2015

Who Benefits from a Minimum Wage Increase?

John W. Lopresti
College of William and Mary

Kevin J. Mumford
Purdue University

Upjohn Institute working paper ; 15-224

W.E. UPJOHN INSTITUTE
FOR EMPLOYMENT RESEARCH
Researching the causes and consequences of unemployment

Who Benefits from a Minimum Wage Increase?

Upjohn Institute Working Paper No. 15-224

John W. Lopresti
College of William and Mary
jwlopresti@wm.edu

Kevin J. Mumford
Purdue University
mumford@purdue.edu

March 2015

ABSTRACT

This paper addresses the question of how a minimum wage increase affects the wages of low-wage workers. Most studies assume that there is a simple mechanical increase in the wage for workers earning a wage between the old and the new minimum wage, with some studies allowing for spillovers to workers with wages just above this range. Rather than assume that the wages of these workers would have remained constant, this paper estimates how a minimum wage increase impacts a low-wage worker's wage relative to the wage the worker would have if there had been no minimum wage increase. The method allows for the effect to depend not only on the initial wage of the worker, but also nonlinearly on the size of the minimum wage increase. Using Current Population Survey data from 2005 to 2008, a period with a large number of U.S. state-level minimum wage increases, this paper finds that low-wage workers who experience a small increase in the minimum wage tend to have lower wage growth than if there had been no minimum wage increase. A large increase to the minimum wage increases the wages of not only those workers who previously earned less than the new minimum wage, but also spill over to workers with moderately higher wages. Finally, this paper finds little evidence of heterogeneity in the effect by age, gender, income, and race.

JEL Classification Codes: J31, J38

Key Words: Wage Effects, Minimum Wage

Acknowledgments:
We thank David Hummels, Steve Martin, Justin Tobias, Stephen Woodbury, and Chong Xiang for helpful discussion and comments. We acknowledge financial support from the Upjohn Institute for Employment Research.

The minimum wage literature has primarily focused on evaluating the employment effects of a minimum wage increase.[1] In this paper, we address the far less-studied question of documenting the wage effects of a minimum wage increase. We focus our attention on estimating how the wage effects of a minimum wage increase differ across the wage distribution and by the size of the minimum wage increase. Most studies assume that a minimum wage increase causes those workers with an initial wage between the old and the new minimum wage to have their wage bumped up to the new minimum wage. Some studies allow for minimum wage spillovers to a predefined group of workers with slightly higher wages.[2] However, when calculating benefits, the implicit assumption is that wages for low-wage workers would have remained constant had it not been for the minimum wage increase.

In contrast, we start with the assumption that low-wage workers would have experienced wage changes in the absence of a minimum wage increase. In our approach, the benefit of a minimum wage increase to a particular low-wage worker is the difference in the hourly wage after the minimum wage increase and the hourly wage the worker would have experienced had there been no minimum wage increase. It is possible for this difference to be negative for some workers if the wage increase they would have experienced is larger than what they actually experienced with a small minimum wage increase. This approach is most similar to Neumark, Schweitzer, and Wascher (2004) in that we estimate the effect of a minimum wage increase on the wages of current low-wage workers, allowing the effect to differ for workers with different initial wage rates. However, our analysis is different than Neumark et al. in that we also allow for

[1] See Card (1992a,b); Katz and Krueger (1992); Neumark and Wascher (1992, 1995); Card and Krueger (1994, 1995); Spriggs and Klein (1994); Deere, Murphy, and Welch (1995); Currie and Fallick (1996); Lang and Kahn (1998); and Baker, Benjamin, and Stanger (1999). Neumark and Wascher (2007) provide a comprehensive review.

[2] The observation that a minimum wage increase affects the wages of workers earning more than the new minimum wage originated with Gramlich (1976) and has been confirmed in many subsequent studies.

the effect to depend on the size of the minimum wage increase without imposing linearity. Allowing for this additional flexibility in the estimation allows us to better understand how a minimum wage increase affects wages.

An alternative approach would be to analyze how a minimum wage increase affects the wage distribution, as in DiNardo, Fortin, and Lemieux (1996). However, this approach is better suited to understanding how the minimum wage affects income inequality and is not applicable to analyzing how a minimum wage increase affects the wages of current low-wage workers. Because we estimate the effect for current workers, we can subsequently analyze how the effect differs by the magnitude of the minimum wage increase, by the initial wage, and for various demographic groups. For example, it is well documented that workers earning the minimum wage are predominantly women, adults (rather than teenagers), and members of low-income households (bottom 40 percent of the household income distribution). However, this does not necessarily imply that these groups experience larger wage gains from a minimum wage increase than other groups.

Our approach does not address employment effects, nor does it address the wage effects for new entrants into low-wage positions who were not working before the minimum wage increase, some of whom benefit from the law change. These limitations are notable, but our question of how a minimum wage increase affects the wages of current low-wage workers is important to crafting minimum wage policy and has not been fully answered. Our analysis provides a more complete picture of the wage effects than has been previously available.

Our analysis shows that the wage impact of a minimum wage increase depends on the size of the minimum wage increase as well as the characteristics of the individual. Surprisingly, we find that a small minimum wage increase may actually cause low-wage workers to

experience less wage growth than they otherwise would have without the minimum wage increase. We do a great deal of sensitivity analysis and show that this finding is quite robust. We hypothesize that employers may use a minimum wage increase as a focal point in setting wages, and thus when a minimum wage increase is small this may limit wage increases.

DATA

We use the public-use Current Population Survey (CPS) outgoing rotation group data between August 2005 and June 2008. CPS respondent households are interviewed for four consecutive months, followed by an eight-month hiatus, followed by a final four consecutive months of interviews. A household initially interviewed in January 2006 would thus be interviewed through April of that year, as well as January through April of 2007. We include only the fourth and eighth interview months—outgoing months spaced one year apart—which contain more detailed employment and wage data. Employing the methodology of Madrian and Lefgren (1999), we match respondent interviews year to year based on state, month interviewed, household identifiers, sex, race, and age.

Due to both the mobility of respondents between interview years and reporting error, we are unable to match everyone interviewed in the fourth interview month to a corresponding interview one year later. We match 72.8 percent of individuals in the CPS from August 2005 to June 2007 across sample years. This match rate is similar to that found in other time periods. The less than perfect match rate raises the concern that our sample will not be representative of the population if the observed attrition is not random.[3] Specifically, if attrition is correlated with

[3] Our match rate is higher for older workers and those with higher wages. Our match rate is lowest for individuals aged 20–24. These young workers are most likely to move from the household and because the CPS follows households rather than individuals, we are unable to match those who move between the fourth and eighth interviews. It is thus not surprising that young, mobile workers are the least likely to be matched.

either wage growth or with the size of the minimum wage change, our results will be biased. We do not observe wage growth for those individuals who are not matched, so we cannot directly address this concern. However, there is no significant correlation between state-level match rates and state average wage growth, state per-capita GDP growth rate, or the magnitude of the state minimum wage change in our time period.[4] We view this as evidence against the concern that the minimum wage increase itself may reduce the number of individuals we observe in the 2nd period.

