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Government Mandates and Employer-Based Health Insurance: Who Is Still Not Covered?

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Abstract

In this paper we explore the probability that employees have employer-based health insurance. Health insurance is a fixed cost which when added to cash compensation raises the cost of a low-wage worker more than that of a non-low-wage worker. A worker who has high expected medical expenditures or whose family has such expenditures may raise the cost of health insurance for all workers in the firm, particularly in a small firm. The minimum wage reduces an employer's ability to shift the cost of coverage to low-wage employees. These factors, along with a government subsidy that is more valuable to higher-income employees, lead to private-employer-based coverage that is highly correlated with wages. The nondiscrimination law attempts to change this pattern. We explore the resulting pattern of coverage and the effectiveness of the nondiscrimination law using national medical expenditure data from 1977 and 1987. Individual expected medical expenditures are estimated using a nonparametric approach; wages and premiums are also imputed and coverage itself is estimated using logit models over low-wage and non-low-wage samples separately for 1977 and 1987. Bootstrap methods test the robustness of our model.

Government Mandates and Employer-Based Health Insurance:
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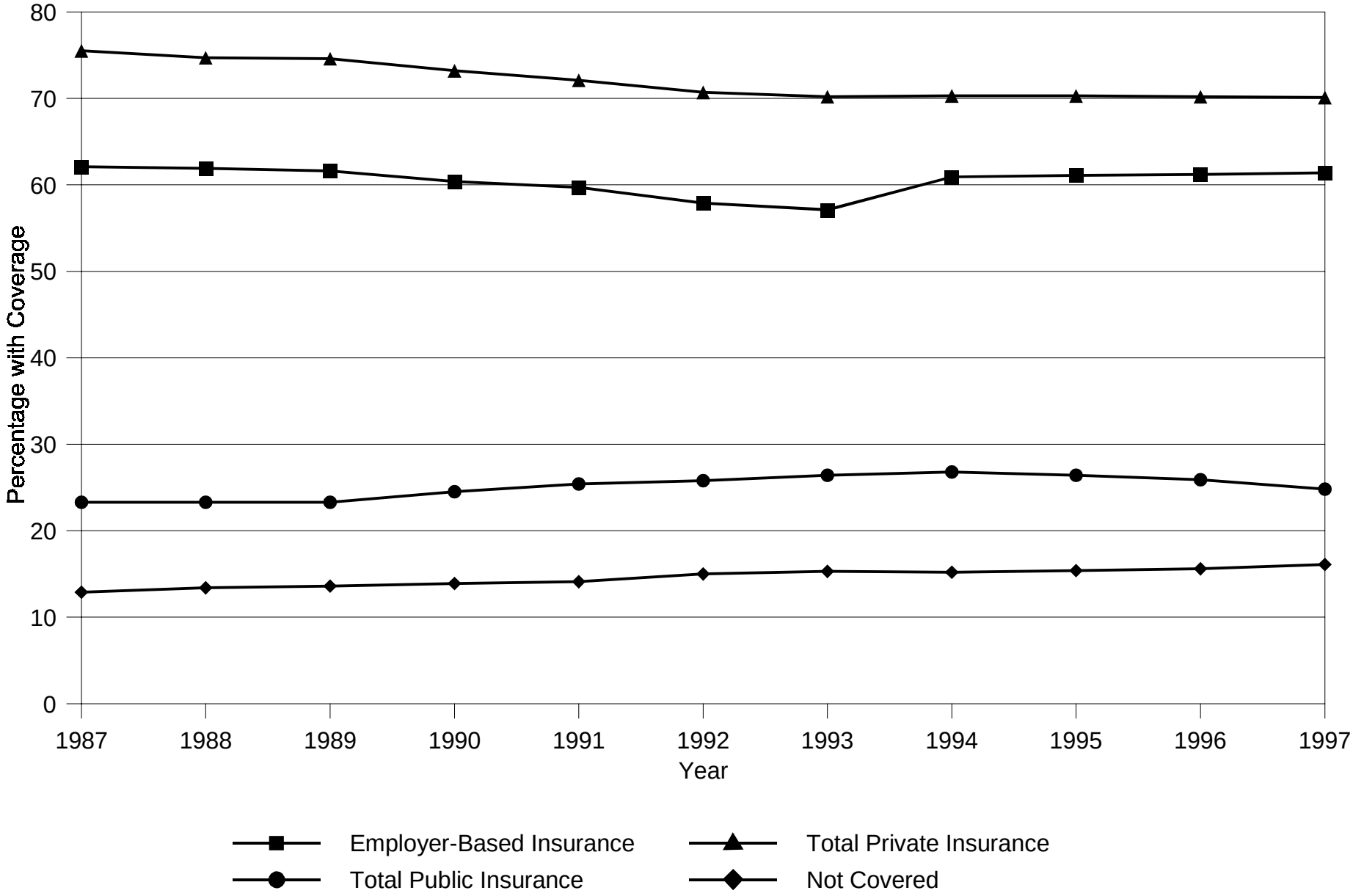
In the United States, health insurance is not universal, but the government provides either health insurance or health insurance subsidies to the majority of citizens and regulates eligibility for these subsidies. Nearly all persons 65 and older have publicly provided coverage through the Medicare program. The majority of the nonelderly population has private insurance, the vast proportion of which is provided by employers as a fringe benefit. Such employer-based coverage is subsidized by the government through exclusion of employer-paid premiums from the employee's taxable income.[1] Nevertheless, a substantial (and growing) portion of the population goes without health insurance coverage.

