DO MINIMUM WAGES AFFECT NON-WAGE JOB ATTRIBUTES? EVIDENCE ON FRINGE BENEFITS

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Although many studies have tested neoclassical labor market theory's prediction that employers will react to binding minimum wages by reducing employment levels, much less empirical research has explored the possibility that employers also respond to minimum wages by adjusting non-wage components of the job, such as fringe benefits, job safety, and access to training. Using Current Population Survey data for 1979–2000, this study investigates the effect of minimum wage legislation on the provision of employer health insurance and employer pension coverage. The authors examine effects of state and federal variation in minimum wages on groups likely to be affected by the minimum wage, and compare these effects to estimates found for groups unlikely to be affected. Whether the analysis uses only state-level variation or federal and state variation in minimum wages, the results indicate no discernible effect of the minimum wage on fringe benefit generosity for low-skill workers.

There is a very large literature examining the employment effects of the minimum wage.[1] However, there is very little research exploring the potentially important effects of a minimum wage on non-monetary attributes of employment such as fringe benefits, job safety, and access to training opportunities. To the extent that employers can change non-wage compensation and working conditions for low-wage workers, adjustments of this type would take some of the bite out of minimum wage increases and weaken the effect of minimum wages on employment.[2] Non-wage compensation accounts for 25% of total compensation, with 15% being voluntary compensation (Pierce 2001). To the extent that non-wage compensation is voluntary and flexible, it can offset regulation-induced changes in wage compensation.

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A data appendix with additional results, and copies of the computer programs used to generate the results presented in the paper, are available from the first author at Department of Policy Analysis and Management, Cornell University, Ithaca, NY 14853; (607) 255–7103; kis6@cornell.edu.

[1]Studies that find a small increase in employment include Card (1992a, 1992b), Card and Krueger (1994), Katz and Krueger (1992), Machin and Manning (1994), and Bernstein and Schmitt (1998). Studies showing adverse employment effects include Neumark and Wascher (1992), Deere, Murphy, and Welch (1995), Baker, Benjamin, and Stanger (1999), Abowd, Kramarz, and Margolis (1999) and Burkhauser, Couch, and Wittenburg (2000b). Studies that attempt to reconcile the findings are Manning (1995), Baker, Benjamin, and Stanger (1999), and Burkhauser, Couch, and Wittenburg (2000a).

[2]This point is fully developed by Wessels (1981).

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We use the Current Population Survey (CPS) to study the effect of minimum wages on the provision of employer health insurance and pension coverage during the period 1979–2000. If minimum wages affect provision of fringe benefits, we can address whether or not these adjustments can explain the smaller than expected effect of minimum wages on employment found in some studies. Our analysis of the relationship between minimum wages and fringe benefit provision also adds to the literature exploring compensating wage differentials for fringe benefits. Variation in wages caused by changes in minimum wage laws is exogenous to productivity, and therefore provides an excellent opportunity to examine the effect of wage changes on fringe benefits.

Previous Literature

There are relatively few studies of the effect of minimum wages on fringe benefits and working conditions. Card and Krueger (1995) reviewed the limited evidence on the importance of non-wage compensation as adjustment mechanisms to minimum wage changes and concluded that the evidence is mixed. For example, Mincer and Leighton (1981) and Hashimoto (1982) found that an increase in the minimum wage significantly reduces on-the-job training, but Lazear and Miller (1981) found no effect of minimum wages on training. Two recent papers explored this issue further and reported mixed results. Neumark and Wascher (2001) found that minimum wages reduce on-the-job training, but that there is no commensurate increase in training needed to obtain jobs. Acemoglu and Pischke (1999) found that minimum wages do not appear to affect training. Similarly, Wessels (1980) and Alpert (1986) reported small reductions in fringe benefits in response to a minimum wage increase in the retail and restaurant industries, respectively, but Card and Krueger (1994) found that fast food restaurants do not reduce free or reduced-price meal benefits.

Finally, Holzer, Katz, and Krueger (1991) showed that applicant queues for minimum wage jobs are longer than those for jobs paying more than the minimum wage, which suggests that rents on minimum wage jobs are not dissipated by non-wage offsets. In contrast, Sicilian and Grossberg (1994) showed that quit rates on minimum wage jobs are higher than on non–minimum wage jobs. This finding suggests that the rent on minimum wage jobs is more illusory (because of the higher money wage) than real, and that non-wage attributes of minimum wage jobs diminish their appeal.

Besides our study, the only other study of which we are aware that looks at the effect of minimum wages on health insurance and pensions is Royalty (2000). Using data from the Current Population Survey, Employee Benefits Supplements of 1988 and 1993, Royalty focused on variation in state minimum wages that occurred between those two years. She reported that for workers with few years of education, minimum wage increases between 1988 and 1993 had a somewhat surprising effect: increases of up to approximately 50 cents (in 2001 dollars) were associated with statistically significant *increases* in offers of health insurance and pension benefits, but larger increases in minimum wages were associated with statistically significant decreases in offers of health and pension benefits. For the range of state minimum wage variation observed in her sample (between \$.02 and \$1.00, with values above \$.50 only observed once each for Hawaii, the District of Columbia, and New Jersey), most of the results predicted by the model indicated that an increase in the minimum wage increased the eligibility for fringe benefits.

Our research differs from Royalty (2000) in several ways. First, we use variation in both federal and state minimum wages between 1979 and 2000 to identify the effect of minimum wages on fringe benefit receipt. Second, we use both annual income and education to identify target and comparison groups for our analysis. Third, we use different dependent variables—specifically, whether the benefit is actually received rather than whether it is offered—and for health insurance we also use measures of generosity.

The lack of more studies investigating the connection between fringe benefits and minimum wages cannot be because fringe benefits are not an important component of minimum wage jobs. For example, data from the National Longitudinal Survey of Youth (NLSY) indicate that approximately one-third of workers aged 16–24 who were earning near the minimum wage in 1979–82 were offered health insurance by their employer (Simon and Kaestner 2003), and data from the Current Population Survey (CPS) indicate that 44% of young (under age 30) high school dropouts observed during 1979–86 and a quarter of the same population observed during 1987–2000 received employer-provided health insurance (see Appendix Table A1). Thus, there is scope for adjustment of fringe benefits and working conditions to appreciably dull the impact of a minimum wage increase on employment.