Our sample includes individuals age 16 and older who are employed at the time of both interviews. In order to focus on workers in sectors covered by the minimum wage, we impose a threshold $0.10 below the minimum wage and exclude individuals reporting a wage below this threshold at the time of either interview.[5] We also exclude individuals reporting wage growth greater than 1,000 percent. Finally, self-employed workers and those in the agricultural sector have been removed. This leaves us with a final sample of 101,299 observations. We report variable means from the matched sample in column (1) of Table 1.

The 2005–2008 period is notable for a large number of U.S. state-level minimum wage changes in addition to the federal minimum wage increase of 2007. From 2005 to 2008, 28 states and the District of Columbia increased the minimum wage. An additional 20 states were affected

[4] State-level match rates for workers aged 16–65 range from 65.6 percent in Nevada to 80.4 percent in West Virginia. There is a slightly negative, though not statistically significant, correlation between average wage growth and the match rate. There is a slightly positive, though not statistically significant, correlation between the magnitude of the minimum wage increase and the match rate.

[5] For individuals who do not report an hourly wage, we use the reported weekly earnings divided by the usual hours of work per week. While this imputation likely introduces some measurement error and potentially causes us to drop some individuals from the sample who either reported too high or too low usual hours of work per week, we do not believe the imputation causes bias in the results. Importantly, there is no evidence that the need to impute wages is in any way correlated with the minimum wage change. In our full sample, the correlation between the minimum wage change in a state-year and the fraction of workers whose hourly wage is imputed is statistically indistinguishable from zero (p-value = 0.853).

by the federal increase.[6] At the level of the individual observation, we define the minimum wage increase as the change that occurs in the year between interviews in the applicable minimum wage. For example, the Arkansas minimum wage rose from $5.15 to $6.25 on October 1, 2006, and there was no minimum wage change in 2007. An individual living in Arkansas whose first outgoing interview occurred in September 2006 is thus defined as having experienced a $1.10 minimum wage increase, while an individual first interviewed in October 2006 is defined as experiencing no increase.

Slightly less than 64 percent of the respondents in our sample experienced a minimum wage increase between interviews. This includes individuals in 48 states and the District of Columbia. The remaining 36 percent of individuals who did not experience a minimum wage increase between interviews span 44 states and the District of Columbia. These minimum wage changes differed not only in their timing and location but also in their magnitude. Minimum wage changes during this period were as small as $0.10 and as large as $2.10.[7] This dispersion in magnitude across states and time is the primary identifying variation in our analysis.

This leads to an important question, why did some states raise their minimum wage by only a small magnitude while other enacted a large minimum wage increase? There is a great deal of randomness inherent in the political process and this may be the main source of variation in the timing of increases to the minimum wage. However, for our estimates to be unbiased, the size of the minimum wage increases must also be as good as randomly assigned, conditional on the controls. We argue that this is the case. Some initial supportive evidence is that those states that enacted a small increase in the minimum wage come from all regions of the country with

[6] Alaska, which had a minimum wage of $7.15 throughout the entire sample, and Minnesota, which had a minimum wage of $6.15 throughout the entire sample, were not affected by a minimum wage change in any year.

[7] Montana increased its minimum wage from $6.15 to $6.25 on January 1, 2008. Iowa increased its minimum wage from $5.15 to $6.20 on April 1, 2007, and again to $7.25 on January 1, 2008, so that individuals first interviewed between January and March of 2007 experienced an increase of $2.10.

substantial variation in the timing.[8] In addition, as reported in columns (1)–(6) of Table 1, there is no clear pattern in the characteristics of state-year observations across the different groups defined by size of the minimum wage increase. Furthermore, there is no statistically significant correlation between the size of the minimum wage increase and the prior year's state GDP growth rate, unemployment rate, union membership rate, price level, or poverty rate. We have identified no factors that appear to drive the size of minimum wage increases and view this as support for our assertion.

Before proceeding to the empirical analysis, we pause to note an important aspect of the data. We observe considerable upward wage mobility among low-wage workers even in the absence of a minimum wage law change. Table 2, which examines the wage mobility of workers that did not experience a minimum wage change between interviews, illustrates this point. Workers are divided into five categories based on their wage relative to the applicable minimum wage at the time of the first interview. We report the movement of workers among these groups between their first and second interviews. Specifically, the table reports the percentage of workers in a particular group at time t that belong to a given group at time $t + 1$. As shown in the table, most low-wage workers experience considerable wage growth in our sample, even in the absence of a minimum wage increase. Approximately one quarter of the workers earning no more than 10 percent above the minimum wage at the time of their first interviews still earn within 10 percent of that minimum a year later. Furthermore, over half of these individuals earn more than 25 percent above the minimum wage at the time of their second interviews. For an

[8] In our 2005–2008 time period, Arizona, Colorado, Connecticut, Florida, Maine, Michigan, Missouri, Montana, Nevada, Oregon, Ohio, Rhode Island, Vermont, and Washington all enacted a minimum wage increase that set the new minimum wage no more than 5 percent higher than the old minimum wage.

individual in a state with a minimum wage of $5.15, this implies that only 25 percent would still have a wage of no more than $5.65, and more than half would have a wage greater than $6.40.[9]

We observe similar patterns higher in the wage distribution. Of those individuals earning between 25 and 50 percent above the minimum wage at the time of their first interview, over 60 percent earn more than 50 percent above the minimum wage the following year, with more than 29 percent earning more than double the minimum. These simple averages reveal that minimum wage changes are not occurring in a static environment, but rather in one in which there is already a large degree of upward mobility among low-wage earners.

ESTIMATION

The large number and staggered timing of state-level minimum wage changes creates a rich environment in which to analyze the effects of minimum wage law changes. We abstract from any employment effects and focus solely on the wage effects of a minimum wage change conditional on continued employment. We hypothesize that such effects may differ along two dimensions. First, following Neumark, Schweitzer, and Wascher (2004), we allow the effect of a minimum wage increase to vary throughout the wage distribution, with individuals at or near the initial minimum wage level experiencing wage changes that are different from those experienced by individuals at the upper end of the wage distribution. The wage effect at or near the initial minimum wage is primarily mechanical, while those effects higher in the wage distribution are often called minimum wage spillovers. Second, we examine effects that vary according to the size of the change in the minimum wage itself.

