. More precisely estimated policy impacts that take into account each state's minimum wage rate are desirable, and this is done in the current study.

Fifth, the FPI study examines only the effects of minimum wage increases on employment rates. But minimum wage increases may affect not only employment decisions by employers, but hours worked among current employees. Neumark, Schweitzer, and Wascher (2004, 2005) have emphasized the need for more complete analyses of the impacts of minimum wage increases, focusing not only on employment, but also on wages, hours worked, and earnings. For example, in their 2004 paper, these authors conclude that while "workers who initially earn near the minimum wage experience wage gains[,] their hours and employment decline, and the combined effect of these changes on earned income suggests adverse consequences, on net, for low-wage workers." Unlike the FPI study, this study examines hours worked to provide a more complete picture of the effect of minimum wage increases on labor market outcomes. This is important because firms may respond to minimum wage increases not only by reducing their number of employees but also hours offered existing employees. And finally, this study explicitly allows for the possibility that the lagged minimum wage may affect current year employment. Taken together, these methodological and theoretical improvements will permit more credible estimates of the effect of minimum wage increases on the employment outcomes of low-skilled workers in small or retail businesses.

Finally, the methodology used in the FPI report does not explicitly allow for lagged minimum wage effects. Neumark et al. (1994) note that firms may respond to minimum wage hikes following their implementation. It may be that the prevailing minimum wage in the previous period may impact employment decisions in the current period. That is, there may be important lagged effects that should be incorporated into analyses of the effects of minimum wage increases. This is done in the current study.

Econometric Model

Following Card and Krueger (1995) and Burkhauser et al. (2000), a fixed effects model of the following form is used to estimate the employment models:

1

$$E_{ijt} = \alpha + s_i \delta_i + m_j \lambda_j + \tau_t \theta_t + MW_{ijt} \gamma + X_{ijt} \beta + \varepsilon_{ijt}$$

where E_{ijt} is the ratio of employment to population in state *i* in month *j* in year *t*, s_i is a time-invariant state effect, m_j is a seasonal (month) effect, τ_t is a year effect, MW_{ijt} is the natural logarithm of the larger of the state or federal minimum wage, and X_{ijt} is a set of state-specific time-varying observables.[3] Each of the control variables is included because each is expected to have an impact on employment, and the variable's omission may result in a biased estimate of the impact of minimum wage increases.

The dependent variable is a measure of employment to population, as is common in the minimum wage literature. This measure is preferred to employment levels because employment levels may change simply because of state-specific changes in the working-age population over time. Five specific employed to population measures are used:

- the share of individuals aged 16-64 employed in the retail industry;
- the share of individuals aged 16-64 employed in small businesses;

- the share of 16-19 year-olds employed;
- the share of 16-19 year-olds employed in retail businesses; and
- the share of 16-19 year-olds employed in small businesses.

In the model described in equation (1), the state effect (δ) is included to capture any state-specific, time-invariant unobserved characteristics associated with employment rates. For instance, if there is a stronger work ethic among teens in Georgia than in New York, the state effect will capture this, as long as this unmeasured work ethic does not change over time in Georgia or New York. A time-varying state-level measure of the prime age unemployment rate and year effects are included so as to capture changes in macroeconomic conditions that may be correlated with the adoption of state-level minimum wage changes and with changes in employment. Month effects are included to capture seasonal trends in employment. The key parameter of interest is. The estimate of can be interpreted as the effect of state minimum wage hikes above the federal minimum wage on teenage employment.[4]

The empirical framework described in equation (1) can be extended to permit delayed employment effects through the inclusion of a lagged minimum wage variable, and nonlinear impacts of minimum wage increases by using dummy variables for each state and federal minimum wage rather than the continuous measure described in equation (1). These alternate specifications are estimated to show that estimation results are not sensitive to modest changes in the model specification.

In addition to estimating employment effects, this study also examines the effects of minimum wage increases on average hours worked by teenagers:

2

$$H_{ijt} = \alpha + s_i\delta_i + m_j\lambda_j + \tau_t\theta_t + MW_{ijt}\gamma + X_{ijt}\beta + \varepsilon_{ijt}$$

where H_{ijt} is the natural log of the average hours worked by individuals. Six measures of average hours worked are used:

- average hours worked by all 16-19-year-olds(including nonworkers);
- average hours worked by employed 16-19-year-olds;
- average retail hours worked by all 16-19year-olds (including nonworkers);
- average retail hours worked by 16-19 year-olds employed in retail jobs;
- average small business hours worked by all 16-19-year-olds (including nonworkers);
- average retail hours worked by 16-19-year-olds employed in small business jobs;

Because employers may respond to minimum wage increases not only by reducing employment but also by reducing hours worked, estimating models such as equation (2) will provide a more complete picture of the effect of minimum wage increases on labor market outcomes.

Data

The data for the overall and retail employment analyses come from the CPS Merged Outgoing Rotation Group (MORG) from January 1979 to December 2004. From these individual-level data, a panel of states and months is created. There are approximately 22,000 to 23,000 individuals aged 16-64 in each month, and these individual observations, along with their respective weights, are used to create nationally representative state-month observations. While several previous studies have used panels of states and years using CPS data (Card and Krueger, 1995; Neumark and Wascher, 1994; Deere et al., 1995), Burkhauser et al. (2000) argue in favor of state-month observations due to (i) the statistical power gained from the increase in the overall sample size and (ii) the

gain in month-specific variation in the state or federal minimum wage. The total sample size for the overall and retail employment analysis is 11,861.[5]

For the analysis of small business employment, monthly data on employer size are not available, and annual information is only available beginning in the late 1980s. A panel of states and years is constructed using the March CPS outgoing rotation group data from March 1989 to March 2005. There are 867 observations used in the small business employment analysis, so the power of the evaluation design is weakened.

Table 1 presents the names, definitions, and weighted means of the dependent and independent variables used in the econometric analysis. The key dependent variables are listed first. They include the ratio of individuals aged 16-64 who are employed in retail jobs (ORETAIL) and in small businesses (OSMALL). A retail sector job is defined using the two-digit Standard Industrial Classification (SIC)-based Detailed Industry Classification Code and the North American Industry Classification System (NAICS).[6] An individual is defined to have been employed in the retail industry if he or she reports working positive hours last week in a retail job. The mean ratio of retail employment to population in the sample is 0.11.

Data on employer size are available in the CPS from March 1989 to March 2005. In annual surveys, workers were asked, "Counting all locations where [your primary] employer operates, what is the total number of persons who work for [the] employer?" This measure of employer size may be measured with error since employees may not know the number of locations of their employer and may be ignorant of the total number of employees. Indeed, comparing CPS reports on employer size to the Census' Statistics on U.S. Businesses, the Small Business Administration (1997) concludes that while the CPS may understate true employer size, the CPS is still, the CPS is still valuable in its matching of individual characteristics to characteristics of their employers. In this study, an individual is defined as employed in a small business if he or she reports working for an employer with 100 or fewer employees at all locations.[7]

It is important to note that individuals in the March CPS are asked about employer size for their *previous year's* employment, rather than current employment, as is the case for retail employment. Hence, for the small business analysis, labor market participation information must be used from the previous year. Moreover, minimum wage information must be used from the year prior to the administering of the survey. For the small business sample, an individual is defined as employed if he or she reported working positive hours in the previous *year.* The mean ratio of small business employment to population in the sample is 0.34.