Hypotheses: Effects of Minimum Wages on Benefits

That minimum wages may adversely affect employment levels has long been hypothesized in the literature, although some doubt was cast on this theory during the 1990s.[3] The effect of minimum wages on benefits is less clear. A simple example illustrates the possible consequence of a rise in the minimum wage for low-wage workers. Consider a firm with the following characteristics: it hires only low-skill workers from a competitive labor market; it faces a constant price for its output (that is, there is no monopoly power); and it has a production process characterized by diminishing marginal returns to labor. Before the minimum wage hike, the firm hires workers until the last worker's marginal revenue product (MRP_i) is equal to the employer's marginal cost of hiring that worker; the employer's marginal cost is equal to the wage (W_i) plus fringe benefits plus other expenses such as marginal workplace safety costs, which we assume to be a non-trivial component of compensation. The imposition of a binding minimum wage (W^m) exceeding W_i will cause an imbalance between total compensation and the value of the worker's productivity. Employers have two non–mutually exclusive options to re-establish equilibrium: reduce employment until marginal worker productivity is increased by a sufficient amount, or reduce the non-wage part of compensation. Heterogeneity in employers' costs of adjusting employment versus adjusting fringe benefits may lead some employers to choose one solution over the other, and so in aggregate, an increase in the minimum wage may cause both a change in employment and a change in fringe benefits.

However, several factors limit the ability of employers to adjust benefits. In contrast to the example above, low-skill (low-wage) workers are likely to work in firms that also employ high-skill (high-wage) workers, and the federal tax code requires employers to provide benefits on a non-discriminating basis in order to maintain the tax-exempt status of employer contributions to some benefits (for example, self-insured health insurance) and the deferred tax treatment of others (almost all employer pensions).[4] Thus, these employers are not freely able to adjust health or pension benefits on an employee-by-employee basis, although there are some exemptions (for example, on the basis of age and full-time/part-time status) that allow employers to segment the work force for purposes of providing benefits (Carrington, McCue, and Pierce 2002).[5]

[3]See Stigler (1946) for the earliest exposition on the employment effects of the minimum wage.

[4]According to Collins (1999), "only self-insured health plans are subject to the non-discrimination rules" (p. 2). The gist of these restrictions is to prevent the within-firm distribution of non-wage benefits from being heavily weighted toward the high-wage workers. See Collins (1999) and Carrington, McCue, and Pierce (2002) for more details on the provisions of the federal legislation.

[5]This suggests that employers may attempt to cut back these fringe benefits by changing the status of workers who are affected by binding minimum wages

The discussion above assumes a one-to-one tradeoff between a dollar of health insurance and wages. However, employers may decide to provide non-wage benefits for other reasons, such as to reduce turnover. Employers also may not adjust fringe benefits to changes in minimum wages that they view as only binding in the short run because of an anticipated rise in prices (that is, inflation) that will soon cause the nominal wage to be no longer binding. In this case, employers will not incur the fixed cost of changing fringe benefit decisions. For example, the change in the federal minimum wage from \$3.35 to \$3.80 between 1989 and 1990 would have been fully eroded by inflation by 1992 (had no further legislation occurred).

In addition, commercial health insurers that generally serve the small employer market usually require minimum participation clauses that create an incentive for the firm to make health insurance affordable for low-wage workers, particularly if those employees represent an important portion of the firm's work force. Other non-wage aspects of the job, such as workplace safety, may be public goods that are shared by several types of workers and therefore prevent the employer from making adjustments just for low-wage workers.[6] Benefits such as vacation pay and sick day pay are more flexible in that they are not as likely to be constrained by the technology of production or tax rules, and can be more readily altered in response to a minimum wage increase. In sum, the extent to which fringe benefits would react to minimum wage hikes depends on the minimum wage having a binding effect, fringe benefits comprising a non-trivial portion of total compensation for low-wage workers, and the employer's being able to differentially adjust benefits for affected workers and to adjust the level of employment.[7]

from full-time to part-time. We take this possibility into account in our empirical analysis by testing for whether hours worked were affected. We find no evidence that they were.

[6]However, Hamermesh (1999) found that the income elasticity of demand for workplace safety and shift work was greater than one, indicating flexibility in the determination of these amenities.

Empirical Methods

As discussed above, fringe benefits depend on employee characteristics (for example, employee productivity), firm characteristics (for example, share of minimum wage workers), and the minimum wage. Our empirical analysis investigates the hypothesis that binding minimum wages affect non-wage attributes of the job, as measured by receipt of health insurance and pensions. We test our hypotheses using the following regression model:

$$\text{(1)} \quad \text{FrBen}_{ijt} = \alpha + X_{ijt}\Gamma + \beta\text{MinWage}_{jt} + \gamma_j + \tau_t + \varepsilon,$$

$$i = 1,\ldots, N \textit{ (persons)}$$
$$j = 1,\ldots, 51 \textit{ (states)}$$
$$t = 1,\ldots, T \textit{ (years)}$$

In equation (1), FrBen is an indicator of whether or not worker i has the fringe benefit in question (health insurance or pension), MinWage is the real value of the minimum wage in state j in year t, and X is a vector of personal characteristics (for example, age, race, and sex) and, in some cases, job characteristics (for example, industry and occupation). Also included in X are controls for macroeconomic conditions in the state, such as the unemployment rate and the manufacturing wage rate. The model also includes controls for unmeasured state-specific (γ_j) and year-specific (τ_t) effects. We estimate this model by ordinary least squares.[8]

[7]If employers are unable to differentially adjust fringe benefits for low-skill workers, they are unlikely to instead lower fringe benefits for everyone at the firm (including high-skill workers), since minimum wage workers are likely to be only a small fraction of the total work force.

[8]We have also estimated models using a logit, and the results are consistent with the conclusion of this analysis. The statistical properties of a probit regression using panel data are not well understood. Furthermore, OLS is consistent and easy to interpret.

Equation (1) identifies the effect of minimum wages on fringe benefits from state variation in minimum wages and fringe benefits from year to year. Federal variation in minimum wages is subsumed by the year effects. Thus, equation (1) assumes that unmeasured factors that vary by state-year are uncorrelated with minimum wages and fringe benefits. To bolster the case for this identification strategy, we estimate equation (1) for several groups of individuals who differ in their likelihood of being affected by the minimum wage. We expect the minimum wage to have a larger effect on fringe benefits for groups more likely affected by it.