[9] $5.15, the federal minimum wage prior to the 2007 increase, is the applicable minimum wage for more than half the individuals that do not experience a minimum wage increase in our sample.

Nearly 64 percent of the individuals in our sample experienced a minimum wage increase, but there is substantial heterogeneity in the size of the minimum wage increase they experienced. More than 16 percent experienced a small minimum wage increase of less than 5 percent of the initial minimum wage, while over one-tenth experienced a very large increase of more than 20 percent of the initial minimum wage. Figure 1 shows this heterogeneity in a histogram of the size of the minimum wage increases experienced by the individuals in our sample.

In order for our model to allow for different effects by the initial-wage group and by the size of the minimum wage increase, we employ the following specification:

$$\%\Delta W_{ismy} = \beta_0 + \sum_{j=1}^{7} \beta_j 1\left(WageGroup_{ismy} = j\right) + \sum_{k=1}^{5} \gamma_k 1\left(\Delta MinWage_{smy} = k\right) + \sum_{j=1}^{7}\sum_{k=1}^{5} \delta_{jk} 1\left(WageGroup_{ismy} = j\right) \times 1\left(\Delta MinWage_{smy} = k\right) + \eta \mathrm{X}_{ismy} + \lambda_s + \mu_m + \omega_y + \varepsilon_{ismy}. \quad (1)$$

The dependent variable $\%\Delta W_{imys}$ is defined as the fractional wage change (the percentage wage change divided by 100) between interviews experienced by individual *i* first interviewed in month *m* of year *y* in state *s*.

The variable $1(WageGroup_{imys} = j)$ is an indicator variable equal to 1 if individual *i* has a wage in the range of wage group *j* at the time of the first interview. It is included to account for differences in the rate of wage growth across the wage distribution. We define seven wage groups with the first three groups corresponding to initial hourly wages less than 10 percent above the minimum wage at the time of the first interview, between 10 and 20 percent above the minimum wage, and between 20 and 30 percent above the minimum wage, respectively. The fourth group corresponds to an initial hourly wage at least 30 percent above the minimum wage

but less than $11 (approximately the 25th percentile of the wage distribution). The final three wage groups include initial hourly wages within approximately the second, third, and fourth quartiles of the wage distribution at the time of their first interviews. The wage ranges for the seven wage groups, along with the number of individuals with an initial wage within each wage group, are given in Table 3.

Similarly, $1(\Delta MinWage_{smy} = k)$ is an indicator variable equal to 1 if the minimum wage increase in state *s* in month *m* of year *y* falls within minimum-wage-change group *k*, where the groups are defined as in Table 4. More than one-third of the individuals in our sample are included in the first minimum-wage-change group, indicating no minimum wage change. The remainder of the sample is divided between groups experiencing a minimum wage change of less than 5 percent, between 5 and 10 percent, between 10 and 20 percent, and greater than 20 percent. For those in the sample that experienced a minimum wage increase, about 45 percent experienced a minimum wage change of between 10 and 20 percent, which includes the federal minimum wage change of approximately 13.6 percent. Table 4 also indicates the number of states that experienced a minimum wage change within each bin. Note that within our sample period the same state may have experienced both a year with a minimum wage change and a year without a minimum wage change.

To allow for differential effects of a minimum wage increase throughout the wage distribution, we include the interaction of these two indicator variables. With the no-change group excluded, this leaves $28\,\delta_{jk}$ parameters indicating the effect of an increase in the minimum wage of a given size (indicated by group *k*) for initial-wage group *j* relative to the baseline initial-wage groups that experienced no minimum wage change. Not only does this allow for a differential effect of a minimum wage increase by initial-wage group, as in Neumark,

Schweitzer, and Wascher (2004), it also allows for a nonlinear response to an increase in the minimum wage that differs by the magnitude of the change. This not only allows for the possibility that minimum wage changes affect low- and high-wage individuals differently, but also for the possibility that the difference between the low- and high-wage responses depend upon the magnitude of the minimum wage increase. The flexibility of this model allows for a more complete understanding of the wage effects of a minimum wage increase. The model also includes a vector of controls, $\boldsymbol{X}_{isy}$, including gender, race, ethnicity, education level, family income, and a quadratic term in age.

A primary concern is that state-level minimum wage changes might occur in response to changes in state-level economic conditions. Our results could be biased if states with a low rate of wage growth are more (or less) inclined to increase the minimum wage. In an attempt to control for this, we include several variables measuring state-level economic conditions including the state poverty rate, the percentage of workers earning a wage that is below the federal minimum wage, the percentage of workers in the state that belong to a union, the growth rate in state per capita GDP in the year prior to the individuals' first interview, and state price level.[10] In order to control for the possibility that governments are able to respond within years to changes in economic conditions, we have included the monthly state unemployment rate. Finally, to control for broader macroeconomic and geographical trends as well as seasonality, we include month, year, and state fixed effects.

[10] The annual state price level was calculated following Aten and Figueroa (2014) using the Bureau of Economic Analysis "regional price parities" in combination with the consumer price index.

RESULTS

We report the estimated impact of a minimum wage change of size *k* for wage group *j*, which is given by $\hat{\gamma}_k + \hat{\delta}_{jk}$ from Equation (1), in Table 5, along with corresponding standard errors. For ease of exposition, we report only this estimated effect and corresponding standard errors; complete tables with all suppressed covariates are available upon request. The columns of Table 5 do not indicate separate specifications as is common in the literature; the coefficient estimates are from a single regression presented in matrix form. Each reported coefficient estimate represents the effect of a given minimum wage change for individuals within a given wage group *relative to individuals within the same wage group who experienced no increase in the minimum wage*. Thus, an individual initially earning within 10 percent of the minimum wage who experienced an increase in the minimum wage of less than 5 percent saw her wage increase by 10.8 percent *less* than an individual who saw no minimum wage increase. An individual in the same wage group who experienced a minimum wage increase of greater than 20 percent (up to 41 percent in our sample) experienced 50 percent greater wage growth relative to an individual experiencing no minimum wage law change.[11]

The results are striking. Within the first quartile of the wage distribution, individuals experiencing minimum wage increases of less than 5 percent have *lower* wage growth than similar individuals who experience no change in the minimum wage law, with the magnitude of the estimated effect ranging from −5.6 percent to −21.9 percent. Moderate minimum wage changes of 5-20 percent lead to small, often statistically insignificant wage effects. It is only for minimum wage increases in excess of 20 percent that we observe strong positive wage effects of

[11] An effect this large may not be plausible. Note however that the 95 percent confidence interval ranges from 26 to 77 percent. Right skewness in the wage change distribution may be driving these OLS parameter estimates up.

a minimum wage increase, with these effects concentrated among workers within an initial wage no more than 10 percent above the minimum wage. Of the individuals experiencing a minimum wage increase in our sample, nearly 25 percent experienced an increase of less than 5 percent. The possibility that such changes might yield *lower* wage growth for low-wage individuals, even ignoring potential disemployment effects, is surprising.