For low-skilled workers—teenagers—the key dependent variables include the natural logarithm of the average teenage wage rate (TEENWAGE), the ratio of teenagers employed to the teenage population (TEMPLOY), the natural log of the average number of hours worked by all teenagers (THOURS), and the natural log of the average number of hours worked by employed teens (THOURSW). The variables also include measures of teenage employment and hours worked in the retail industry (TRETAIL, TRHOURS, TSHOURSW) and in small businesses (TSMALL, TSHOURS, TSHOURSW).

Over the period 1979-2004, the mean ratio of teenage employment in the retail sector to teenage population was 0.22, representing more than 50 percent of all teenage employment. The mean number of hours per week worked by employed teens in the retail sector was 21.6 hours (natural log equal to 3.07).

From March 1989 to March 2005, the ratio of teenagers employed in franchises with 100

or fewer employees to teenage population was 0.27. A measure of annual hours worked is constructed using reports of weeks worked last year and usual hours worked per week. Among all teens, the average annual hours worked in small businesses is 195 hours (natural log of 5.27); among teens employed in small businesses, the average annual hours worked is 731 hours (natural log of 6.59).

Also included in Table 1 are the weighted means and standard deviations of the control variables, identical to those used in Card and Krueger (1995) and by Burkhauser et al. (2000). The central independent variable of interest is the natural log of the greater of the state or federal minimum wage. Economic and demographic variables believed to influence retail or small business employment include the mean wage rate of prime-age working adults, the share of teenagers in the overall population, and the overall unemployment rate of prime-age males. Other control variables include seasonal adjustments (month effects), which are especially important for teenagers who are more likely to work over the summer months and over holiday breaks than at other times of the year. Recession dummies are included as an alternative macroeconomic control to year effects in some models.[8] Several different models are estimated to show whether the results are sensitive to choice of macroeconomic control variables, the inclusion of lagged minimum wages, and nonlinear effects of minimum wages. All models presented are weighted by the overall state population, and include state effects to control for time-invariant state-level unobserved heterogeneity.

Appendix A shows state minimum wages that were higher than the federal minimum wage on January 1 of each year from 1979 to 2005. In 2005, 14 states had minimum wages that were higher than the federal minimum wage level of $5.15 per hour. Since the last federal minimum wage increase, there have been many increases in state minimum wages. Not only are a greater number of states implementing minimum wages higher than the federal minimum (i.e., 10 states in 1995 vs. 14 states in 2005), but the states that are implementing higher minimum wages are choosing minimum wage levels that are increasingly higher than the federal minimum.[9]

Empirical Findings

Overall Retail and Small Business Employment.

Table 2 presents estimates of the effect of state minimum wage increases on the share of individuals aged 16-64 who are employed in retail jobs (columns 1-4) or in small businesses (columns 5-8). Estimates on retail employment are obtained using the full state-month panel of 15,861 observations from January 1979 to December 2004. Estimates on small business employment are obtained using state-year observations from March 1989 to March 2005.

The findings in columns (1)-(4) suggest consistent evidence that increases in state minimum wages are associated with declines in retail employment. Model (1) presents fixed effects estimates, model (2) corrects for heteroskedastic and autocorrelated errors[10], model (3) controls for state-specific changes in the overall prime-age adult male (age 25-54) unemployment rate, and model (4) controls for state-specific linear time trends to capture linear trends in unobserved state-specific characteristics. Across each specification, the evidence is consistent: a 10 percent increase in state minimum wages decreases the share of 16-64-year-olds employed in the retail industry by 1 to 3 percent. This finding is consistent with neoclassical economic theory, which predicts that price floors cause unemployment among low-skilled workers, and contradicts the FPI report's finding that a minimum wage hike *increased* retail employment.

In columns (5)-(8) of Table 2, estimates of the effect of state minimum wage increases on the share of individuals aged 16-64 employed in small businesses are presented. Employment in small businesses is defined as those working at a business with fewer than 100 employees employed at any location. As discussed above, information on employer size is only available annually in the March CPS beginning in the late 1980s. A panel of 51 states[11] and 16 years between 1989 and 2005 is used to estimate the effect of minimum wage increases on teen employment in small businesses. The use of annual data over this limited time interval reduces the power of the evaluation design due to (i) the reduction in sample size from more than 16,000 to 867 and (ii) elimination of state-specific monthly variation in minimum wage policies. Despite this reduction in statistical power, across each of these specifications, there is consistent evidence that a 10 percent increase in the minimum wage is associated with a 1 percent decline in small business employment. Again, this finding is in contrast to the FPI report, which found no adverse effects of minimum wage hikes on small business employment.

Taken together, the findings in Table 2 suggest that despite the FPI report's claim, there is no such thing as a free lunch. More careful statistical models with more complete data suggest that minimum wage hikes come at a price: unemployment of workers in retail and small businesses. There are three key reasons why the current study's findings are more credible than those presented in the FPI report. First, the econometric model used in this study is more appropriate than the simple "difference-in-difference" framework used by the authors of the FPI study.[12] While the FPI study did not control for any changes in the economic environment that could be correlated with both states' decisions to implement the minimum wage and with employment outcomes, this study controls for several state-specific changes in economic conditions, as well as national macroeconomic trends. Second, this study has greater statistical power than the FPI study because of a significantly larger number of observations over a longer period of time (more than 16,000 state-month observations) and greater within-state variation in minimum wages. The greater statistical power allows a greater ability to detect significant effects of minimum wage increases on employment.

In addition to the limited statistical power of the evaluation design, the FPI study grouped skilled and unskilled workers together to examine the effect of the minimum wage on overall retail and small business employment. Thus, an important limitation of the FPI report is that it does not specifically focus on the effects of minimum wage hikes on the employment of low-skilled workers. One would not expect that employment of skilled workers in retail or small businesses would be directly affected by minimum wage hikes. Taken together with the limited power of the study's design, it is not surprising that the researchers failed to detect significant adverse effects of minimum wage hikes on overall employment. The evidence presented here, however, suggests that minimum wage hikes do have important disemployment effects in both retail and small businesses.

In fact, the estimates presented in Table 2 may actually understate the adverse effects of minimum wage increases on low-skilled workers to the extent that overall employment rates include skilled laborers. This study next turns to a group of low-skilled workers who have often been examined in the minimum wage literature —teenagers. Minimum wage increases are expected to have their strongest adverse effects on low-skilled workers employed in retail and small businesses.

Before examining the effect of minimum wage increases on teenage employment and

hours worked in the retail and small business sectors, the effects of minimum wage hikes on teenage wage rates and on overall teen employment are examined. If minimum wage increases are expected to influence teenage retail and small business employment, it is important to examine first whether minimum wage increases affect overall teenage employment.