For example, we divide the sample by education and age, and estimate equation (1) separately for two groups: persons age 18–29 with fewer than 12 years of education (that is, high school dropouts); and persons age 20–29 with 12–15 years of education.[9] Those with fewer than 12 years of education earn relatively low wages and are therefore more likely to be affected by minimum wages than individuals of the same age but with 12–15 years of education. We also divide the sample by income and estimate separate equations for those with a relatively low level of earned income (those with less than $8,000 in 1982–84 dollars) compared to two higher-income groups (those with income of $8,000–12,000, and those with $12,000–20,000). Thus, if we find any effect, we should find larger effects of the minimum wage among the young, low-education sample and the lower-income sample. A finding of similar-sized effects across all groups would suggest that the coefficient on minimum wages is capturing unmeasured state-year factors rather than true causal effects.

As an alternative to equation (1), we also estimate models that omit year fixed effects. This allows us to use variation in federal minimum wages in addition to variation in state minimum wages to identify the effect of minimum wages on fringe benefits. Recent analyses of the employment effects of minimum wages show that the use of such variation is important and leads to inferences qualitatively different from those that follow from relying only on state-level variation (for example, Burkhauser, Wittenburg, and Couch 2000a). However, omitting year fixed effects increases the possibility that estimated effects of the minimum wage will be spurious, reflecting the correlation between unmeasured, time-varying factors and the minimum wage. In these specifications, the use of state-level macro indicators and comparison groups is particularly important, as these are ways to control for unmeasured, time-varying factors. Obviously, this specification relies heavily on the adequacy of the "control group" and the assumption that time effects are the same for high- and low-wage workers.[10]

Meaningful state variation in minimum wages did not start until the end of the 1980s. Thus, we examine the effect of minimum wages in two periods. The first period, 1979–86, encompasses the 1980–81 changes in the federal minimum wage. Virtually all of the variation in minimum wages in this period is by year, as only four states had state minimum wages that differed from the federal minimum.[11] Thus, we are only able to estimate models that omit year effects in such periods, because it is impossible to identify separate year and minimum wage effects. The second pe-

[9]Those with 13–15 years of education were found to be extremely similar to those with high school education among the 20–29-year-old group. Results do not change in any substantial way if those who are 20–29 years old and have 13–15 years of education are omitted from the analysis.

[10]As noted, one potential mechanism for adjusting to an increase in minimum wages is to shift people to part-time status, making some of their benefits easier to alter. If our empirical investigation indicates that fringe benefits have decreased among workers, we can test whether this type of adjustment takes place by estimating models of full-time employment status.

[11]In the period 1979–82, Alaska, Connecticut, and the District of Columbia had a state minimum wage above the federal minimum and yearly increases that differed slightly from the federal.

riod, 1987–2000, encompasses major changes in the federal minimum wage from 1989 to 1991 and from 1996 to 1998. In addition, many states changed their state minimum wage during this time, allowing us to estimate models with and without year effects.

Data

We test our hypotheses using the Current Population Survey (CPS), which is a cross-sectional survey administered monthly to approximately 55,000 households. Every March, respondents are asked additional questions about the provision of fringe benefits (employer-provided health insurance and pensions) at jobs held the previous year through the Annual Demographics Survey (ADS). The fringe benefits questions were first asked in the 1980 wave, and we use ADS up to 2001; thus the data span the period 1979–2000. During this period, the nominal minimum wage changed from $2.90 to $5.15 in six steps, and 18 states acted to raise their state minimum wage above the federal level (see Table 1 for changes in the minimum wage between 1979 and 2000).

Although monthly Outgoing Rotation Groups (ORGs) of the CPS have been used in the minimum wage literature, to the best of our knowledge, the ADS has not been previously analyzed in this context. The ADS is particularly important for the analysis of minimum wages and fringe benefits for three reasons:

—It contains questions about the receipt of health insurance and pensions, and not just whether or not an employee was eligible for benefits, as in other data sets (for example, the CPS Benefits Supplement questions used in Royalty's 2000 study). Whether or not the worker actually receives these fringe benefits is perhaps a more appropriate outcome to study, because it reflects two types of employer actions: decisions to offer benefits to low-wage workers, and decisions to alter the terms of offers (for example, making changes in employee contributions to health insurance coverage).

—The ADS also contains other measures of the generosity of health insurance: it asks whether the employer pays all, some, or none of the premium, and it has information about whether the worker receives single or family health insurance coverage.

—The ADS spans the past two decades and covers a period of substantial variation in federal and state minimum wages.

The ADS has some limitations. For example, it does not record the hourly wage for workers, and thus we cannot identify affected workers by their wage.[12] In addition, the ADS has changed the way that health insurance questions have been asked over time, although our use of comparison groups or year fixed effects (or both) minimizes the severity of this problem.[13] Despite these drawbacks, the ADS is perhaps the survey most frequently used by researchers and policy-makers to gain information on the health insurance coverage of nonelderly Americans during the past two decades. Descriptive statistics for our sample are given in Appendix Table A1.

We separate workers in the ADS into groups based on the likelihood of their being affected by a minimum wage. In some analyses, we use education and age, which we find to be good proxies for exposure to minimum wages, to define "affected" and "unaffected" groups. Specifically, the "affected" group is high school drop-outs aged 18–29 years (HSDO), and the corresponding "unaffected" group is those with between 12 and 15 years of education aged 20–29 years (GEHS). We also define "affected" and "unaffected" groups based on

[12]The basic CPS solicits extra data (including wages) from about a quarter of the respondents every month. This wage information pertains to the time of the survey, while the health insurance information asked of everyone through the Annual Demographic Supplement refers to the previous year. We use the ORG wages to judge whether the minimum wage is binding on particular groups of workers.

[13]For example, in 1995 the ADS started asking a more straightforward set of health insurance–related survey questions, which is thought to have resulted in an across-the-board increase in the number of people estimated to have employer health insurance. (http://www.bls.census.gov/cps/ads/1995/susrnot3.htm.)

Table 1. States with Minimum Wages above the Federal Level, 1979–2000.