While we have limited our sample to individuals whose wage increases by less than a factor of 10, more than 6 percent of the individuals in the remaining sample report at least a doubling of their hourly wage between interviews. Furthermore, nearly 5 percent of individuals reported a decline in hourly wages of more than one half. It is unlikely that such outcomes are driven primarily by changes in minimum wage laws. In an effort to mitigate the effect of such extreme wage changes on our estimates, we repeat the above specification in a median regression framework as proposed by Koenker and Bassett (1978). The median regression estimates of the δ_{jk} parameters from Equation (1) are the effects of the minimum wage increase at the median percentage wage change rather than on average. Skewness in the conditional percentage wage change distribution causes the OLS results to be different from the median regression results. To the extent that the results differ, we prefer the median regression results as they ignore extreme wage changes.

Table 6 reports results for the median regression specification. Again, the parameter estimates are from a single median regression; the columns do not indicate separate regression specifications. The median regression point estimates are generally smaller than those from the OLS specification, but the qualitative results are similar. Individuals earning an initial hourly wage in the bottom quarter of the wage distribution (below $11) experience lower wage growth following a minimum wage increase of less than 5 percent than similar individuals experiencing

no minimum wage change. The magnitude of this effect varies from −2.8 percent to −9.3 percent, with results significant at the 5 percent level for all wage levels except within 10 percent of the minimum wage.

Individuals initially earning a wage within 20 percent of the minimum wage experience increased wage growth following a minimum wage increase of 10 percent or larger, while individuals with an initial wage no more than 30 percent larger than the minimum wage experience increased wage growth for minimum wage increases of 20 percent or more. The wage effects of a minimum wage increase of any magnitude disappear for individuals earning an initial wage in the upper half of the wage distribution (wages above $16.00).

Thus, the story is broadly consistent. Small increases in the minimum wage have negative effects on wage growth for low-wage individuals. Larger increases in the minimum wage have positive effects on low-wage individuals, with the effects being felt most strongly by those at or very near the initial minimum wage level. Minimum wage increases have little to no effect on individuals in the upper three quartiles of the wage distribution. These results suggest that small minimum wage increases dampen wage growth for those at the bottom of the wage distribution. The median low-wage worker experiences higher wage growth without a minimum wage increase than with a small minimum wage increase.

Are the estimated effects for low-wage workers experiencing a small minimum wage increase reasonable? The results suggest that wages for low-wage workers in states with a minimum wage change of less than 5 percent would have grown by 2.8 to 9.3 percentage points more had there been no increase in the minimum wage. The median wage growth for low-wage workers in state-year combinations with no minimum wage increase is about 20 percent, so

estimates suggesting that a small increase in the minimum wage reduces expected wage growth by 5 or even 10 percent are plausible.

One possible explanation for this finding is that the minimum wage increase acts as a focal point for employers in determining wages. When the minimum wage increase is small, employers react by only increasing low-wage workers' wages by the required amount. However, without a minimum wage increase there is no low-wage-growth focal point and the resulting wage growth is higher for low-wage workers who experience no minimum wage increase as compared to those who experience a small minimum wage increase.

This focal-point explanation for this finding is consistent with a model proposed by Shelkova (2008) in which low-wage employers tacitly collude in setting wages. In the model, there is no wage bargaining; employers post a wage and then wait for vacancies to fill. This creates an incentive for employers to coordinate on a wage below the marginal product of labor. In an infinitely repeated game, the equilibrium wage can be anywhere between the wage that a monopsonist would set and the marginal product of labor (the competitive equilibrium). The minimum wage may be a focal point that makes is easier to sustain coordination as in Schelling (1960).

For workers with a wage above the minimum wage, the change in the minimum wage could act as a focal point in determining raises. Our results show that the strongest estimated negative wage effects are for those with an initial wage between 10 and 30 percent above the minimum wage. These individuals would not directly benefit from a small minimum wage increase and therefore may only experience the low-wage-growth focal point effect from the minimum wage increase.

ROBUSTNESS TESTS

Another explanation for this result is that it is simply caused by some omitted variable bias. It could be that states which increase the minimum wage by a small amount every year happen to have lower wage growth for unrelated reasons. Perhaps states that never increase the minimum wage in our sample period happen to have higher wage growth for unrelated reasons. As a robustness test, we repeat the median regression specified above, excluding states that raise the minimum wage each year in our sample, as well as those that did not change the minimum wage at all.[12] This reduces our sample to 85,624 observations, with results reported in Table 7. The point estimates in Table 7 for low-wage individuals experiencing small minimum wage increases remain negative and the level of statistical significance declines only slightly. It seems clear that our main finding is not driven by these "constant" states.

One might worry that even with the inclusion of state fixed effects and state-year-level controls, there may be omitted variables related to state-level economic conditions that simultaneously affect percentage wage growth and the likelihood of a minimum wage change. If these unmeasured state-year economic conditions are correlated with the state minimum wage changes, this may bias our results. In order to control for such potential omitted variables, we repeat the specification from Table 6 and include state-by-year fixed effects. Note that with this inclusion, identification no longer comes from variation in minimum wage changes that occur on January 1, as such variation will be collinear with the state-by-year effects. However, a large number of minimum wage changes—most notably the federal minimum wage change in 2007—took place during, as opposed to at the beginning of, the calendar year. Results for this specification are reported in Table 8. As before, the broad story remains unchanged.

[12] This includes Alaska, Florida, Maine, Minnesota, Oregon, Vermont, Washington, and West Virginia.

The specifications described thus far have not allowed covariates other than those pertaining to the magnitude of the minimum wage change to vary throughout the wage distribution. For instance, the effect of a bachelor's degree on wage growth is constrained to be identical for an individual earning a wage near the minimum wage as for an individual earning many times more than this. This is perhaps a set of overly tight restrictions on the parameters. Thus, Table 9 reports results for a specification in which the covariates for race, ethnicity, education, gender, and age, as well as the state-level economic controls are each allowed to vary by wage group. This additional flexibility again leaves the qualitative results largely unchanged.