Teenage Wage Effects. Columns (1)-(3) of Table 3 present evidence on the effect of minimum wage increases on the mean hourly wage rates of employed teenagers. Effects on wages must be observed if we are to expect employment effects. These models estimate the relationship between the natural log of the minimum wage and the natural log of the mean hourly teen wage rate. In the specification in column (1), the results show that minimum wage increases are associated with a significant increase in teenage wage rates. This result persists in model (2) when recession dummies are included to control for economic trends in the national economy. Finally, in model (3), year effects are included to control for year-specific unobserved characteristics. The magnitude of the minimum wage effect falls by more than 50 percent but remains statistically significant. These findings confirm results in the existing empirical literature (see, for example, Burkhauser et al., 2000). Minimum wage increases positively affect the average hourly wage rates of teenagers who remain employed, with wage elasticities ranging from 0.159 to 0.498.

Overall Teenage Employment Effects.

In columns (4)-(6) of Table 3, estimates of the effect of minimum wage increases on the ratio of teenage employment to teenage population are presented. Across all model specifications, there is consistent evidence that minimum wage increases are associated with a decline in the teenage employment ratio. Controlling for the average adult wage rate, the share of teens in the state, the prime-age adult male unemployment rate, seasonal employment trends, unobserved time-invariant state characteristics, and year effects, an increase in the minimum wage is consistently associated with a decline in teen employment. A 10 percent increase in the minimum wage is associated with a 2.2 to 3.0 percent decline in the ratio of teenagers who are employed. This finding is generally consistent with the results obtained by Abowd et al. (2004), Burkhauser et al. (2000), Deere et al., (1995), and Neumark and Wascher (1994).

In Table 4, we examine whether these results persist if there are autocorrelated errors, lagged minimum wage effects, and nonlinear effects of minimum wage increases.[13] Across all models, there is consistent evidence that minimum wage increases reduce the employment of teenagers. Models (1)-(3) continue to assume a contemporaneous relationship between the minimum wage and teenage employment. Whether macroeconomic trends are controlled for via a recession dummy (model 2) or year effects (model 3), minimum wage hikes have adverse employment effects for teens. A 10 percent increase in the minimum wage is associated with a 1.8 to 3.0 percent decline in the ratio of teens who are employed.

In models (4)-(6), lagged minimum wage effects are permitted. Included in each model is a measure of the state minimum wage one year prior to the contemporaneous employment rate. The elasticities[14] presented in these models are long-run elasticities. The lagged minimum wage effect is included because firms might not instantaneously respond to increases in the price of low-skilled labor. When these lagged effects are permitted, the estimated long-run elasticity is slightly higher than the short-run elasticity estimated in the previous models. A 10 percent increase in the minimum wage is associated with a 2.5 to 3.3 percent decrease in the ratio of employed teenagers.

In models (7)-(8), dummy variables for each state and federal minimum wage are included to allow the minimum wage to have a nonlinear effect on teenage employment, as in Deere et al. (1995). Dummy variables are created for each of the 55 federal and state minimum wages from January 1979 to December 2004, and include all but a dummy variable for $3.35, the federal minimum wage from 1981 to 1989. The coefficients and elasticities for the federal minimum wage rates of $4.25 and $5.15 are reported in the table[15]. As in the previous models, an increase in the minimum wage is found to significantly decrease the employment of teenagers.

The results in Table 4 provide consistent evidence that minimum wage increases are associated with significant declines in the ratio of teenage employment to teenage population. These findings are consistent with much of post-Card and Krueger minimum wage literature (see, for example, Deere et al., 1995; Burkhauser et al., 2000).[16]

Effect on Teenage Hours Worked.

Table 5 presents estimation results on the effect of minimum wage hikes on average weekly hours worked. This is an important outcome of interest since employers can respond to minimum wage hikes not only by reducing the employment of new teenagers and laying off existing workers but also by reducing the hours of existing employees. In columns (1)-(5), the effect of minimum wage increases on average hours worked by all teenagers is presented. Estimates of the effect of minimum wage increases on average hours worked by all teenagers include the total effect of minimum wage hikes on both employment and hours worked by employed teens. Teenagers who do not work contribute zero work hours in the calculation of the state-month specific measure of average hours worked.

Model (1) includes a recession effect rather than year effects to control for macroeconomic conditions, model (2) uses year effects, models (3) and (4) permit lagged minimum wage effects, and model (5) permits a nonlinear relationship between the minimum wage and average hours worked. Across each of these specifications, there is consistent evidence that minimum wage increases reduce average weekly hours worked by teenagers. A 10 percent increase in the minimum wage is associated with a 3.7 to 4.5 percent reduction in average weekly hours worked by teens. This finding reflects, in part, that minimum wage hikes reduce teen employment (resulting in more teens with zero hours worked). However, as models (6)-(10) show, this finding also suggests that minimum wage increases may reduce hours worked among those who are employed.

The dependent variable used in models (6)-(10) is the natural log of average hours worked by *employed* teenagers.[17] There is fairly consistent evidence that minimum wage increases reduce hours worked by teenagers who are employed. This finding is especially strong in models that use a recession effect to control for macroeconomic trends (models 6, 8, and 10).[18] The estimates obtained in models (6) and (8) reflect that a 10 percent increase in the minimum wage is associated with a 2.9 percent decline in average hours worked by employed teenagers.

Taken together, the results in Tables 3-5 suggest strong evidence that minimum wage hikes continue to have adverse effects on teenage employment and hours worked. Contrary to recent claims by some minimum wage advocates, minimum wage increases are associated with a reduction in employment and hours worked among low-skilled workers. In the remaining tables, we once again turn specifically to the claim made in the FPI study—that raising the minimum wage has no adverse employment effects on low-skilled workers in retail or small businesses.

Teenage Retail Sector Employment.

Given that teenagers often select jobs in the retail sector, such low-skilled workers are likely to be hardest hit by minimum wage hikes. As noted above, the majority (51 percent) of employed teenagers worked in the retail sector.

Table 6 presents the effect of minimum wage hikes on the ratio of teenagers employed in the retail sector, on average retail hours worked by all teenagers (including nonworkers), and on average retail hours worked by teenagers employed in retail jobs. Each of the models is corrected for heteroskedastic and autocorrelated residuals. Columns (1)-(4) present employment effects. There is consistent evidence that minimum wage increases reduce the proportion of teenagers employed in the retail industry. A 10 percent increase in the minimum wage is associated with a 2.7 to 4.3 percent decline in the employment of teenagers in the retail sector. This finding is robust across all model specifications. This effect is larger than the effect of minimum wage increases on the overall retail employment, reflecting that low-skilled workers are, as expected, most adversely affected.

Models (5)-(7) in Table 6 show the effect of minimum wage increases on average retail hours worked by all teenagers. These estimates capture the total effect of minimum wage increases on both retail employment and on hours worked by teenagers employed in retail businesses.[19] These models show that a 10 percent increase in the minimum wage is associated with a 5 percent decline in average hours worked in the retail sector. The results in columns (8)-(10) suggest that while the reduction in retail hours can be partially explained by disemployment effects, minimum wage increases may also decrease mean hours worked by teenagers working in the retail sector. In models that use a recession dummy to control for macroeconomic trends (columns 8 and 10), there is evidence of a significant negative relationship between minimum wage increases and retail hours worked among teens *employed* in the retail sector. A 10 percent increase in the minimum wage is associated with a 2.8 percent decline in retail hours worked among teens employed in retail businesses. However, the model including year effects (column 9) finds a negative, but insignificant, relationship between minimum wage increases and hours worked among employed teens.