	Year																					
State	*79*	*80*	*81*	*82*	*83*	*84*	*85*	*86*	*87*	*88*	*89*	*90*	*91*	*92*	*93*	*94*	*95*	*96*	*97*	*98*	*99*	*00*	*Total*
AK	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	5.65	22
CA											X	X							X	X	X	5.75	6
CT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	6.15	22
DE																		X	X		X	5.65	4
DC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	6.15	22
HI										X	X	X		X	X	X	X	X	X	X	X	5.25	12
ID																							0
IA												X		X	X	X	X	X					6
ME							X	X	X	X	X	X											6
MD																			X				1
MA									X	X	X							X	X	X	X	6.00	8
MN										X	X	X											3
NH									X	X	X												3
NJ														X	X	X	X	X	X				6
NY																							0
OR												X	X	X	X	X	X	X	X	X	X	6.50	11
PA											X												1
RI									X	X	X	X	X	X	X	X	X	X	X			5.65	12
VT									X	X	X	X					X	X	X	X	X	5.75	10
WA											X	X				X	X	X	X		X	6.50	8
	3	3	3	3	3	3	4	4	8	10	13	12	5	8	8	9	10	12	13	8	10	11	163
Federal Level	2.9	3.1	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.8	4.25	4.25	4.25	4.25	4.25	4.25	4.75	5.15	5.15	5.15	
Avg. Dif. from Fed.	.3	.2	.22	.26	.33	.33	.28	.31	.41	.4	.58	.31	.3	.4	.5	.56	.53	.54	.41	.41	.53	.76	

Source: Data generously provided by David Neumark and William Wascher, cross-checked for select years against reports in the *Monthly Labor Review.* The last row shows the average difference between the federal level and the state level (for those states that set a minimum wage above the federal level).

income: those with less than $8,000 (1982–84 dollars) in earned income are in the "affected" group, and the two "unaffected" groups are those with income of $8,000–12,000 and $12,000–20,000.

As noted, our identification strategy is based on two assumptions: that minimum wages will have a larger effect on fringe benefit receipt among low-wage workers than among high-wage workers, and that in the absence of changes in the minimum wage, time variation in fringe benefit receipt would be the same for low- and high-wage workers. The first assumption has clear face validity and is self-evident: a minimum wage is more likely to be binding among low-wage workers than among higher-wage workers and therefore is more likely to affect low-wage workers' receipt of fringe benefits. The second assumption is less obvious, especially given evidence of growing inequality in non-wage compensation (Pierce 2001).[14] To conduct a convincing test of whether past trends in fringe benefits rates for "affected" and "unaffected" groups were the same, one would need a time period during which no changes in the real minimum wage occurred. No such data exist. At a minimum, the use of different samples (that is, samples of "affected" and "unaffected" groups) to obtain estimates of the effect of minimum wages on fringe benefits allows us to assess whether any effect is group-specific or common across groups.

A Preliminary Look at the Data—Minimum Wages and Health Insurance

The history of the variation in federal and state minimum wage laws during our study period is summarized in Table 1. An X indicates that a state set a minimum wage above the federal level in that year, while the last row shows the average dollar difference between the federal level and the levels in states with higher-than-federal minimum wages. The next to last row shows the federal level in May of that year.[15] Although no important state variation in the minimum wage took place until 1987, the federal minimum wage rose (in nominal terms) from $2.90 to $3.35 between 1979 and 1981. As stated before, our first sample period, 1979–86, focuses on this rise in the federal minimum wage. In contrast, our post-1987 study period witnessed substantial state activity in setting minimum wages as well as four federal minimum wage hikes.

Figure 1 plots the real value of the minimum wage on the same graph as the fractions of the two "affected" groups (one based on low education and the other based on low income) with employer-provided health insurance from 1980 to 2000. This figure shows that during the period from 1980 to about 1987, the real value of the minimum wage as well as the health insurance coverage rate for both affected groups decreased, although the decline in health insurance coverage was steeper for the group with low education (less than high school education) than for the group with low income (annual income less than $8,000).

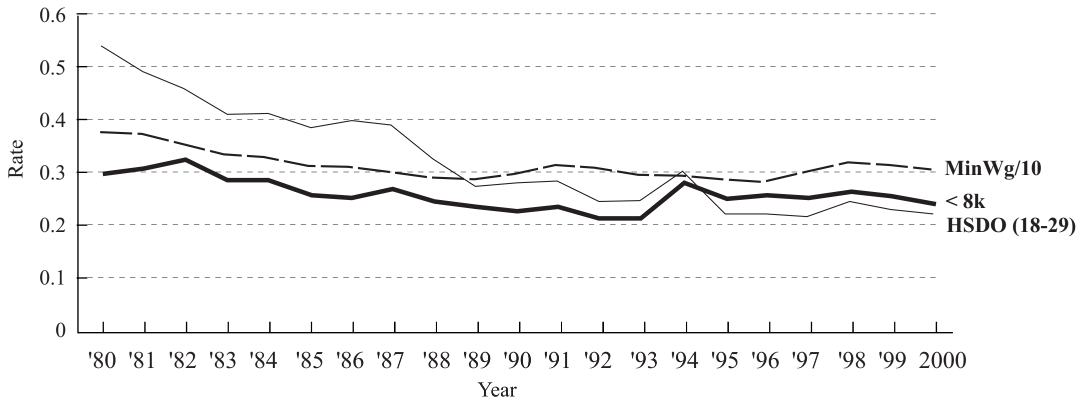
One should be cautious in interpreting this as evidence against our hypothesis that rising minimum wages would lead to a drop in employer-provided health insurance, since we cannot be certain of what the time trend for health insurance coverage among these two low-skill groups would have been, independent of changes in the minimum wage.[16] From 1987 to 2000, the minimum

[14]Differences in time trends between the two groups would bias the estimation toward finding a larger difference between the treatment and the control group that may incorrectly be attributable to the minimum wage. Given our empirical findings, this is not a cause for concern in the present case.

[15]We are grateful to David Neumark and William Wascher for sharing their minimum wage data with us.

[16]Another possibility suggested by a monopsony model of the labor market (as in Manning 1995) is that lower wages received by minimum wage workers as a result of lower minimum wages result in a lower demand for fringe benefits, since they are normal goods. We do not find this to be a plausible story in this current context.

Figure 1. Trends in Health Insurance Coverage Rate and Real Minimum Wages.



Sample: CPS ADS 1980-2000, those appearing in the ORG sample, those working positive hours last year, population weighted results. The figures show the percentage of workers actually receiving employer health insurance from their own employers relative to the minimum wage in effect.