Finally, from a policy perspective, these results are of most relevance if they hold for individuals for whom low-wage jobs represent their primary source of income. We thus repeat the specification from Table 6, including only workers ages 23 – 65. Results, reported in Table 10, reveal a similar, albeit slightly noisier pattern. The estimated coefficients for minimum wage increases of less than five percent are negative for all wage groups in the first quartile of the wage distribution. The estimated negative effects are even larger than those reported in Table 6. However, the estimates are less precise because the age restriction reduces the number of observations in the first quartile of the wage distribution by over 20 percent.

Tables 7–10 indicate that the results hold across a broad range of specifications and are not likely driven by the alternative explanations given above. We argue that the results seem most consistent with the minimum wage acting as a focal point in the employer wage-setting decision that causes percentage wage growth to be lower for low-wage workers if there is a small minimum wage increase.

HETEROGENEOUS EFFECTS

The prior specifications allow the effect of a minimum wage increase to differ by the size of the minimum wage increase and by the initial wage of the worker, but not by the worker's characteristics. The minimum wage may have different wage effects by gender, race, age, education, and income. In an attempt to see if there are heterogeneous effects, we consider the effect of minimum wage changes of varying sizes across subsamples of male, female, white, black, Hispanic, young (age 22 and under), low-education (no high school diploma), and low-income (annual household income under $40,000). Due to the reduction in sample size, we limit the number of parameters we need to estimate by repeating specification (1) with only two wage groups: individuals with an initial wage within 30 percent of the minimum wage, and individuals with an initial wage more than 30 percent above the minimum wage. Table 11 reports the effects of the various minimum wage changes on the wage growth of individuals with an initial wage within 30 percent of the minimum wage relative to low wage individuals who experienced no minimum wage change. As before, the results are from median regressions with the additional control variables and state, month, and year fixed effects included. Each row represents a separate regression.

The qualitative story in this table is much the same as the one discussed above: for nearly all groups, a minimum wage increase of less than 5 percent has a negative effect on wage growth. The estimated effect for Hispanic individuals is slightly positive, but is very small and not statistically significant. For all other groups, the sign of the coefficient is negative. While the coefficient for men is not statistically significant, the point estimate is negative and similar in magnitude to the estimate for women. We thus view Table 11 as evidence that our findings are

not driven by any particular demographic group. The negative wage effect of a small minimum wage increase seems to hold across nearly all demographic groups.

CONCLUSION

There is strong evidence that a small minimum wage increase actually reduces the annual wage growth for many low-wage workers. This result is important to labor policy and was previously absent from the minimum wage literature. Larger minimum wage increases have positive wage effects that spill over to workers with wages higher than the new minimum wage. Workers with wages in the top three quartiles of the wage distribution do not seem to experience any wage impact from a minimum wage increase regardless of the size. These findings are robust to a variety of alternative specifications and are generally consistent by income, gender, race, and age.

We suggest that the negative effects of a minimum wage increase work by setting a low-wage-growth focal point for employers of low-wage workers. Had the minimum wage increase not occurred, employers would have provided larger wage increases to their employees. While this focal-point story is consistent with the results, we provide no evidence to substantiate that this is the mechanism.

The 2005–2008 data come from a period that is ideal for studying the effect of a minimum wage increase because of the large number of state-level minimum wage increases of various sizes. The short time period helps to address other methodological and interpretation issues common in minimum wage studies. Our use of median regression methods increases confidence that the results are being driven by the minimum wage increases and not by skewness in the annual wage growth distribution.

It should be recognized that new entrants to low-wage jobs would likely benefit from a minimum wage increase, and these individuals have been excluded from the analysis. Similarly, workers who experience large wage losses would also benefit from a minimum wage increase. However, because there are few of these workers, their impact on the OLS regression result is small. Finally, our study does not consider any increased unemployment risk for a low-wage worker as a result of a minimum wage increase. However, even with these limitations, the results indicate that a small minimum wage increase likely reduces wage growth for low-wage workers.

References

Aten, B. and E. Figueroa. 2014. “Regional Price Parities and Real Regional Income for the United States: 2008–2012.” Paper prepared for the IARIW 33rd General Conference, held in Rotterdam, the Netherlands, August 24–30.

Baker, M., D. Benjamin, and S. Stanger. 1999. “The Highs and Lows of the Minimum Wage Effect: A Time-Series Cross-Section Study of the Canadian Law.” *Journal of Labor Economics* 17(2): 318–350.

Card, D. 1992a. “Do Minimum Wages Reduce Employment? A Case Study of California, 1987–1989.” *Industrial and Labor Relations Review* 46(1): 38–54.

———. 1992b. “Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage.” *Industrial and Labor Relations Review* 46(1): 22–37.

Card, D., and A. B. Krueger. 1994. “Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania.” *American Economic Review* 84(4): 772–793.

———1995. *Myth and Measurement*. Princeton, NJ: Princeton University Press.

Currie, J., and B. Fallick. 1996. “The Minimum Wage and the Employment of Youth: Evidence from the NLSY.” *Journal of Human Resources* 31(2): 404–428.

Deere, D., K. M. Murphy, and F. Welch. 1995. “Employment and the 1990-1991 Minimum-Wage Hike.” *American Economic Review Papers and Proceedings* 85(2): 232–37.

DiNardo, J., N. Fortin, and T. Lemieux. 1996. “Labor Market Institutions and the Distribution of Wages: 1973–1992: A Semi-Parametric Approach.” *Econometrica* 65(5): 1001–1044.

Gramlich, E. M. 1976. “Impact of Minimum Wages on Other Wages, Employment, and Family Incomes” *Brookings Papers on Economic Activity* 2: 409–451.

Katz, L. F., and A. B. Krueger. 1992. “The Effect of the Minimum Wage on the Fast Food Industry.” *Industrial and Labor Relations Review* 46(1): 6–21.

Koenker and Bassett. 1978. “Regression Quantiles” *Econometrica* 46(1): 33–50.

Lang, K., and S. Kahn. 1998. “The Effect of Minimum-Wage Laws on the Distribution of Employment: Theory and Evidence” *Journal of Public Economics* 69: 67–82.

Madrian, B. C., and L. J. Lefgren. 1999. “A Note on Longitudinally Matching Current Population Survey (CPS) Respondents.” NBER Working Paper No. T0247. Cambridge, MA: National Bureau of Economic Research.

Neumark, D., M. Schweitzer, and W. Wascher. 2004. “Minimum Wage Effects throughout the Wage Distribution.” *Journal of Human Resources* 39(2): 425–450.

Neumark, D., and W. Wascher. 1992. “Employment Effects of Minimum and Subminimum Wages: Panel Data on State Minimum Wage Laws.” *Industrial and Labor Relations Review* 46(1): 55–81.