In summary, the results in Table 6—along with the findings in columns (1)-(4) of Table 2—provide strong evidence that minimum wage increases have adverse effects on employment and hours worked of low-skilled retail workers.

Teenage Small Business Employment.

The effect of minimum wage increases on teenage small business employment is examined in Table 7. Due to the limited power of the evaluation design, the choice of macroeconomic controls (year effects vs. recession effects) is likely to have a greater influence over these estimates. This is because the year effects will capture all changes in the federal minimum wage. Moreover, given that the data are less precisely measured (annual data vs. monthly data) than those data used for the previous models, lagged minimum wage effects may be more important in these specifications.

Columns (1)-(4) present estimates of the relationship between minimum wage increases and the ratio of teenagers employed in small businesses. Across all model specifications, there is consistent evidence that an increase in the minimum wage is associated with a significant reduction in teenage small business employment. A 10 percent increase in the minimum wage is associated with a 4.6 to 9.0 percent reduction in the ratio of teenagers employed in small businesses.

In columns (5)-(7), estimates of the effect of minimum wage increases on average teenage hours worked in small businesses are presented. Across each of these models, an increase in the minimum wage is associated with a decline in average small business hours worked by all teenagers. A 10 percent increase in the minimum wage is associated with a 4.8 to 8.8 percent reduction in average hours worked. The findings in columns (8)-(10) suggest that among teenagers who work in small businesses, average hours worked may be adversely affected by minimum wage increases. However, the adverse effects do not appear to occur contemporaneously, but rather are lagged effects. In model (8), the estimate reflects that a 10 percent increase in the minimum wage is associated with a 5.6 percent reduction in average hours worked among teens who are *employed* in small businesses. However, the negative effects appear to be strongest in the period following the implementation of the minimum wage.[20] That is, the previous year's minimum wage has an important adverse effect on hours worked during the current year. A likely explanation for this finding is that the use of annual data reduces the precision of the evaluation design; that is, analyzing mid-year changes in state or federal minimum wages may not have their full effects until the following year.

Along with the findings in columns (5)-(8) of Table 2, the results in Table 7 paint a picture quite different from that of the FPI report, which concluded that there were no adverse employment effects of minimum wage hikes on small businesses. When more appropriate statistical methods are used, and the dependent variable is more carefully defined, important adverse employment effects are detected. As expected, the magnitude of the disemployment effect is larger for teenage small business employment than for overall small business employment.

Conclusions

This study has examined the impact of minimum wage increases on retail and small business employment, with special attention to employment by a group of low-skilled workers—teenagers—employed in retail and small businesses. These findings provide consistent evidence that minimum wage increases result in a significant decline in retail and small business employment. This finding is robust across several model specifications. A 10 percent increase in state minimum wages is consistently associated with a 1 percent reduction in retail employment and a 1 percent reduction in small business employment.

Minimum wage hikes are associated with an even larger reduction in teenage employment in the retail sector, with elasticities ranging from -0.267 to -0.429. Moreover, a 10 percent increase in the minimum wage reduces average retail hours worked by 5 percent, and, among teens who remain employed in the retail sector, reduces average hours worked by 2 to 3 percent. Finally, teen employment in small businesses is negatively affected by minimum wage hikes. A 10 percent increase in the minimum wage is associated with a 4.6 to 9.0 percent decline in teenage employment in small businesses and a 4.8 to 8.8 percent reduction in hours worked by teens in the retail sector.

Taken together with other recent work (Abowd, Kramarz, Lemieux, and Margolis, 2004; Burkhauser, Couch, and Wittenburg, 2000a; Burkhauser, Couch, and Wittenburg, 2000b; Deere, Murphy, and Welch, 1995; Neumark and Wascher, 1994), the findings of this study suggest that low-skilled workers will not escape adverse labor market consequences resulting from minimum wage increases. Moreover, the results of this study suggest that the findings from the Fiscal Policy Institute report

(2004) are misleading. Raising the minimum wage has negative effects on the employment and hours worked of low-skilled workers, particularly in the retail sector and in small businesses. This finding is consistent with standard neoclassical economic theory, which suggests that if the price of low-skilled labor rises, employers will reduce the numbers of low-skilled employees, reduce the hours offered to currently employed low-skilled employees, or both.

In addition to the adverse employment effects of the minimum wage, there are other important reasons why raising the minimum wage is a poor policy strategy. Modern-day minimum wage hikes are no longer an effective means of reducing poverty among the working poor (Burkhauser, Couch, and Wittenburg, 1996; Burkhauser and Finegan, 1989; Burkhauser and Harrison, 1999; Burkhauser and Sabia, 2004). This is true for two reasons. First, most minimum wage workers now live in nonpoor households because they are second or third earners in a family, such as teenage dependents. Second, most workers from poor households earn wage rates higher than the minimum wage. Hence, raising the minimum wage is not target efficient at reducing poverty among the working poor. As Burkhauser et al. (1996) show, the Earned Income Tax Credit (EITC) is a far more effective policy tool to reduce poverty among poor families. Moreover, the EITC has the advantage of avoiding the adverse employment effects described in this study. In fact, Neumark et al. (2002) show that a minimum wage hike may actually increase the poverty rate because the increase's adverse effect on hours worked will push nonpoor families into poverty.

The findings of this study should serve as a caution to legislators considering an increase in the minimum wage. While the findings of the FPI study may be seductive to some policymakers, the evidence presented here should serve as a reminder that there is no such thing as a free lunch. Raising the minimum wage will hurt rather than help low-skilled workers in retail and small businesses.

Endnotes

1. Burkhauser, Couch, and Wittenburg (2000a) find that the anomalous Card and Krueger (1995) results using the CPS can be explained by the authors' choice of macroeconomic controls. Card and Krueger's use of year effects to control for macroeconomic trends captures all of the federal variation in minimum wages; thus, given the small amount of identifying variation left in state-specific minimum wages, it is not surprising that they find insignificant effects of minimum wage increases. When Burkhauser et al. (2000) use alternate macroeconomic controls that do not capture all of the variation in federal minimum wage increases, they find significant negative effects of minimum wage increases on teenage employment.

2. This final control is accomplished through the use of state fixed effects.

3. Most of the models presented are corrected for panel-level heteroskedasticity and first-order autocorrelation, i.e. $\varepsilon \sim (0, \sigma_i^2)$; $\varepsilon_{it} = \rho \varepsilon_{it-1} + \upsilon$, via Prais-Winsten feasible generalized least squares estimation with panel-corrected standard errors.

4. One alternate specification, suggested by Burkhauser et al. (2000), uses a recession dummy variable to capture national macroeconomic trends rather than year effects. A specification of this form will allow identifying variation to come from changes in the federal minimum wage as well as state minimum wages, rather than just changes in state-specific minimum wages. If this alternate specification is adopted, then the estimate of can be interpreted as the effect of the higher of the state or federal minimum wage. This permits identifying variation from changes in the federal minimum wage as well as state minimum wages. Another specification permits state-specific linear time trends to capture linear trends in unobserved state-specific characteristics.