Figure 1 offers a historical view of health insurance coverage over the last decade. Several patterns stand out. First, the proportion of the population with private coverage has dropped steadily over this decade from 75.5 to 70.1 percent. Second, the prevalence of employer-based insurance bottomed out in 1993 and has been increasing gradually since then. The proportion of the population with employer-based coverage was more than 62 percent in 1987 and stood at 61.4 percent in 1997. Third, public coverage increased over most of the period but has gradually declined since 1994. In 1997, the proportion of the population covered by publicly provided insurance was 23.3 percent. Fourth, the proportion without any form of coverage increased steadily over this decade and stood at more than 16 percent by 1997.

As shown in Figure 2, the situation is far different for individuals living in poor families. For this population, only about 23 percent have private coverage as of 1997. Only 15.5 percent have employer-based coverage. More than half of the poor population has public coverage, yet nearly a third (31.6 percent) goes without any form of coverage (U.S. Census Bureau, March 1998 CPS). Simply working

[1]According to Sheils and Hogan (1999) the value of this tax expenditure (foregone taxes) was $111.2 billion in 1998.

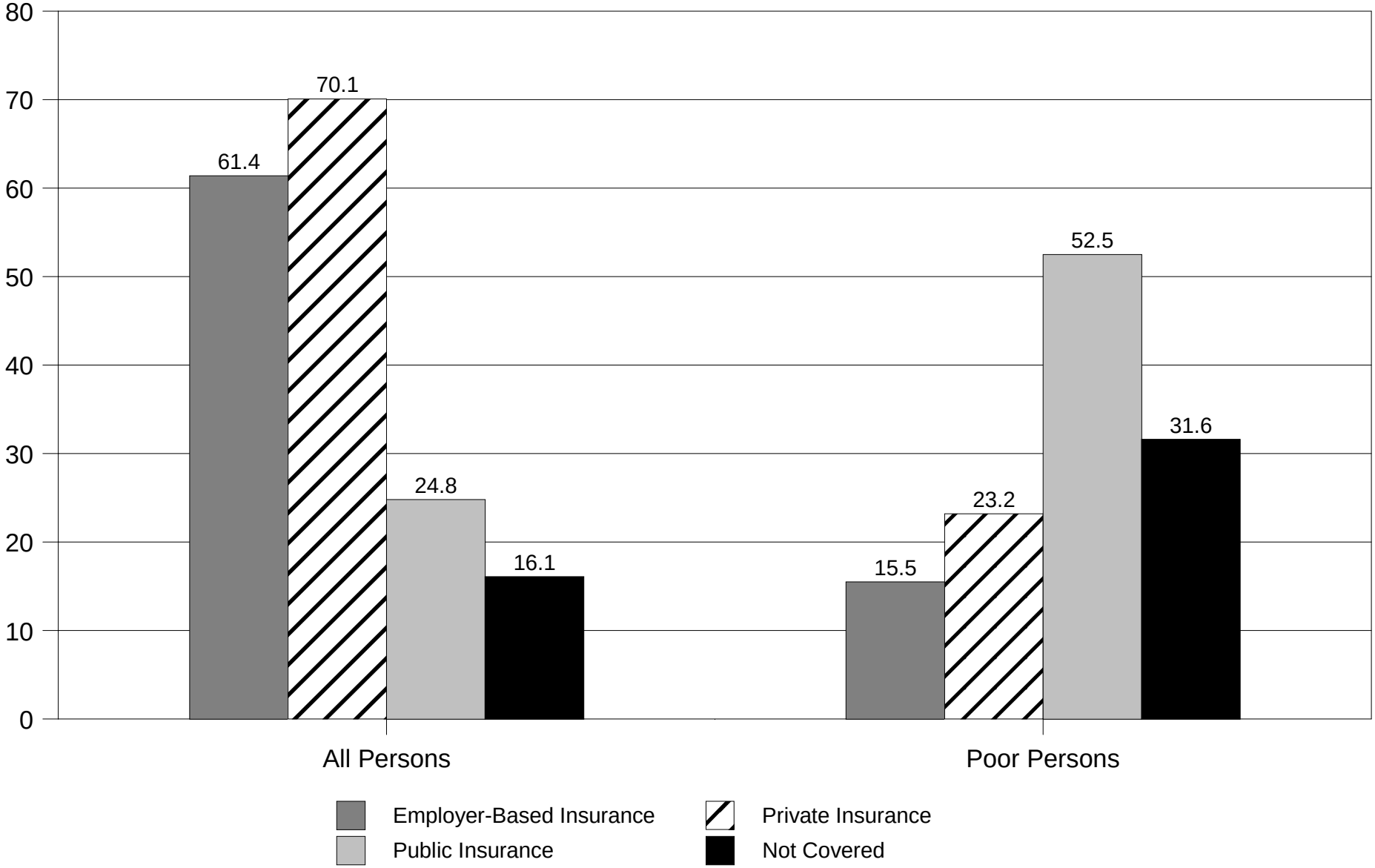
FIGURE 1
Health Insurance Coverage, U.S. 1987-1997