——— 1995. “Reconciling the Evidence on Employment Effects of Minimum Wages: A Review of our Research Findings.” Federal Reserve Board Finance and Economics Discussion Series No. 95–53. Washington, DC: Board of Governors of the Federal Reserve System.

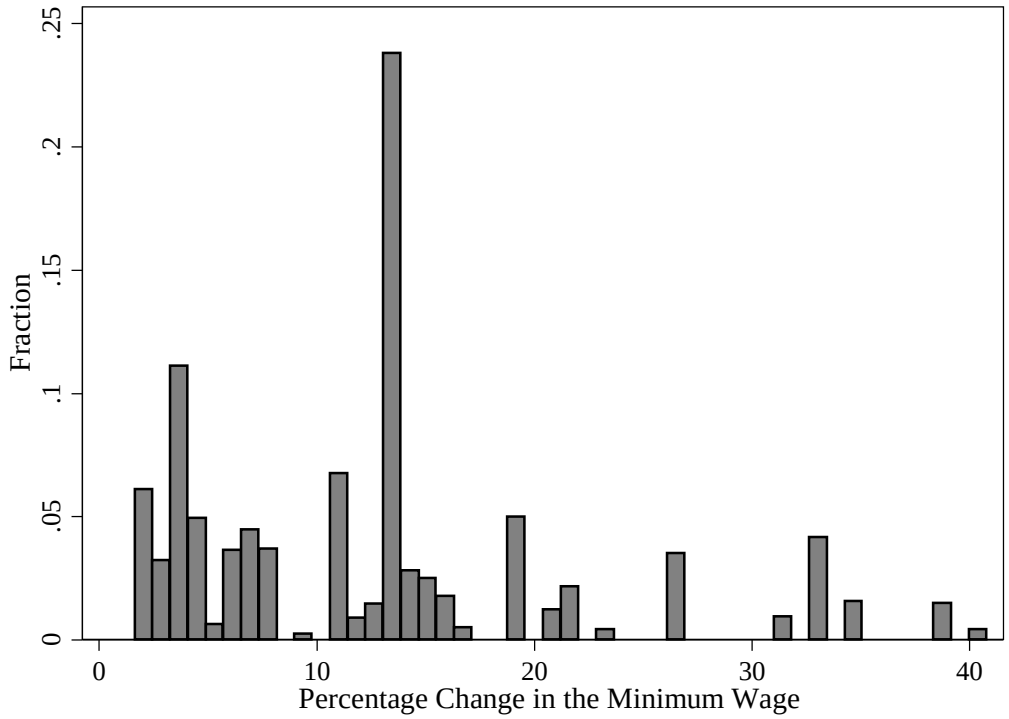
——— 2007. “Minimum Wages and Employment.” *Foundations and Trends in Microeconomics* 3(1-2): 1–182.

Schelling, T. 1960. *The Strategy of Conflict*. Cambridge, MA: Harvard University Press.

Shelkova, N. Y. 2008. “Low-Wage Labor Markets and the Power of Suggestion.” UConn Economics Working Paper No. 200833. Storrs, CT: University of Connecticut.

Spriggs, W. E., and B. W. Klein. 1994. *Raising the Floor: The Effects of the Minimum Wage on Low-Wage Workers*. Washington, DC: Economic Policy Institute.

Figure 1 Percentage Minimum Wage Increases



NOTE: The figure depicts the percentage change in minimum wage laws affecting 64,462 individuals in 48 states and the District of Columbia who experienced a minimum wage change between interviews. The spike at 13.6 is the 2007 federal minimum wage increase.

Table 1 Summary Statistics

		Minimum wage change				
	Full sample	No change	≤ 5%	5%–10%	10%–20%	> 20%
Observations	101,299	36,837	16,406	8,244	29,453	10,359
Mean wage	19.33	18.94	19.49	22.17	19.41	18.14
Percentage employed	100	100	100	100	100	100
Sex						
Male	51.83	51.67	51.18	51.84	52.21	52.13
Female	48.17	48.33	48.82	48.16	47.79	47.87
Race						
White	83.58	83.27	86.89	77.32	81.67	90.08
Black	10.2	10.95	8.18	8.84	11.76	6.87
Hispanic	11.85	10.55	11.1	18.58	13.58	7.13
Education						
Less than high school	8.76	9.15	7.23	8.89	9.55	7.17
High school only	47.62	47.54	48.18	41.58	47.44	51.94
Associate's or more	43.61	43.31	44.59	49.53	43.01	40.88
Age						
16–19	2.68	2.87	2.23	2.46	2.59	3.16
20–24	6.73	6.73	6.23	6.97	6.76	7.15
25–34	20.05	20.14	19.13	19.91	20.47	19.95
35–44	26.16	26.13	26.36	27.46	26.2	24.94
45–54	27.43	27.54	28.07	26.7	27.13	27.62
65+	16.95	16.6	17.06	16.6	16.85	17.18
Family income						
Low	6.88	7.49	6.71	5.08	6.87	6.45
Low-mid	18.92	18.86	19.07	15.66	19.19	20.35
Mid	20.78	21.23	21.46	18.63	20.15	21.75
Mid-high	30.85	30.71	31.82	28.94	30.38	32.68
High	22.57	21.71	20.95	31.7	23.42	18.77

NOTE: The following individuals have been removed: those earning a wage more than $0.10 below the minimum wage, those earning an hourly wage greater than $100, those experiencing a wage change greater than 1,000 percent, those listed as self-employed and agricultural workers, and individuals younger than 16. Low income families are defined as those with an annual family income of less than $20,000. Low-and mid-income includes families earning between $20,000 and $40,000 annually. Mid includes families earning between $40,000 and $60,000 annually. Mid-high includes families earning between $60,000 and $100,000 annually, and high includes families earning at least $100,000 annually. Individuals are weighted by sample weights included in the CPS.

Table 2 Wage Mobility

First interview wage	Second interview wage				
	≤ MW*1.1	MW*1.1–MW*1.25	MW*1.25–MW*1.5	MW*1.5–MW*2	MW*2 <
≤ Minimum wage*1.1	25.01	21.05	19.76	19.01	15.17
MW*1.1–MW*1.25	7.08	19.84	26.55	23.40	23.13
MW*1.25–MW*1.5	3.18	6.47	27.71	32.99	29.65
MW*1.5–MW*2	1.12	2.94	7.12	43.23	45.59
MW*2 <	0.42	0.82	2.17	7.74	88.85

NOTE: The table includes 36,837 individuals from 44 states and the District of Columbia who did not experience a minimum wage increase between interviews. Percentages represent the percent of a given wage bin at the time of the first interview that belong to a given bin at the time of the second interview, so that percentages sum horizontally to 100. Individuals are weighted by sample weights included in the CPS.