5. Data from November 2004 are not available.

6. Comparable measures of retail employment were created during the period when the CPS switched from the Standard Industrial Classification (SIC) system to the North American Industry Classification System (NAICS). Thanks to Jean Roth at NBER for assistance with creating comparable measures of retail employment.

7. Given available data in the CPS, I could not replicate the 50 employee threshold used in the FPI study (2004).

8. In these models, variation in the federal minimum wage (in addition to variation in state minimum wages) is permitted to affect employment.

9. The mean state minimum wage among states with minimum wages higher than the federal minimum was 13 percent higher that the federal minimum in 1995 and 28 percent higher than the federal minimum in 2005.

10. Failing to correct for autocorrelation when it is, in fact, present could result in depressed standard errors. This would

11. This includes the District of Columbia.

12. More precisely, the identification strategy is more credible.

13. Each model is estimated via feasible generalized least squares (FGLS) models using the Prais-Winsten method of autocorrelation correction and with state-specific, panel corrected standard errors.

14. This is the sum of the contemporaneous and one-year lagged effect.

15. Estimates for other coefficients are available upon request of the author.

16. Burkhauser et al. (2000) could not identify significant effects of minimum wage hikes when including year dummies in their models because these dummies captured much of the identifying variation in minimum wages, specifically that from changes in the federal minimum wage. The results presented here reflect that because of significant variation in state minimum wage policies from 1997-2005, significant effects of state minimum wage policies can be estimated.

17. Teenagers who contribute to mean hours worked by employed teens (HOURSW) have positive number of hours worked last week. The denominator includes only those who are employed. This is in contrast to the previous measure of average hour worked (HOURS), which include work hours of all teenagers in the calculation; the denominator in the HOURS measure includes all teenagers.

18. One explanation for why the finding is not as strong in models that use year effects is that these year effects capture much of the identifying variation in the minimum wage needed to find significant effects on hours worked by employed teens.

19. As before, teenagers who report no employment in a retail job are coded as working for zero hours.

20. While contemporaneous minimum wage is actually positive and significant, indicating a short-run positive effect of minimum wage hike, the long-run effect, which includes both the contemporaneous and lagged minimum wage effect, is negative and large.Thus, a specification that did not consider the importance of large negative lagged minimum wage effects would erroneously conclude that minimum wage increases actually increased employment.

References

Abowd, John, Francis Kramarz, Thomas Lemieux, and David Margolis. 2000. "Minimum Wage and Youth Employment in France and the United States." In David G. Blanchflower and Richard Freeman, eds. Youth Employment and Unemployment in Advanced Countries. Chicago: University Chicago Press, 427-472.

Bernstein, Jared. 2004. "Minimum Wage and its Effects on Small Businesses" (April 29) Testimony: House Subcommittee on Workforce Empowerment & Government Programs, http://www.epinet.org/content.cfm/webfeatures_viewpoints_raising_minimum_wage_2004

Burkhauser, Richard V., Kenneth A. Couch, and Andrew J. Glenn. 1996. "Public Policies for the Working Poor: The Earned Income Tax Credit versus Minimum Wage Legislation." In Solomon W. Polachek (ed.), Research in Labor Economics 15: 65-109.

Burkhauser, Richard V., Kenneth A. Couch, and David C. Wittenburg. 1996. "Who Gets What from Minimum Wage Hikes: A Re-Estimation of Card and Krueger's Distributional Analysis in Myth and Measurement: The New Economics of the Minimum Wage," Industrial and Labor Relations Review 49(3): 547-552.

Burkhauser, Richard V., Kenneth A. Couch and David C. Wittenburg. 2000a. "A Reassessment of the New Economics of the Minimum Wage," Journal of Labor Economics 18(4): 653-681.

Burkhauser, Richard V., Kenneth A. Couch, and David C. Wittenburg. 2000b. "Who Minimum Wage Increases Bite: An Analysis Using Monthly Data from the SIPP and CPS," Southern Economic Journal, 67(1): 16-40.

Burkhauser, Richard V. and T. Aldrich Finegan. 1989. "The Minimum Wage and the Poor: The End of a Relationship," Journal of Policy Analysis and Management 8: 53-71.

Burkhauser, Richard V. and Martha Harrison. 1999. "Providing a Living Wage: Why Increases in the Minimum Wage Are No Longer the Answer for Helping the Working Poor," Cornell University, Department of Policy Analysis and Management Working Paper.

Burkhauser, Richard V. and Joseph J. Sabia. 2004. "Why Raising the Minimum Wage Is a Poor Way to Help the Working Poor," Employment Policies Institute.

California Senate Committee on Industrial and Labor Relations (CSCILR). 2006. Bill No: SB 1162, http://info.sen.ca.gov/pub/bill/sen/sb_1151-1200/sb_1162_cfa_20060327_165626_sen_comm.html

Card, David and Alan B. Krueger. 1995. Myth and Measurement: The New Economics of the Minimum Wage. Princeton, NJ: Princeton University Press.

Card, David, Lawrence Katz and Alan Krueger 1994. "Comment on David Neumark and William Wascher, 'Employment Effects of Minimum Wages and Subminimum Wages: Panel Data on State Minimum Wage Laws,'" Industrial and Labor Relations Review 48: 487-496.

Conti, Judith M. 2004. Testimony of Judith M. Conti, D.C. Employment Justice Center, Committee on Public Services, http://www.dcejc.org/app/docs/MinimumWageTestimony.pdf

Deere, Donald, Kevin M. Murphy, and Finis Welch. 1995. Reexamining Methods of Estimating Minimum Wage Effects: Employment and the 1990-1991 Minimum Wage Hike. American Economic Association Papers and Proceedings, 85: 232-237.

Fiscal Policies Institute. 2004. "State Minimum Wages and Employment in Small Businesses," http://www.fiscalpolicy.org/minimumwageandsmallbusiness.pdf

Fuchs, Victor R., Alan B. Krueger, and James M. Poterba. 1998. "Economists' Views about Parameters, Values, and Policies: Survey Results in Labor and Public Economics," Journal of Economic Literature 36: 1387-1425.

Hill, Steve. 2005. Testimony Before the [Maryland] Senate Finance Committee on Senate Bill 59, http://www.marylandpolicy.org/documents/SB89.pdf

Kennedy, Ted. 2005. "Senator Kennedy Offers Minimum Wage Act of 2005" (May) http://kennedy.senate.gov/~kennedy/statements/05/05/2005518409.html

Neumark, David and William Wascher. 1994. "Employment Effects of Minimum and Subminimum Wages: Reply to Card, Katz, and Krueger," Industrial and Labor Relations Review 47(April): 497-512.

Neumark, David and William Wascher. 2001. "Using the EITC to Help Poor Families: New Evidence and a Comparison with the Minimum Wage." National Tax Journal 54(3): 281-317.

Neumark, David and William Wascher. 2002. "Do Minimum Wages Fight Poverty?," Economic Inquiry 40(3): 315-333.