Source: U.S. Census Bureau, Health Insurance Historical Table 1, http://www.census.gov/hhes/hlthins/historic/hihistt1.html

FIGURE 2

Health Insurance Coverage in the U.S., Entire Population and Poor Persons, 1997



Source: U.S. Census Bureau, Health Insurance Coverage: 1997, Table 1, http://www.census.gov/hhes/hlthins/hlthin97/hi97t1.html

does not guarantee access to employer-based coverage. Indeed, as of 1997 only 53 percent of all workers had employer-based coverage from their own employment.[2]

In this paper, we look back to 1977 and 1987 to examine the ability of workers to obtain health insurance through the workplace. We find that in both 1977 and 1987, low-wage workers (especially those with high anticipated family medical expenditures) were less likely to hold insurance through employment than were higher-wage employees. Low-wage workers fared worse over the decade despite the federal government's passage of new rules in 1978 requiring larger firms that offered coverage to offer it to lower-wage employees in order for the firm's contributions to coverage to be exempt from federal income and payroll taxes. These so-called nondiscrimination rules were in large part designed to extend coverage to low-wage workers.

Why did the nondiscrimination rules fail to extend coverage? We develop and test a model positing that employers will offer coverage only if their net profit position does not deteriorate by doing so. The cost of insurance offered by an employer must be borne largely by employees. Profit-maximizing employers will attempt to shift the cost to employees by reducing wages (Summers 1989).

However, the presence of a minimum wage law may prevent employers from reducing cash wages to compensate for the cost of health insurance for low-wage workers (Gruber 1994). Employers may be reluctant to offer health insurance to low-wage workers at the firm's expense. We suggest that the minimum wage may present a barrier preventing low-wage workers (particularly those with higher costs of insurance) from benefiting from nondiscrimination rules.[3] We test this hypothesis using data from the

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[2]In fact, poor workers employed full-time are *less* likely than poor nonworkers to have health insurance (Census Bureau 1998).

[3]Similar logic suggests that minimum wage laws may also reduce the potential impact of other nondiscrimination laws such as those on pensions. This, of course, does not imply that a minimum wage law is welfare-decreasing, but instead presents the issue that policy designed to increase insurance coverage must take into account the effects the minimum wage may impose.

two national medical expenditure surveys, the 1977 National Medical Care Expenditure Survey and the 1987 National Medical Expenditure Survey.