Legend:

MinWg/10 = the real (1982-84 = 100) value of the applicable minimum wage in that state divided by 10.
HSDO: Employer health insurance coverage rate for those with less than high school education aged 18-29 years.
<8k: Employer health insurance coverage rate for those earning less than $8,000 (aged 18-64 years), in 1982-84 dollars.

wage remained relatively constant, but health insurance coverage continued to decline until 1993, after which it also remained relatively stable.[17]

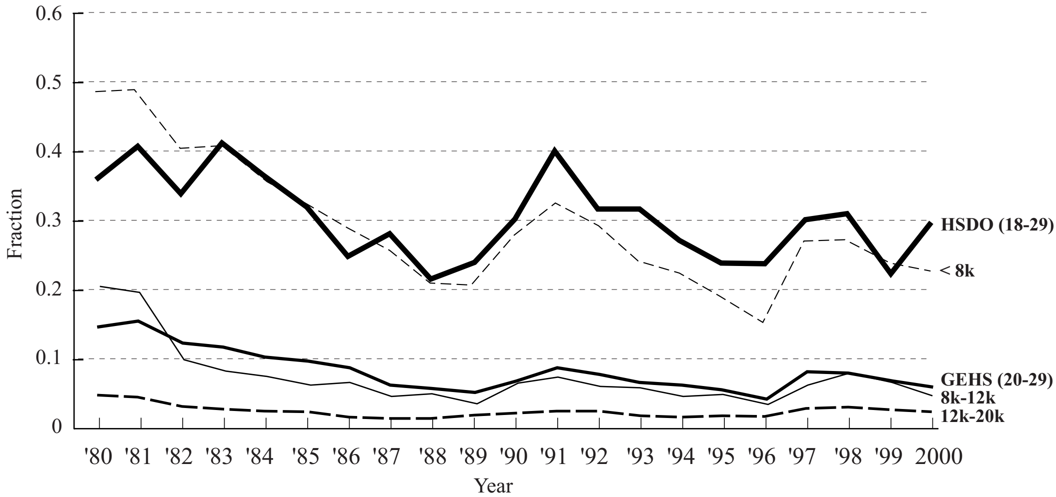
In sum, Figure 1 provides little aggregate evidence that minimum wages adversely affected health insurance coverage of the lowest-skill workers. However, aggregate data may mask important heterogeneity. Thus we turn next to an analysis using individual-level data from CPS.

Effects of Minimum Wages on Wages

The hypothesis motivating our analysis is that minimum wages that bind—that is, that increase wages—may affect fringe benefits. Therefore, it is important to establish that minimum wages are binding for members of our sample. Lee (1999) provided an extensive analysis of the effect of minimum wages on the wage distribution for the periods studied in this paper. His analysis revealed that during this period, higher minimum wages were linked with statistically significant compression of the wage distribution below the median, and had little effect on the wage distribution above the median, particularly in the early 1980s. Lee's results imply that minimum wages were binding for low-wage workers during the periods we study, particularly the earlier period 1979–86. Neumark, Schweizer, and Wascher (2000) provided further evidence to support this point using data from the CPS ORG samples from 1979–97. They estimated that wages responded to changes in minimum wages with an elasticity of 0.8 for those earning just around the mini-

[17]These figures generally match the trend in health insurance for low-skill workers in Currie and Yelowitz (2000) and Farber and Levy (2000). Unreported graphs for employer pension coverage (available upon request) show trends similar to those for health insurance.

Figure 2. Fraction of Each Category below 1.1 × Min. Wage.



Sample: CPS ORG sample 1980-2000, those with positive reported hourly wages, population-weighted results. The figures show the percentage of workers earning within 1.1 times the minimum wage.

Legend:

HSDO: Employer health insurance coverage rate for those with less than high school education aged 18-29 years.

<8k: Employer health insurance coverage rate for those earning less than $8,000 (aged 18-64 years), in 1982-84 dollars.

GEHS: Employer health insurance coverage rate for those with greater than or equal to high school education aged 20-29 years.

8k-12k: Employer health insurance coverage rate for those earning less than $12,000 but more than $8,000 (aged 18-64 years), in 1982-84 dollars.

12k-20k: Employer health insurance coverage rate for those earning less than $20,000 but more than $12,000 (aged 18-64 years), in 1982-84 dollars.

mum wage. For those earning 1.5 times the minimum wage, the elasticity of wages with respect to the minimum wage was lower—0.4.

To further establish that our "affected" and "unaffected" groups differ in their exposure to minimum wages, we calculated the fraction of each of our groups that is directly constrained by the minimum wage (defined conservatively as earning less than 1.1 times the prevailing minimum wage) from the ORG sample, since hourly wages are not reported in the ADS. These results are shown in tabular and graphic form (Table 2 and Figure 2). Reflecting the erosion of the minimum wage in real terms, the series start out showing high fractions of our "affected" groups—as much as 40% of the HSDO group and 50% of the low-income group—clustered at the minimum wage, but these fractions become smaller over time. The "unaffected" groups show stable trend lines over time, while the "affected" groups' lines vary dramatically with hikes in the minimum wage. In summary, these numbers show that the "affected" groups are far more likely to be constrained by the minimum wage than our "unaffected" groups, and that the fraction constrained varies with the degree to which minimum wages have been binding over time, as we would expect.

Table 2. Fraction with Health Insurances and Fraction Constrained by the Minimum Wage, by Group and Year.