Neumark, David and William Wascher. 2004. "Minimum Wage, Labor Market Institutions, and Youth Employment: A Cross-Sectional Analysis." Industrial and Labor Relations Review 57(2): 223-248.

Neumark, David, Mark Schweitzer, and William Wascher. 2004. "Minimum Wage Effects throughout the Wage Distribution," Journal of Human Resources 39(2): 425-450.

Neumark, David, Mark Schweitzer, and William Wascher. 2005. "The Effects of Minimum Wages on the Distribution of Family Incomes: A Non-Parametric Analysis," Journal of Human Resources

New York Newsday. 2006 (April 3). "Study: Minimum Wage Hikes Boost Retail Employment," (byline: Carrie Mason-Daffen), http://72.14.203.104/search?q=cache:WwtFGzPHDa4J:www.newsday.com/business/ny-bzwage034687798apr03,0,1007045.story%3Fcoll%3Dny-business-headlines+newsday+fiscal+policy+institute+retail+minimum+wage&hl=en&gl=us&ct=clnk&cd=1

Table 1: Means and Standard Deviations of Variables (January 1979 - December 2004)

Variable Name	Definition	Mean (StD)
Dependent Variables		
ORETAI	Ratio of overall (ages 16-64) retail employment (last week) to population aged 16-64	0.11 (0.02)
OSMALL[2]	Ratio of overall (ages 16-64) small business employment (last year) to population aged 16-64	0.34 (0.04)
TEMPLOY	Ratio of teenage (ages 16-19) employment (last week) to teenage population	0.42 (0.12)
TEENWAGE	Natural log of wage of employed teenagers	1.63 (0.27)
THOURS	Natural log of average weekly hours worked by all teenagers	2.26 (0.40)
THOURSW	Natural log of average weekly hours worked by employed teenagers (ages 16-19)	3.15 (0.21)
TRETAIL[1]	Ratio of teenage (ages 16-19) employment in retail sector to teenage population	0.22 (0.08)
TRHOURS[1]	Natural log of average weekly retail hours worked by all teenagers	1.48 (0.47)
TRHOURSW[1]	Natural log of average weekly hours worked by teenagers employed in retail sector	3.07 (0.25)
TSMALL[2]	Ratio of teenage (ages 16-19) employment at any time during last year in small-size firm (<100 employees) to teenage population	0.28 (0.08)
TSHOURS[2]	Natural log of average annual small business hours worked by all teenagers	5.27 (0.33)
TSHOURSW[2]	Natural log of average annual hours worked by teenagers employed in small businesses	6.59 (0.16)
Independent Variables		
MINWAGE	Natural log of higher of state or federal minimum wage	1.42 (0.21)
ADULTWAGE	Natural log of the wage rate of workers aged 25-54	2.46 (0.30)
SHARETEEN	Proportion of population aged 16-64 who are teenagers (aged 16-19)	0.09 (0.02)
AUNEM	Unemployment rate of males aged 25-54	0.05 (0.03)
RECESSION	Dummy variable equal to one in the month in which the economy was officially in a recession	0.12 (0.32)
State Effects	Dummy variable equal to one for each state	---
Seasonal Effects	Dummy variable equal to one for each month in the year	---
Year	Dummy variable equal to one for each year	---
Number of states[3]		51
N		15,861

SOURCE: Computed by the author with monthly CPS data from the outgoing rotation group.

[1]Consistent data on retail employment for teenagers available for 15,859 observations.

[2]Data on firm size are available annually in the March CPS beginning in 1989; N = 867.

[3]Includes the District of Columbia

Table 2: Effect of Minimum Wage on Ratio of Employment in Retail and Small Businesses to Population (Age 16-64)

	ORETAIL				OSMALL			
	1	2	3	4	5	6	7	8
MINWAGE	-0.011***	-0.009**	-0.010***	-0.032***	-0.028***	-0.038***	-0.040***	-0.028***
	(0.003)	(0.004)	(0.004)	(0.002)	(0.008)	(0.006)	(0.006)	(0.008)
ADULTWAGE	-0.039***	-0.041***	-0.041***	-0.049***	0.009	0.004	-0.005	-0.003
	(0.002)	(0.003)	(0.002)	(0.002)	(0.009)	(0.010)	(0.010)	(0.008)
SHARETEEN	0.083***	0.088***	0.087***	0.090***	-0.024	-0.002	0.015	0.203***
	(0.009)	(0.010)	(0.010)	(0.009)	(0.070)	(0.066)	(0.065)	(0.061)
AUNEM	---	---	-0.039***	-0.012***	---	---	-0.168***	-0.082***
			(0.007)	(0.006)			(0.031)	(0.030)
Seasonal Effects	Yes	Yes	Yes	Yes	---	---	---	---
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	No	Yes	Yes	Yes	No
State Linear Time Trend	No	No	No	Yes	No	No	No	Yes
Prais-Winsten	No	Yes	Yes	Yes	No	Yes	Yes	Yes
N	15,861	15,867	15,867	15,867	867	867	867	867
Elasticity	-0.101	-0.085	-0.092	-0.290	-0.081	-0.113	-0.116	-0.081

SOURCE: Computed by the author.

Dependent variable in models (1)-(4) is the ratio of 16-64 year-olds employed in retail industry.
Dependent variable in models (5)-(8) is ratio of of 16-64 year-olds employed in small businesses.
**** Significant at 1% level ** Significant at 5% level * Significant at 10% level*

Table 3: **Effect of Minimum Wage on Average Teenage (Ages 16-19) Wage Rates and Ratio of Teenage Employment to Teenage Population, January 1979 - December 2004**

	TEENWAGE			TEMPLOY		
	1	2	3	4	5	6
MINWAGE	0.498***	0.496***	0.159***	-0.094***	-0.092***	-0.126***
	(0.015)	(0.015)	(0.026)	(0.010)	(0.010)	(0.019)
ADULTWAGE	-0.039***	-0.041***	-0.041***	-0.049***	0.009	
	(0.002)	(0.003)	(0.002)	(0.002)	(0.009)	
SHARETEEN	0.134*	0.119	-0.003	-0.027	-0.017	0.007
	(0.081)	(0.081)	(0.085)	(0.054)	(0.054)	(0.054)
AUNEM	-0.445***	-0.453***	-0.166***	-0.853***	-0.847***	-0.548***
	(0.052)	(0.051)	(0.052)	(0.032)	(0.032)	(0.035)
RECESSION	---	0.009**	---	---	-0.006**	---
		(0.003)			(0.002)	
Seasonal Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	No	Yes	No	No	Yes
R^2	0.788	0.788	0.802	0.463	0.463	0.487
N	15,861	15,861	15,861	15,861	15,861	15,861
Elasticity	-0.498	0.496	0.159	-0.222	-0.217	-0.298

SOURCE: Computed by the author.