Section II provides a brief background and presents our hypothesis regarding the impact of minimum wage and the nondiscrimination laws on reducing coverage of low-wage workers. Section III presents the approach we use, while Section IV describes the data. Section V presents our empirical results on the estimation of medical expenditures and the probability of having employer-based coverage. We discuss our results and offer our conclusions in Section VI.

II. BACKGROUND AND HYPOTHESIS

In 1978, Congress enacted Public Law 95-600, which included so-called nondiscrimination rules requiring many firms offering health insurance benefits to offer those benefits roughly equally across wage-classes of their employees for those benefits to be excludable from employee income.[4] The nondiscrimination rules were designed in part to "provide adequate benefits to rank and file employees." (RIA USTR Income Taxes P1254.06).

The exclusion of the value of health insurance benefits from employee taxable income constitutes a major incentive for firms to offer such benefits.[5] The loss of such tax-favored status would presumably impact the benefit provision decisions of employers. A firm offering benefits affected by the new nondiscrimination rules would have to either comply (thereby extending the health insurance

[4]Under Section 106 of the Internal Revenue Code, employee-provided health insurance is excluded from an employee's gross income for tax purposes. It is subject to two nondiscrimination requirements. Section 105 applies to self-funded, employer-provided health insurance reimbursement, and Section 125 applies to "cafeteria plans," or benefits packages that allow workers to choose between different benefits, both of which require that such health insurance benefits "not discriminate in favor of highly compensated participants." In 1991, 40 percent of employees who had employer-provided insurance were in a self-funded plan.

[5]See, for example, Gruber and Poterba (1995) for a review.

benefits to workers not previously offered them) in order to retain tax-favored status, or circumvent the rules, or drop coverage of benefits.

We begin with a simple model that an employee's value of employer-based health insurance depends on the valuation of the coverage offered. This valuation should be a function of expected covered health expenditures of the employee and family and any value for the reduction of uncertainty. Value to the employee also depends on the cost to the employee for the insurance (through implicit wage reductions or explicit premium contributions).

Consistent with profit maximization theory, we assume that a firm will offer fringe benefits to its employees if its profit exceeds that which would prevail in the absence of the offer of fringe benefits. For this to be true, the total cost of compensating labor must stay constant or decrease—i.e., the cost shifted to an employee must be greater than or equal to the firm's costs of extending benefits to the employee.[6] In the case of health insurance, the total cost includes not only the additional premium for the worker but also the impact the worker has on future premium costs for all covered workers.

An employee will accept health insurance if the cost shifted to the employee is less than or equal to their willingness to pay for insurance. Workers are likely to be willing to "pay" more than the employer's total cost for two reasons. First, firms can obtain an equivalent amount of insurance more

[6]In addition to profiting by lowering costs, the firm also may profit by increasing productivity. Worker loyalty or duration at the job may be enhanced through the provision of health insurance, thereby reducing worker turnover.

cheaply than the employee can on his/her own.[7,8] Second, workers may value such insurance more highly because it is paid for with pretax dollars.[9] Because this amount is increasing in the tax rate, the potential to increase profits should be greater for firms with high-wage workers who face higher marginal tax rates.[10]

However, low-wage workers may present difficulties for a firm's strategy to decrease costs by offering insurance. For low-wage workers, the premium that can be shifted is constrained by the minimum wage—thus total costs of compensation may not be reduced. In addition, low-wage employees may not value insurance enough for the firm to profit by offering it.[11]

Because health insurance is a fixed cost not related to earnings, the reduction in compensation required of the low-wage worker is a far higher proportion of total compensation than that of high-wage workers. In addition, federal income tax rates are progressive which means that the tax subsidy is far

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[7]This is especially likely for larger firms, given lower administrative costs and the ability to spread risk over a large set of employees. According to a study by the Congressional Budget Office (1991), the rates of overhead are as follows by size of firm:

Number of Employees	Total Loading Fee
1–4	40.0%
5–9	35.0%
10–19	30.0%
20–49	25.0%
50–99	18.0%
100–499	16.0%
500–2,499	12.0%
2,500–9,999	8.0%
10,000+	5.5%

[8]If a worker were willing to individually purchase a given insurance policy that he or she values at $x, but the firm can obtain an equivalent policy for $y < $x, then the firm can potentially capture all or part of $x−$y in additional profits.