Table 3 Minimum Wage Groups

Wage group	Observations
Wage ≤ minimum wage*1.1	2,346
MW*1.1 < Wage ≤ MW*1.2	2,388
MW*1.2 < Wage ≤ MW*1.3	2,089
MW*1.3 < Wage ≤ $11	19,431
$11 < Wage ≤ $16	25,303
$16 < Wage ≤ $24	24,641
$24 < Wage	25,101

NOTE: The table includes 101,299 observations. The final three rows correspond approximately to the upper three quartiles of the wage distribution.

Table 4 Minimum Wage Changes

Wage change	Observations	States
No minimum wage law change	36,837	45
0 < Minimum wage law change ≤ 5%	16,406	14
5% < Minimum wage law change ≤ 10%	8,244	8
10% < Minimum wage law change ≤ 20%	29,453	33
20% < Minimum wage law change	10,359	11

Table 5 Ordinary Least Squares

	Minimum wage change				
Wage group	≤ 5%	5%–10%	10%–20%	> 20%	Obs.
Wage ≤ minimum wage*1.1	−0.108**	0.036	0.080	0.521***	2,346
	(0.050)	(0.051)	(0.053)	(0.127)	
MW*1.1 < wage ≤ MW*1.2	−0.076	−0.064	0.06	0.166*	2,388
	(0.054)	(0.045)	(0.049)	(0.087)	
MW*1.2 < wage ≤ MW*1.3	−0.219***	−0.006	−0.033	0.085	2,089
	(0.038)	(0.083)	(0.049)	(0.066)	
MW*1.3 < wage ≤ $11	−0.056**	0.002	0.024**	0.028	19,431
	(0.025)	(0.015)	(0.012)	(0.019)	
$11 < wage ≤ $16	0.012	0.036***	0.008	−0.014	25,303
	(0.014)	(0.013)	(0.012)	(0.011)	
$16 < wage ≤ $24	0.008	0.031	0.002	0.015	24,641
	(0.013)	(0.024)	(0.007)	(0.011)	
$24 < wage	−0.0004	−0.020	−0.007	0.008	25,101
	(0.018)	(0.013)	(0.008)	(0.013)	
Observations	16,406	8,244	29,453	10,359	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. The table reports results from a single ordinary least squares regression that includes all 101,299 observations. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, the state monthly unemployment rate, the lagged growth in state per capita GDP, the annual state union membership rate, the annual state poverty rate, the percentage of workers in the state earning below the federal minimum wage, and the state price level. Fixed effects are included for the state of residence, and the month and year of the first interview. The final three rows correspond approximately to the upper three quartiles of the wage distribution. Standard errors are clustered at the state level.

Table 6 Median Regression

Wage group	Minimum wage change				Obs
	≤ 5%	5% − 10%	10% − 20%	> 20%	
Wage ≤ minimum wage*1.1	−0.036	0.055	0.081***	0.286***	2,346
	(0.032)	(0.079)	(0.029)	(0.103)	
MW*1.1 < wage ≤ MW*1.2	−0.075**	0.003	0.046**	0.131***	2,388
	(0.032)	(0.048)	(0.022)	(0.029)	
MW*1.2 < wage ≤ MW*1.3	−0.093***	0.070**	−0.001	0.107**	2,089
	(0.027)	(0.030)	(0.020)	(0.053)	
MW*1.3 < wage ≤ $11	−0.028**	−0.0080	0.003	0.018*	19,431
	(0.011)	(0.013)	(0.006)	(0.010)	
$11 < wage ≤ $16	0.000	0.006	0.001	−0.010**	25,303
	(0.007)	(0.007)	(0.005)	(0.005)	
$16 < wage ≤ $24	0.009	0.008	−0.001	0.002	24,641
	(0.007)	(0.009)	(0.004)	(0.007)	
$24 < wage	0.009	−0.009	−0.004	0.008	25,101
	(0.014)	(0.011)	(0.008)	(0.010)	
Observations	16,406	8,244	29,453	10,359	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. The table reports results from a single median regression that includes all 101,299 observations. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, the state monthly unemployment rate, the lagged growth in state per capita GDP, the annual state union membership rate, the annual state poverty rate, the percentage of workers in the state earning below the federal minimum wage, and the state price level. Fixed effects are included for the state of residence, and the month and year of the first interview. The final three rows correspond approximately to the upper three quartiles of the wage distribution. Standard errors are clustered at the state level.

Table 7 Median Regression with Constant States Removed

	Minimum wage change				
Wage group	≤ 5%	5% − 10%	10% − 20%	> 20%	Obs.
Wage ≤ minimum wage*1.1	−0.043	0.038	0.070**	0.277***	1,834
	(0.041)	(0.060)	(0.029)	(0.075)	
MW*1.1 < wage ≤ MW*1.2	−0.057**	−0.016	0.037	0.119***	1,893
	(0.025)	(0.082)	(0.023)	(0.032)	
MW*1.2 < wage ≤ MW*1.3	−0.095**	0.068*	−0.0040	0.105*	1,636
	(0.038)	(0.039)	(0.025)	(0.058)	
MW*1.3 < wage ≤ $11	−0.048***	−0.011	−0.0002	0.013	17,182
	(0.014)	(0.009)	(0.006)	(0.009)	
$11 < wage ≤ $16	−0.002	0.006	−0.001	−0.013**	21,227
	(0.007)	(0.007)	(0.005)	(0.005)	
$16 < wage ≤ $24	0.007	0.013	−0.002	0.002	20,578
	(0.008)	(0.009)	(0.004)	(0.008)	
$24 < wage	0.012	−0.004	0.003	0.014*	21,274
	(0.011)	(0.012)	(0.006)	(0.009)	
Observations	6,485	7,825	28,261	10,359	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. The above table reports results from a median regression that includes 85,624 observations. Observations from states with a minimum wage change that falls into the same change bin in each year, and observations from states that never change the minimum wage have been removed. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, the state monthly unemployment rate, the lagged growth in state per capita GDP, the annual state union membership rate, the annual state poverty rate, the percentage of workers in the state earning below the federal minimum wage, and the state price level. Fixed effects are included for the state of residence, and the month and year of the first interview. The final three rows correspond approximately to the upper three quartiles of the wage distribution. Standard errors are clustered at the state level.