Dependent variable in models (1)-(3) is natural log of the average teenage wage rate.
Dependent variable in models (4)-(6) is ratio of employed teenagers to teenage population.
**** Significant at 1% level ** Significant at 5% level * Significant at 10% level*

Table 4: Prais-Winsten FGLS Estimates of Impact of Minimum Wage on Ratio of Teenage (Ages 16-19) Employment to Teenage Population (January 1979 - December 2004)

	1	2	3	4	5	6	7	8
MINWAGE $4.25[1]	—	—	—	—	—	—	-0.011***	-0.011***
							(0.004)	(0.004)
MINWAGE $5.15[1]	—	—	—	—	—	—	-0.015	-0.012
							(0.006)	(0.006)
MINWAGE	0.080***	-0.078***	-0.127***	-0.007	0.002	-0.094***	---	---
	(0.009)	(0.010)	(0.010)	(0.009)	(0.070)	(0.066)	(0.065)	(0.061)
LAG MINWAGE (1 YR)	---	---	---	-0.101***	-0.108***	-0.044	---	---
				(0.027)	(0.027)	(0.031)		
ADULTWAGE	-0.007	-0.010	-0.001	0.019	0.016	0.002	-0.019*	-0.025**
	(0.009)	(0.009)	(0.014)	(0.011)	(0.011)	(0.014)	(0.011)	(0.011)
SHARETEEN	-0.007	0.005	0.037	-0.020	-0.008	0.031	-0.002	0.009)
	(0.051)	(0.051)	(0.051)	(0.053)	(0.053)	(0.053)	(0.051)	(0.051)
AUNEM	-0.711***	-0.704***	-0.454***	-0.685***	-0.682***	-0.462***	-0.663***	-0.658***
	(0.037)	(0.037)	(0.038)	(0.038)	(0.038)	(0.038)	(0.037)	(0.037)
RECESSION	---	-0.008**	---	---	-0.008**	---	---	-0.010***
		(0.004)			(0.004)			(0.004)
Seasonal Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	No	Yes	No	No	Yes	No	No
N	15,861	15,861	15,861	15,249	15,249	15,249	15,861	15,861
Elasticity	-0.189	-0.184	-0.300	-0.255	-0.250	-0.326	---	--

SOURCE: Computed by the author.

[1]Relative to $3.35 federal minimum wage level.

Dependent variable in each model is the ratio of teenage employment to teenage population

**** Significant at 1% level ** Significant at 5% level*

Table 5: Prais-Winsten FGLS Estimates of Effect of Minimum Wage on Average Hours Worked by Teenagers, January 1979 - December 2004

	THOURS					THOURSW				
	1	2	3	4	5	6	7	8	9	10
Min Wage $4.25[1]	---	---	---	---	-0.079***	---	---	---	---	-0.067***
					(0.015)					(0.009)
Min Wage $5.15[1]	---	---	---	---	-0.130***	---	---	---	---	-0.110***
					(0.023)					(0.013)
MINWAGE	0.454***	-0.371***	-0.141	-0.377***	---	-0.287***	-0.039	-0.146***	-0.111**	---
	(0.045)	(0.070)	(0.093)	(0.103)		(0.286)	(0.038)	(0.054)	(0.057)	
LAG MINWAGE	---	---	-0.373***	0.011	---	---	---	-0.142***	0.099	---
(1 YR)			(0.095)	(0.110)				(0.056)	(0.061)	
ADULTWAGE	-0.101***	-0.050	-0.055	-0.048	-0.173***	-0.087***	-0.045	-0.097***	-0.049*	-0.123**
	(0.032)	(0.047)	(0.037)	(0.049)	(0.038)	(0.019)	(0.027)	(0.022)	(0.028)	(0.022)
SHARETEEN	0.892***	1.00***	0.931***	1.03***	0.935***	0.587***	0.620***	0.638***	0.638***	0.586***
	(0.173)	(0.174)	(0.179)	(0.180)	(0.174)	(0.102)	(0.102)	(0.106)	(0.106)	(0.102)
AUNEM	-2.01***	-1.43***	-2.01***	-1.46***	-1.93***	-0.259***	-0.293***	-0.296***	-0.298***	-0.296***
	(0.128)	(0.128)	(0.131)	(0.131)	(0.126)	(0.075)	(0.073)	(0.077)	(0.075)	(0.074)
RECESSION	-0.001	---	-0.007	---	-0.018	0.018**	---	0.012	---	0.014
	(0.013)		(0.013)		(0.013)	(0.008)		(0.008)		(0.008
Seasonal Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	Yes	No	Yes	No	No	Yes	No	Yes	No
N	15,861	15,861	15,249	15,249	15,861	15,861	15,861	15,249	15,249	15,861

SOURCE: Computed by the author.

Dependent variable in each model is the natural log of the average hours worked.
[1]Relative to $3.35 federal minimum wage level. All other minimum wage levels were included in models (5) and (10) and are available upon request of the author.

**** Significant at 1% level ** Significant at 5% level * Significant at 10% level*

Table 6: Prais-Winsten FGLS Estimates of Impact of Minimum Wage on Ratio of Teen age (Ages 16-19) Retail Employment to Teenage Population and on Average Hours Worked, January 1979 - December 2004

	TRETAIL				TRHOURS			TRHOURSW		
	1	2	3	4	5	6	7	8	9	10
Min Wage $4.25[1]	---	---	---	0.001	---	---	-0.074***	---	---	-0.067***
				(0.003)			(0.019)			(0.010)
Min Wage $5.15[1]	---	---	---	-0.011**	---	---	-0.171***	---	---	-0.106***
				(0.004)			(0.028)			(0.015)
MINWAGE	-0.058***	-0.087***	-0.069***	---	-0.530***	-0.502***	---	-0.204***	-0.107	---
	(0.009)	(0.016)	(0.023)		(0.099)	(0.146)		(0.058)	(0.069)	
LAG MINWAGE	---	---	-0.024	---	---	-0.021	---	-0.075	0.061	---
(1 YR)			(0.025)			(0.155)		(0.060)	(0.074)	
ADULTWAGE	0.052***	0.015	0.014	0.032***	0.057	0.056	0.078	-0.054	-0.068*	-0.084***
	(0.007)	(0.011)	(0.011)	(0.008)	(0.068)	(0.070)	(0.049)	(0.025)	(0.036)	(0.025)
SHARETEEN	-0.251***	-0.155***	-0.158***	-0.199***	0.361	0.372	0.157	0.523***	0.586***	0.472***
	(0.041)	(0.042)	(0.043)	(0.042)	(0.259)	(0.267)	(0.256)	(0.138)	(0.140)	(0.135)
AUNEM	-0.395***	-0.270***	-0.273***	-0.418***	-1.49***	-1.52***	-2.14***	-0.157*	-0.186*	-0.173*
	(0.028)	(0.030)	(0.030)	(0.028)	(0.181)	(0.185)	(0.174)	(0.095)	(0.096)	(0.091)
RECESSION	-0.006**	---	---	-0.007***	---	---	-0.036**	0.005	---	-0.004
	(0.003)			(0.003)			(0.016)	(0.009)		(0.008)
Seasonal Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No
N	15,859	15,859	15,249	15,859	15,859	18,249	18,589	15,249	18,249	18,859
Elasticity	-0.267	-0.401	-0.429	---	-0.530	-0.523	---	-0.279	-0.046	---

SOURCE: Computed by the author.

Dependent variable in models (1)-(4) is the ratio of teenage retail employment to teenage population. The dependent variable in the remaining models is the natural log of the average hours worked.