[9]If a worker is willing to pay $x in posttax dollars for an insurance policy, then the worker should be willing to pay $x/(1− t) in pretax dollars, where t is the tax rate. Then the firm can capture some or all of $x/(1− t) − $x = $tx/(1− t) in additional profits even if it pays the same price as the employee.

[10]However, all workers who are subject to the payroll tax can potentially receive a tax subsidy, and hence a firm has the potential to increase profits by offering coverage to them as well.

[11]One would expect low-wage workers to have high marginal utility of cash income, and hence be unwilling to trade much cash for fringe benefits. Cooper and Schone (1997) found that the take-up rate of low-wage workers decreased more than the take-up rates of other workers from 1987 to 1996 as premiums increased and real wages stagnated.

smaller on average for low-wage workers than for high-wage workers. Both of these factors should reduce the willingness of low-wage workers to pay for employer-based health insurance.

Exceptions to low willingness to pay are low-wage workers whose families have high expected medical expenditures. For such workers the expected benefit of insurance is very high. However, the firm must account for the impact offering insurance to such costly workers will have on the total premium for all workers. The firm's willingness to offer insurance to such a worker would be low unless all of this premium increase could be passed on to the worker. This is particularly the case in smaller firms, where the health care expenditures of a few high-cost employees or their families may substantially increase the total premium cost. This effect becomes larger as the real cost of health insurance grows.

If a firm cannot discriminate against high-cost employees, its low-cost employees may be unwilling to accept lower wages.[12] The firm would therefore prefer to circumvent the nondiscrimination rules by not offering health insurance to high-cost employees. A firm would also like to circumvent the nondiscrimination rules and not offer health insurance to low-wage employees to the extent that the firm cannot reduce their wages sufficiently to cover the cost of insurance. The firm's incentive to circumvent would thus be highest for low-wage, high-cost workers.

Employers could circumvent the nondiscrimination rules by any of the following means: (1) shifting certain types of low-skill jobs to other firms (outsourcing low-wage work to firms that do not offer health insurance); (2) shifting low-wage work to part-time employment that is exempt from the law (Wolfe, Wolaver, and McBride 1998); (3) increasing hours worked to reduce the per-hour cost of the mandated benefit (Gruber and Madrian 1997); (4) dropping health insurance coverage for all of its workers. Ultimately, low-wage, high-cost workers may be no better off under the nondiscrimination rules.

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[12]Other workers at the firm would face lower wages if the employer attempts to pass on the full amount of the higher-cost insurance coverage. We assume they would not willingly accept lower wages to offset the higher cost of benefits at any one firm. The alternative is that these firms would face higher costs of employment.

III. METHODOLOGY

The goal of this work is to explore which workers are likely, and which are unlikely, to have firm-based coverage and then to focus on the likely impacts of the minimum wage law, increasing costs of coverage, and the nondiscrimination law on the probability of coverage. We model the probability that a worker obtains health insurance coverage through his or her own employment at two points in time, 1977 and 1987, separately for workers likely to be near the minimum wage constraint. The first date precedes the passage of the nondiscrimination rules and the second postdates their passage.

As discussed above, an employee's valuation of insurance is a function of total compensation, TC, minus the premium cost which is shifted onto the employee, P* or TC – P*, and insurance (I = 1 if insured, 0 otherwise), and is parameterized by a finite vector B. The employee chooses insurance only if V(TC – P*,1;B) > V(TC,0;B). WTP is the most the employee is willing to pay for insurance—i.e., V(TC – WTP,1;B) = V(TC,0;B).

Insuring the employee is profitable to the employer only if $P^* \geq P + \Delta P$, where P is the premium paid by the employer for the employee and ΔP is the amount of total premium change caused by hiring the worker.[13] To satisfy both the employee and the employer, P* must lie in the interval $[P + \Delta P, WTP]$. A necessary condition if an employee is to obtain insurance through employment is therefore that $P + \Delta P \leq WTP$. Furthermore, a minimum wage constraint must be satisfied: $TC - P^* \geq Wm$, where Wm is a statutory minimum wage. Our estimation strategy focuses on identifying $WTP - (P + \Delta P)$ separately for workers for whom $TC - P^* < Wm$.

Our problem of identification stems from the fact that WTP, TC, ΔP, and P* are not observed (are latent) while observed cash wages and total premiums, W and P, are endogenously determined.