Table 8 Median Regression, State-Year Fixed Effects

	Minimum wage change				
Wage group	≤ 5%	5%–10%	10%–20%	> 20%	Obs.
Wage ≤ minimum wage*1.1	−0.060*	−0.005	0.072**	0.277***	2,346
	(0.031)	(0.087)	(0.029)	(0.106)	
MW*1.1 < wage ≤ MW*1.2	−0.093***	−0.059	0.037	0.121***	2,388
	(0.031)	(0.042)	(0.026)	(0.031)	
MW*1.2 < wage ≤ MW*1.3	−0.117***	0.012	−0.0140	0.094*	2,089
	(0.024)	(0.032)	(0.019)	(0.055)	
MW*1.3 < wage ≤ $11	−0.050***	−0.065***	−0.004	0.009	19,431
	(0.017)	(0.014)	(0.006)	(0.013)	
$11 < wage ≤ $16	−0.023**	−0.053***	−0.007	−0.019**	25,303
	(0.011)	(0.015)	(0.005)	(0.009)	
$16 < wage ≤ $24	−0.010	−0.047**	−0.010**	−0.005	24,641
	(0.012)	(0.018)	(0.005)	(0.010)	
$24 < wage	−0.012	−0.062***	−0.013	0.0002	25,101
	(0.018)	(0.018)	(0.009)	(0.013)	
Observations	16,406	8,244	29,453	10,359	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. The above table reports results from a single median regression that includes 101,299 observations. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, and the state monthly unemployment rate. The final three rows correspond approximately to the upper three quartiles of the wage distribution. Standard errors are clustered at the state level.

Table 9 Median Regression, Flexible Covariates

	Minimum wage change				
Wage group	≤ 5%	5%–10%	10%–20%	> 20%	Obs.
Wage ≤ minimum wage*1.1	−0.020	0.087	0.089***	0.274***	2,346
	(0.030)	(0.077)	(0.024)	(0.042)	
MW*1.1 < wage ≤ MW*1.2	−0.068**	0.025	0.046	0.117***	2,388
	(0.027)	(0.037)	(0.029)	(0.039)	
MW*1.2 < wage ≤ MW*1.3	−0.117***	0.020	−0.0004	0.055	2,089
	(0.028)	(0.055)	(0.030)	(0.049)	
MW*1.3 < wage ≤ $11	−0.020*	−0.018	−0.002	0.018**	19,431
	(0.011)	(0.013)	(0.006)	(0.009)	
$11 < wage ≤ $16	0.0004	0.005	−0.001	−0.008	25,303
	(0.007)	(0.008)	(0.005)	(0.005)	
$16 < wage ≤ $24	0.012*	0.007	−0.001	0.003	24,641
	(0.006)	(0.009)	(0.004)	(0.006)	
$24 < wage	0.001	−0.001	0.002	0.002	25,101
	(0.009)	(0.008)	(0.007)	(0.007)	
Observations	16,406	8,244	29,453	10,359	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. The table reports results from a single median regression that includes 101,299 observations. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, the state monthly unemployment rate, the lagged growth in state per capita GDP, the annual state union membership rate, the annual state poverty rate, and the percentage of workers in the state earning below the federal minimum wage, the state price level, as well as wage group interactions with the race, ethnicity, education, gender, and age variables. Fixed effects are included for the state of residence, and the month and year of the first interview. The final three rows correspond approximately to the upper three quartiles of the wage distribution. Standard errors are clustered at the state level.

Table 10 Median Regression, Ages 23–65

	Minimum wage change				
Wage group	≤ 5%	5%–10%	10%–20%	> 20%	Obs.
Wage ≤ minimum wage*1.1	−0.043	0.154***	0.157	0.594***	1,346
	(0.087)	(0.054)	(0.208)	(0.098)	
MW*1.1 < wage ≤ MW*1.2	−0.113	0.003	0.078	0.299***	1,543
	(0.072)	(0.065)	(0.053)	(0.074)	
MW*1.2 < wage ≤ MW*1.3	−0.149	0.115	−0.038	0.125	1,492
	(0.097)	(0.139)	(0.091)	(0.112)	
MW*1.3 < wage ≤ $11	−0.028**	0.0020	0.004	0.015	16,035
	(0.012)	(0.011)	(0.007)	(0.011)	
$11 < wage ≤ $16	−0.001	0.006	0.001	−0.012**	23,939
	(0.006)	(0.007)	(0.005)	(0.005)	
$16 < wage ≤ $24	0.010*	0.009	−0.002	0.002	24,113
	(0.005)	(0.010)	(0.004)	(0.008)	
$24 < wage	0.005	−0.013	−0.006	0.007	24,659
	(0.013)	(0.013)	(0.008)	(0.010)	
Observations	15,185	7,559	27,134	9,450	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. The table reports results from a single median regression that includes 93,127 observations. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, the state monthly unemployment rate, the lagged growth in state per capita GDP, the annual state union membership rate, the annual state poverty rate, the percentage of workers in the state earning below the federal minimum wage, and the state price level. Fixed effects are included for the state of residence, and the month and year of the first interview. The final three rows correspond approximately to the upper three quartiles of the wage distribution. Standard errors are clustered at the state level.

Table 11 Median Regression, Low-Wage Earners

	Minimum wage change				
	≤ 5%	5%–10%	10%–20%	> 20%	Obs.
Men	−0.047	0.065	0.044	0.154***	51,023
	(0.044)	(0.053)	(0.034)	(0.042)	
Women	−0.059**	0.040*	0.037**	0.140***	50,276
	(0.027)	(0.021)	(0.019)	(0.038)	
White	−0.050**	0.036*	0.048***	0.173***	86,547
	(0.024)	(0.021)	(0.014)	(0.040)	
Black	−0.141**	0.121	−0.002	−0.026	8,194
	(0.067)	(0.111)	(0.068)	(0.063)	
Hispanic	0.023	0.004	0.042**	0.591***	9,656
	(0.037)	(0.020)	(0.017)	(0.052)	
22 and under	−0.040	0.007	0.044**	0.134***	5,986
	(0.039)	(0.024)	−0.019	(0.025)	
No diploma	−0.060***	0.021	0.040***	0.134***	8,263
	(0.023)	(0.018)	(0.016)	(0.036)	
Low income	−0.045	0.024	0.044**	0.210*	22,970
	(0.029)	(0.033)	(0.022)	(0.109)	

NOTE: * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level. Each row reported in the table above represents a separate median regression including only the specified demographic group. Reported coefficients are for individuals earning a wage at the time of the first interview within 30% of the applicable minimum wage. Additional covariates not reported above include race, ethnicity, gender, education level, household income, age and age squared, the "wage bin" to which an individual belongs at the time of the first interview, the state monthly unemployment rate, the lagged growth in state per capita GDP, the annual state union membership rate, the annual state poverty rate, the percentage of workers in the state earning below the federal minimum wage, and the state price level. The low income group includes individuals with a reported household income of no more than $40,000 annually. Standard errors are clustered at the state level.