[1]Relative to $3.35 federal minimum wage level. All other minimum wage levels were included in models (4), (7), and (10) and are available upon request of the author.

**** Significant at 1% level ** Significant at 5% level * Significant at 10% level*

Table 7: Prais-Winsten FGLS Estimates of Impact of Minimum Wage on Ratio of Teenage (Ages 16-19) Small Business Employment to7 Teenage Population and on Average Hours Worked, March 1989 - March 2005

	TSMALL				TSHOURS			TSHOURSW		
	1	2	3	4	5	6	7	8	9	10
Min Wage $4.25[1]	---	---	---	-0.054***	---	---	-0.188***	---	---	-0.086**[2]
				(0.010)				(0.032)		(0.030)
Min Wage $5.15[1]	---	---	---	-0.087***	---	---	-0.281***	---	---	0.034[2]
				(0.032)			(0.091)			(0.041)
MINWAGE	-0.246***	-0.185***	-0.196***	---	-0.478***	-0.431***	---	0.268***		---
	(0.013)	(0.020)	(0.019)		(0.108)	(0.113)		(0.073)		
LAG MINWAGE (1 YR)	---	---	0.071	---	---	-0.406	---	-0.809***	-0.697***	---
			(0.044)			(0.280)		(0.163)	(0.153)	
ADULTWAGE	-0.000	0.001	0.001	-0.000	-0.008	-0.007	-0.011**	-0.009***	-0.009***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.006)	(0.005)	(0.003)	(0.003)	(0.002)
SHARETEEN	0.900***	0.570***	0.594***	1.36***	0.912	0.952	3.88***	-1.53**	-0.806	-1.93***
	(0.174)	(0.201)	(0.201)	(0.167)	(0.963)	(0.995)	(1.17)	(0.612)	(0.592)	(0.597)
AUNEM	-0.134	0.320***	0.312***	-0.064	0.156	0.191	-2.31***	-0.186	-0.256	-0.132
	(0.097)	(0.101)	(0.101)	(0.079)	(0.784)	(0.789)	(0.810)	(0.448)	(0.447)	(0.397)
RECESSION	-0.027**	---	---	-0.008	---	---	---	---	---	-0.048
	(0.013)			(0.011)						(0.050)
Seasonal Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
N	867	867	867	867	867	867	867	867	867	867
Elasticity	-0.885	-0.668	-0.451	---	-0.478	-0.887	---	-0.541	-0.697	---

SOURCE: Computed by the author.

Dependent variable in models (1)-(4) is the ratio of teenage small business employment to teenage population. The dependent variable in the remaining models is the natural log of the average hours worked.

[1]Relative to $3.35 federal minimum wage level. All other minimum wage levels were included in models (4), (7), and (10) and are available upon request of the author.
[2]Coefficients presented are lagged minimum wage effects.
**** Significant at 1% level ** Significant at 5% level * Significant at 10% level*

Appendix — State Minimum Wages from 1979 to 2005 that were Higher than the Federal Minimum on January 1

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
FEDERAL MINIMUM[a]	3.35	3.35	3.35	3.80	4.25	4.25	4.25	4.25	4.25	4.75	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15
NORTHEAST																			
New England																			
Maine[b]	3.65	3.65	3.75	3.85	---	---	---	---	---	---	---	---	---	---	---	5.75	6.25	6.25	6.25
New Hampshire	3.45	3.55	3.65	3.75	3.85	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vermont	3.45	3.55	3.65	3.75	3.85	---	---	---	4.75	4.75	5.00	---	---	5.75	6.25	6.25	6.25	6.75	6.75
Massachusetts	3.55	3.65	3.75	3.75	---	---	---	---	---	---	5.25	---	---	6.00	6.75	6.75	6.75	6.75	6.75
Rhose Island	3.55	3.65	4.00	4.25	4.25	4.45	4.45	4.45	4.45	4.45	5.15	---	---	5.65	6.15	6.15	6.15	6.15	6.15
Connecticut[c]	3.37	3.75	4.25	4.25	4.25	4.27	4.27	4.27	4.27	4.27	4.77	---	5.65	6.15	6.40	6.70	6.90	7.10	7.10
MIDDLE ATLANTIC																			
New Jersey	---	---	---	---	---	5.05	5.05	5.05	5.05	5.05	5.05	---	---	---	---	---	---	---	---
New York	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	6.00
Pennsylvania	---	---	3.70	3.80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MIDWEST																			
East North Central																			
Illinois	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5.50	6.50
WEST NORTH CENTRAL																			
Minnesota	---	3.55	3.85	3.95	4.25	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Iowa	---	---	---	3.85	4.25	4.65	4.65	4.65	4.65	4.65	---	---	---	---	---	---	---	---	---
SOUTH																			
South Atlantic																			
Delaware	---	---	---	---	---	---	---	---	---	4.65	5.00	---	---	5.65	6.15	6.15	6.15	6.15	6.15
District of Columbia[d]	4.16	4.33	4.33	4.33	4.33	4.33	4.33	5.25	5.25	5.25	5.75	5.75	6.15	6.15	6.15	6.15	6.15	6.15	6.15
East South Central																			
None	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
West South																			
None	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WEST																			
Mountain																			
None	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pacific																			
Washington	---	---	3.85	4.25	4.25	---	---	4.90	4.90	4.90	4.90	---	5.70	6.50	6.72	6.90	7.01	7.16	7.35
Oregon	---	---	---	4.25	4.75	4.75	4.75	4.75	4.75	4.75	5.50	6.00	6.50	6.50	6.50	6.50	6.90	7.05	7.25
California	---	---	4.25	4.25	4.25	---	---	---	---	---	---	5.00	5.75	5.75	6.25	6.75	6.75	6.75	6.75
Pacific (noncontiguous)																			
Alaska[e]	3.85	3.85	3.85	3.85	4.30	4.75	4.75	4.75	4.75	4.75	5.25	5.65	5.65	5.65	5.65	5.65	7.15	7.15	7.15
Hawaii	---	3.85	3.85	3.85	---	4.75	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.75	6.25	6.25	6.25

Source: Updated from Burkhauser et al. (2000), Fiscal Policies Institute (2004), and the U.S. Department of Labor

In 1990 and 1991, the federal minimum wage was not implemented until April 1. Thus, some states listed in the table have a higher state minimum wage than the federal minimum wage from January to March in those years. In 1996 and 1997, the federal minimum wage was not implemented until October 1. Thus, some states listed in the table have a higher state minimum wage than the federal minimum wage from January to September in those years.

[a]The federal minimum wage was $2.90 in 1979, $3.12 in 1980, and $3.37 from 1981 to 1983.
[b]The minimum wage in Maine was $3.45 in 1985 and $3.55 in 1986.
[c]The minimum wage in Connecticut was $2.91 in 1979, $3.12 in 1980, and $3.37 from 1981 to 1986.
[d]The minimum wage in the District of Columbia was was $2.95 in 1979, $3.14 in 1980, $3.48 in 1981, $3.62 from 1983-1984, $3.82 in 184-1985, and $3.86 in 1986.
[e]The minimum wage in Alaska was $3.40 in 1979, $3.60 in 1980, and $3.85 from 1981 to 1986.

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