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[13] ΔP may be large, for instance, if the worker is extremely high-cost and the firm's premiums will increase in the future as a result of insuring the worker.

However, in equilibrium, for workers who obtain health insurance, the observable cash wage W should equal TC−P*. If unobservables are well behaved, and we let θ stand for worker characteristics and φ for job characteristics, then ($E[W|\theta,\varphi;I=1] \leq Wm$) can be viewed as an empirical statement of the minimum wage condition. We will use this condition to separate observations into low-wage and non-low-wage workers.

We assume $WTP = \alpha_1 HC_w + \alpha_2 HC_s + \alpha_3 HC_c + \alpha_4 OC + \alpha_5 E[W|\theta,\varphi] + \alpha_6 X + \varepsilon_{\alpha,}$ where HC_w, HC_s, and HC_c are the expected health costs of the worker, spouse, and children if insured; OC represents other coverage (through a spouse); E[W|.] is the expected wage given employee and job characteristics; and X is a vector of family characteristics.

We use $E[P|\theta,\varphi]$ in place of observed P. Assume $\Delta P = \beta_1 HC_w + \beta_2 HC_s + \beta_3 HC_c + \varepsilon_\beta$. Therefore, given that the minimum wage condition holds, we observe insurance only if $\varepsilon \leq (\alpha_1 - \beta_1)HC_w + (\alpha_2 - \beta_2)HC_s + (\alpha_3 - \beta_3)HC_c + \alpha_4 OC + \alpha_5 E[W|\theta,\varphi] + \alpha_6 X - \beta_0 E[P|\theta,\varphi]$.

To implement the empirical model, we first predict hourly wages for each worker (conditional on wage-determining characteristics) using a subset of data including only full-time workers with employer-provided insurance. Because we only use data from workers with insurance, the observed cash wage should take into account the compensating wage reduction for the offering of insurance. We next impute hourly total premiums for employer-provided health insurance (assuming full-time employment) using the same data and conditioning on the same background variables as the wage imputation (excluding race).

We then employ a nonparametric kernel regression to obtain expected medical expenditures for each member of the household, conditional on health status and demographic variables. For employers to discriminate against workers with high family medical expenditures, the employer needs a measure of expected medical expenditures if the worker and her family were covered. The data themselves provide actual medical expenditures, which reflect health conditions and illness as well as the presence of

insurance coverage. These are inappropriate for our use because of the potential endogeneity of coverage, which would not allow us to estimate our model correctly. Instead, we attempt to capture expected medical expenditures, *conditional on being privately insured*, which is what an employer would wish to know. The critical aspect is whether a potential employee is expected to have high family medical expenditures. Similarly, for an employee, the value of coverage is likely to be related to expected expenditures, which should be anticipatory rather than based only on prior expenditures.

Hence we wish to create a value for each employee that captures the predicted medical expenditure if the family were to have private employer-based insurance. We accomplish this through a nonparametric technique that makes use of data provided by all individuals in the survey who have a discernible insurance status (i.e., always privately insured or always uninsured) and complete background characteristics including all available measures of health. We create imputations from this data for each employee in the insurance model as well as for his/her spouse and children.

The essence of this approach is to use information based on observations with a similar set of conditioning characteristics, but not to impose a functional form. We use a kernel-smoothed regression in which the kernels might be thought of as windows that allow more information from observations that are similar to the value of the conditioning variables chosen than from those that are farther away.[14] Given our large sample size, we believe this approach dominates prediction based on linear or log-linear regression which imposes functional forms on medical expenditures. Prior research has used a two- or four-part model to avoid the normality (or log-normality) assumption since it does not fit the distribution.[15] The nonparametric approach goes further in allowing the estimates to reflect the actual underlying distribution.

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[14]See Hardle and Linton (1994) for a more detailed description of the approach.

[15]See, for example, Manning et al. (1987) on the Rand Health Insurance Experiment.

The actual results can be sensitive to the bandwidth chosen. We choose a bandwidth proportional to the Silverman Rule of Thumb (Silverman 1986) used in kernel density estimators. For each worker in the insurance regression and each member of the family, we condition on the individual's reported race, sex, metropolitan living status (SMSA or not), four health measures (self-reported poor or fair, limited activities, treatment for mental illness, and age), and the year of the study. We also condition on insurance status (0 = uninsured, 1 = insured), but rather than use the reported value, we condition on having insurance coverage in all predictions, since we are interested in the expenditure conditional on actually having insurance. In Table 1 under "Health Variables," the mean expected expenditures are presented by year for employee, spouse, and children. The Appendix presents the nonparametric methodology in greater detail.