Year	*Health Insurance among HSDO*	*% of HSDO Constrained*	*Health Insurance among GEHS*	*% of GEHS Constrained*	*Health Insurance among <8k*	*% of <8k Constrained*	*Health Insurance among 8k–12k*	*% of 8k–12k Constrained*	*Health Insurance among 12k–20k*	*% of 12k–20k Constrained*
1980	0.340	0.360	0.650	0.147	0.299	0.487	0.671	0.202	0.811	0.048
1981	0.360	0.409	0.641	0.153	0.306	0.491	0.690	0.197	0.856	0.045
1982	0.303	0.342	0.623	0.124	0.325	0.404	0.693	0.102	0.861	0.032
1983	0.363	0.414	0.596	0.116	0.283	0.413	0.697	0.083	0.858	0.028
1984	0.332	0.370	0.582	0.105	0.284	0.360	0.663	0.077	0.845	0.026
1985	0.274	0.319	0.585	0.098	0.257	0.325	0.681	0.064	0.833	0.024
1986	0.224	0.248	0.572	0.090	0.254	0.291	0.641	0.066	0.829	0.015
1987	0.257	0.281	0.525	0.063	0.271	0.256	0.634	0.043	0.819	0.017
1988	0.189	0.216	0.527	0.055	0.246	0.207	0.589	0.050	0.773	0.015
1989	0.196	0.239	0.520	0.052	0.238	0.210	0.591	0.036	0.753	0.020
1990	0.205	0.304	0.510	0.070	0.230	0.280	0.566	0.066	0.759	0.021
1991	0.324	0.400	0.483	0.085	0.235	0.325	0.572	0.075	0.763	0.024
1992	0.244	0.315	0.460	0.079	0.216	0.294	0.568	0.060	0.750	0.026
1993	0.252	0.315	0.474	0.068	0.215	0.241	0.555	0.060	0.726	0.020
1994	0.201	0.272	0.469	0.063	0.278	0.224	0.607	0.045	0.776	0.017
1995	0.170	0.240	0.457	0.057	0.254	0.196	0.561	0.050	0.748	0.018
1996	0.182	0.235	0.460	0.041	0.259	0.151	0.572	0.036	0.742	0.017
1997	0.198	0.301	0.460	0.082	0.250	0.273	0.551	0.062	0.730	0.027
1998	0.244	0.310	0.454	0.081	0.263	0.275	0.570	0.080	0.728	0.031
1999	0.167	0.223	0.479	0.070	0.256	0.240	0.563	0.065	0.718	0.027
2000	0.217	0.296	0.485	0.057	0.242	0.226	0.531	0.047	0.716	0.024

Notes: In the pairs of columns, the first column is the fraction of the group that has health insurance through the employer, and the second is the fraction of the group that earns wages below 1.1 times the minimum wage. The groups are:

HSDO: Those with less than high school education, aged 18–29 years.
GEHS: Those with 12 through 15 years of education, aged 20–29 years.
<8k: Those earning less than $8,000 (aged 18–64 years) in real 1982–84 dollars.
8k–12k: Those earning $8,000-12,000 (aged 18–64 years) in real 1982–84 dollars.
12k–20k: Those earning $12,000-20,000 (aged 18–64 years) in real 1982–84 dollars.

The ORG sample is used. Year refers to the CPS year. Population weights are used.

Effect of Minimum Wages on Fringe Benefits

Table 3 presents the OLS estimates of the effect of the minimum wage on the receipt of employer-provided health insurance and pensions for the two education and age groups that define our "affected" and "unaffected" groups. Health insurance is measured in three ways: whether the employee has employer-provided health insurance; whether the employee has family coverage; and whether the employer paid the full cost of employee health insurance. Each row of the table lists estimates from a separate regression. Standard errors are in parentheses. Bold numbers indicate instances in which the differences between the coefficients of the affected and unaffected groups are significantly different at the 10% level. The sample is limited to those with health insurance in the analyses of family coverage and the employer's contribution. The fourth row contains results for the pension regression, with the dependent variable taking a value of 1 if the worker received a pension from the employer and 0 if he or she did not. The first two columns present estimates for the period 1979–86. Because of the lack of state variation in the minimum wages, we are unable to use year fixed effects in these models. Therefore, we estimate equation (1) for each of the two education/age demographic groups. Estimates of the effect of minimum wages for the group for whom the minimum wage does not bind (GEHS) provide information as to the causal nature of the estimates associated with groups for whom the minimum wage is binding.

During 1979–86, increased minimum wages are associated with an increased probability of receiving health insurance and pensions for both demographic groups. There is also an increase in the probability of the employer offering family health insurance, which usually costs the employer more than twice what an individual policy costs, and an increased probability of the employer paying for all of the health insurance costs.

These results are surprising in two ways. First, the effect is opposite in sign to what theory predicts. Second, the magnitudes of the effects are similar across the two groups—those "affected" and those "unaffected"—in the case of pensions. The only case in which the difference in coefficients between the two groups is statistically significant, the effect of the minimum wage on health insurance, is positive and larger in magnitude for the "affected" group than for the "unaffected" group. Therefore, it is likely that these positive and statistically significant results are due to a general decline in employer health insurance generosity that coincided with a decline in the real value of the minimum wage. The absence of a differential effect for the "affected" and "unaffected" groups suggests that the minimum wage had no causal effect on low-wage workers' fringe benefit receipt.

Results in the next several columns relate to models for the 1987–2000 period. The first two columns display results that do not include year fixed effects. In these models, the effects of minimum wages on health insurance coverage and pensions are statistically insignificant and of the same sign for both demographic groups. The effect of minimum wages on the probability that the employer pays the whole cost of health insurance is negative as theorized, but the difference in the magnitude of the effect between the two groups is not statistically significant. The minimum wage is associated with a decrease in the probability of receiving family coverage among the "unaffected" group and a statistically insignificant effect among the "affected" group, but here too the difference between coefficients is not statistically significant. Thus, the estimates for this period, which were obtained without controlling for year fixed effects, suggest that the minimum wage did not reduce the probability that low-wage workers received health insurance or pension benefits.

The last two columns of Table 3 present the estimates for the 1987–2000 period that control for year effects. Most estimates are not statistically significant, and all are small in magnitude. Estimates indicate that for

Table 3. OLS Estimates of Effects of a Minimum Wage on the Receipt of Health Insurance and Pensions of Young Adults, by Age and Education Level, 1980–2001, CPS (Refers to Years 1979–2000 for Retrospective Questions).

	1979–1986		*1987–2000*			
Independent Variable	*HSDO 18–29*	*GEHS 20–29*	*HSDO 18–29*	*GEHS 20–29*	*HSDO 18–29*	*GEHS 20–29*
Health Insurance (HI)	**0.139***** **(0.016)**	**0.093***** **(0.009)**	–0.039 (0.026)	–0.018 (0.013)	–0.018 (0.017)	–0.009 (0.011)
Family HI (among those with HI)	0.051*** (0.008)	0.028*** (0.012)	–0.010 (0.046)	–0.095*** (0.028)	**0.042** **(0.035)**	**–0.055***** **(0.022)**
Employer Paid All Cost of HI (among those with HI)	0.351*** (0.027)	0.326*** (0.021)	–0.078*** (0.030)	–0.050** (0.025)	–0.022 (0.029)	0.028** (0.013)
Pensions	0.094*** (0.006)	0.100*** (0.013)	0.010 (0.010)	0.012 (0.014)	–0.011 (0.018)	–0.023 (0.016)
State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	No	No	No	Yes	Yes
Observations (N)	24,561	104,905	32,310	137,779	32,310	137,779

Notes: Each cell represents an estimate from a different regression. **HSDO**: those with less than high school education, aged 18–29 years. **GEHS**: those with 12 through 15 years of education, aged 20–29 years. All monetary values are expressed in real (1982–84=100) terms. The number of observations listed in the table refers to the number of employed (hours > 0) persons and is relevant to the analysis of health insurance and pensions. The sample is limited to employed persons with health insurance for the analyses of family health insurance coverage and share of health insurance coverage paid for by employer. Estimates were obtained using Ordinary Least Squares, and standard errors have been corrected for clustering at the state level. Regression models include the following additional variables: age; age squared; and indicators for being married, white, black, the state unemployment rate, and the real value of the manufacturing sector wage rate in that state/year. Vectors of state and year fixed effects are included as indicated. Results are weighted to reflect population averages. Adding manufacturing wages into the model eliminated the District of Columbia and Indiana from the sample due to missing data.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level. Bold numbers indicate that the coefficients between the HSDO and GEHS columns are statistically significantly different from each other at the 10% level.

the more educated group (GEHS 20–29), a higher minimum wage was associated with a decrease in family health insurance coverage and an increase in the employer contribution among those with health insurance. A statistically significant difference between the two groups' coefficients occurs only in the case of family health insurance. These results are counter-intuitive and are not readily explained by theory.

An alternative way to identify groups that are more and less subject to minimum wage legislation is by income. Table 4 shows the effects of minimum wages on fringe benefits when we divide our sample into a group earning less than $8,000 per year (in 1982–84 dollars), a group earning $8,000–$12,000, and a group earning $12,000–$20,000. Here again, the minimum wage is positively associated with fringe benefit receipt during the 1979–86 period. Moreover, the magnitudes of the estimates are similar across the three income groups, with the coefficients on health insurance declining with income. The only statistically significant difference in coefficients appears in the first row, for health insurance. This pattern is inconsistent with a causal effect.

For the 1987–2000 period, we estimate models with and without year fixed effects. Without year fixed effects, the results indicate that the probability of health insurance receipt falls as the minimum wage rises. This is true for all three income groups and for all measures of health insurance (any health insurance, family health insurance, and employer payment of the full premium). The difference in coefficients between the lowest income group and the other two income groups is statistically insignificant in all cases. In contrast, the receipt of pensions is positively related to minimum wages. Here too, there are no statistically significant differences between the estimate for the lowest income group and the estimates for the other two groups.

Finally, in models that include year effects, there are fewer coefficients that are statistically significant, and the magnitudes of the estimates are relatively small. There is still no indication that minimum wages have affected the fringe benefit coverage of low-earning workers in a systematic way. The only statistically significant effect—and this is only marginally significant at the 10% level—is for the lowest income group; in this case there is a positive effect of the minimum wage on health insurance. This effect is statistically different from the effect of minimum wages on the health insurance of higher-income groups, but the sign is opposite from theoretical expectations. The only other effect for which a statistically significant difference is found among the income groups is that for pensions: the effect of minimum wages on pensions is statistically insignificant for the lowest income group, while it is negative and statistically significant for the highest income group. In sum, the estimates in Table 4 are consistent with those in Table 3 and suggest that the minimum wage is not associated in a causal way with fringe benefit receipt of low-wage workers.

Several robustness checks were performed. First, we estimated models with an extensive set of controls instead of the relatively small set used for models in Tables 3 and 4. The variables added were hours worked last week, industry (13 categories), occupation (3 categories), and firm size (5 categories, only to the 1987–2000 data). The results from these specifications were not substantially different from those reported, although the adjusted R^2 was much higher.

All models were also estimated using the one year lagged value of the minimum wage, since employers may potentially react with delay. In these models, we also lagged the other state by year control measures, unemployment rate, and real manufacturing sector wages. The coefficients in these specifications were fairly similar to those in the tables, and although significance levels changed in a number of cases, they did not alter the overall conclusion.

For a third check, we used the natural logarithm of the minimum wage as an alternative to the level of the minimum wage to test whether the effect of the minimum wage on health insurance was non-linear. This transformation did not produce results that were substantially different in nature from those using the minimum wage levels.

The models were also estimated using only full-time workers, since part-time workers are far less likely to receive health insurance. Again, the results remained substantively unaltered.

Because the CPS ADS usually contains two consecutive years of information on an individual, the standard errors may be understated. Although this should not pose a problem, since the coefficients do not indicate a statistically significant impact on our dependent variable to begin with, we estimated the models with individuals in months 1–4 and 5–8 separately. Once again, there were no appreciable differences.

We also tested for the confounding effect that state Medicaid expansion policies would have on health insurance for low-skill workers by including the percentage of the poverty level below which states deemed pregnant women eligible for Medicaid. This measure was statistically significant and negative in some specifications, and caused a small across-the-board decrease in the magnitude of the minimum wage estimates.

Finally, we estimated the effect of minimum wages on receipt of several fringe benefits using the 1979 National Longitudinal Survey of Youth and a similar method (Simon and Kaestner 2003). The results from this analysis, too, are consistent with the finding in this paper that the minimum

Table 4. OLS Estimates of Effects of a Minimum Wage on the Receipt of Health Insurance and Pensions, by Earnings Level, 1980–2001, CPS (Refers to Years 1979–2000 for Retrospective Questions).

	1979–1986			*1987–2000*					
	<$8,000	*$8,000–12,000*	*$12,000–20,000*	*<$8,000*	*$8,000–12,000*	*$12,000–20,000*	*<$8,000*	*$8,000–12,000*	*$12,000–20,000*
Health Insurance (HI)	**0.058***** **(0.006)**	**0.031***** **(0.009)**	*0.018**** *(0.007)*	–0.018*** (0.006)	–0.042*** (0.015)	–0.022*** (0.014)	**0.013*** **(0.007)**	**–0.033**** **(0.016)**	0.003 (0.009)
Family HI (among those with HI)	0.015* (0.009)	0.001 (0.008)	0.022*** (0.008)	–0.061* (0.032)	–0.065* (0.038)	–0.085*** (0.009)	0.010 (0.020)	–0.019 (0.038)	–0.022* (0.012)
Employer Paid All Cost of HI (among those with HI)	0.310*** (0.020)	0.340*** (0.022)	0.321*** (0.021)	–0.045*** (0.020)	–0.053* (0.032)	–0.066*** (0.027)	0.010 (0.022)	0.060** (0.030)	0.006 (0.025)
Pensions	*0.034**** *(0.003)*	0.032*** (0.007)	*0.050**** *(0.008)*	0.012*** (0.005)	0.007 (0.010)	0.018* (0.009)	*0.002* *(0.006)*	–0.021 (0.016)	*–0.027**** *(0.006)*
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	No	No	No	No	No	Yes	Yes	Yes
Observations (N)	169,067	70,530	105,482	255,764	114,121	180,677	255,764	114,121	180,677

Notes: All notes to Table 3 apply, except the definition of the "affected" and "unaffected" groups.

<$8,000: Those earning less than $8,000 (aged 18–64 years) in real 1982–84 dollars.
$8,000–12,000: Those earning $8,000-12,000 (aged 18–64 years) in real 1982–84 dollars.
$12,000–20,000: Those earning $12,000-20,000 (aged 18–64 years) in real 1982–84 dollars.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level. Bold numbers indicate that the <$8,000 and $8,000–12,000 column coefficients are statistically significantly different from each other at the 10% level. Italicized numbers indicate that the <$8,000 and $12,000–20,000 column coefficients are statistically significantly different from each other at the 10% level.

wage does not systematically reduce the generosity of fringe benefits for low-skill workers.

In summary, the results from our analysis of the 1979–86 period suggest a positive association between minimum wages and fringe benefit receipt that is most likely caused by the lack of controls for time (year fixed effects). Evidence to support this conclusion is that the effects of the minimum wage did not differ between the "affected" and "unaffected" groups. For the 1987–2000 time period, the pattern of regression coefficients across income and education groups suggests that there is no causal effect of minimum wages on employer health insurance coverage of "affected" groups. For this more recent period, we can explore whether the results using state variation in minimum wages are different from results using both state and federal variation together. Unlike the first period, there is adequate state-level variation in minimum wage legislation to allow us to estimate specifications with and without year fixed effects. Once again, the patterns of magnitudes and standard errors across both education and income groups are not consistent with a causal effect. This is true regardless of which measure of fringe benefit generosity we use.

Conclusions and Discussion

Neoclassical labor market theories imply that employers will react to binding minimum wages by changing the level of employment. A multitude of studies consider this aspect of minimum wages, yet fail to reach a consensus as to its employment effects. Another way employers may adjust to this exogenous shock is by reducing the generosity of fringe benefit provisions. Given that about one out of every three employees near the minimum wage has access to fringe benefits such as health insurance, and that fringe benefits account for up to 30% of total compensation, the potential exists for adjustments along these dimensions. Whether this option is exercised will largely depend on the strength of legal and institutional constraints that discourage it.

The empirical evidence in this paper suggests that minimum wages have had no discernible effect on fringe benefits (specifically, on the receipt of health insurance, on whether the employer paid the whole premium cost, on whether family health insurance was provided, and on receipt of employer pensions). This conclusion is unchanged whether we use only state-level variation or federal and state variation in minimum wages. Taken in light of the fact that the results from these data and previous literature using these survey data suggest that wages of the targeted individuals were affected, we conclude that our results show no strong evidence that binding increases in the minimum wages caused an offsetting decline in the provision of fringe benefits or quality of working conditions. This finding, combined with earlier findings of small to no employment effects of minimum wages, is not consistent with the theory of compensating wage differentials, as there was little discernible change in benefits when wages were increased for low-wage workers.

Despite our efforts to investigate this topic by formulating multiple tests exploiting different forms of variation in minimum wages and different outcomes, it is conceivable that the adjustment mechanism is one that we cannot observe with individual-level data. Given the institutional features that set fringe benefits at aggregate levels (such as the level of the establishment or firm), perhaps the adjustment occurs only in firms dominated by low-wage workers. The story of labor market adjustments to minimum wage changes is one of employer actions rather than employee reactions, and as such a future analysis of these questions using employer-level data would be particularly useful.

Appendix Table A1
Sample Means (and Standard Deviations)
by Age and Education Level, 1979–2000, CPS

	HSDO 18–29		*GEHS 20–29*	
Variable	*1979–1986*	*1987–2000*	*1979–1986*	*1987–2000*
Received Health Insurance from Employer	0.439	0.259	0.614	0.486
	(0.496)	(0.438)	(0.487)	(0.500)
Received Pension from Employer	0.186	0.114	0.330	0.273
	(0.389)	(0.318)	(0.470)	(0.445)
Family Health Insurance Coverage	0.216	0.135	0.263	0.256
	(0.411)	(0.342)	(0.440)	(0.436)
Employer Paid All of Insurance	0.198	0.067	0.306	0.149
	(0.398)	(0.251)	(0.461)	(0.356)
Employer Paid All or Part of Insurance	0.403	0.237	0.582	0.456
	(0.490)	(0.426)	(0.493)	(0.498)
Pension Plan Was Offered at Firm	0.266	0.234	0.444	0.450
	(0.442)	(0.424)	(0.497)	(0.498)
Age	23.107	23.351	24.137	24.357
	(3.433)	(3.571)	(2.878)	(2.930)
Male	0.637	0.651	0.526	0.522
	(0.481)	(0.477)	(0.499)	(0.500)
Married	0.484	0.387	0.480	0.395
	(0.500)	(0.487)	(0.500)	(0.489)
White	0.640	0.492	0.818	0.740
	(0.480)	(0.500)	(0.386)	(0.439)
Black	0.129	0.126	0.105	0.130
	(0.335)	(0.332)	(0.307)	(0.337)
Hours Last Year	38.069	37.746	38.286	38.311
	(10.590)	(10.388)	(10.053)	(10.415)
Percent Full-Time	0.803	0.789	0.818	0.797
	(0.398)	(0.408)	(0.386)	(0.402)
Observations (N)	25,304	32,692	107,621	138,895

Notes: The sample is restricted to respondents who worked for pay the previous year, and who worked in the private sector. The results are weighted using population weights.

Survey questions related to health insurance and pensions provide information as to whether or not the worker was covered by the employer's policy, not whether the employer made these benefits available.

For the year 1995, information is not available on family health insurance or whether the full premium was paid by the employer. Unlike in the regression analysis, family coverage and whether the employer paid the health insurance premium are not restricted here to only those with health insurance.

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