The imputed values for wages, insurance premiums, and medical expenditures (and a limited set of personal background characteristics) are then used in binomial probit models to predict the probability that a worker is a policyholder of employer-provided insurance. These probit models are carried out separately for 1977 and 1987 and separately for low-wage and non-low-wage workers. Given the multiple steps of our approach, as well as the nonparametric estimation, we use bootstrap methods to test for robustness of the results.

IV. THE DATA

The data we use in the empirical work are from two surveys, the National Medical Care Expenditure Survey (NMCES) and the National Medical Expenditure Survey (NMES), both conducted by the Agency for Health Care Policy and Research in the U.S. Department of Health and Human Services. These two data sets are the best available for this study because they are the only large-scale national data sets that include health status, medical expenditures, insurance coverage, and earnings and

TABLE 1
Means and Standard Deviations of Sample Variables

	1977				1987			
	Low-Wage		Non-Low-Wage		Low-Wage		Non-Low-Wage	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Health Variables								
Employee	n=1483		n=3879		n=832		n=3867	
Fair or Poor Self-Reported Health	0.15	0.36	0.11	0.31	0.18	0.38	0.11	0.32
Health Limits Moderate Activity	0.04	0.20	0.07	0.25	0.07	0.25	0.05	0.23
Received Treatment for Mental Condition	0.04	0.20	0.03	0.17	0.03	0.16	0.04	0.18
Imputed Expenditures (with insurance)	933.16	588.44	802.43	629.27	916.81	709.45	929.06	992.56
Imputed Expenditures (no insurance)	548.60	711.33	522.48	518.76	396.00	583.65	411.31	931.77
Actual Expenditures	945.75	2462.25	741.76	1993.00	621.88	1366.71	834.86	2424.24
Spouse (only observations with spouse included)	n=1081		n=3206		n=441		n=2674	
Fair or Poor Self-Reported Health	0.15	0.35	0.13	0.33	0.16	0.37	0.13	0.34
Health Limits Moderate Activity	0.07	0.25	0.07	0.25	0.07	0.25	0.09	0.28
Received Treatment for Mental Condition	0.02	0.12	0.03	0.18	0.02	0.13	0.03	0.18
Imputed Expenditures (with insurance)	726.24	716.49	940.08	637.10	810.92	1204.62	1059.89	1033.56
Imputed Expenditures (no insurance)	508.46	523.92	544.46	583.62	390.86	941.11	469.30	999.70
Actual Expenditures	641.85	1834.51	954.57	2356.03	745.69	2913.19	1010.03	2739.48
Children (only observations with children included)	n=826		n=2149		n=481		n=1847	
Fair or Poor Self-Reported Health	0.11	0.31	0.08	0.27	0.10	0.30	0.07	0.26
Health Limits Moderate Activity	0.03	0.18	0.04	0.20	0.04	0.19	0.04	0.21
Received Treatment for Mental Condition	0.02	0.13	0.02	0.14	0.01	0.10	0.03	0.17
Imputed Expenditures (with insurance)	722.16	499.39	809.78	543.05	847.52	716.16	974.24	773.05
Imputed Expenditures (no insurance)	426.10	756.21	487.84	756.91	421.74	471.92	446.64	487.71
Actual Expenditures	592.64	1789.38	641.65	1472.23	688.36	2146.07	1155.65	5828.04

(table continues)

TABLE 1, continued

	1977				1987			
	Low-Wage		Non-Low-Wage		Low-Wage		Non-Low-Wage	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Sociodemographic Variables	n=1483		n=3879		n=832		n=3867	
Age (Years/100)	0.34	0.13	0.41	0.12	0.31	0.11	0.39	0.11
Sex (Female = 1)	0.89	0.32	0.30	0.46	0.84	0.37	0.42	0.49
Marital Status (Married = 1)	0.73	0.44	0.83	0.38	0.53	0.50	0.69	0.46
Sex*Marital Status (Married Female = 1)	0.65	0.48	0.22	0.41	0.44	0.50	0.26	0.44
Any Children in Household (Yes = 1)	0.56	0.50	0.55	0.50	0.58	0.49	0.48	0.50
Sex*Any Children (Female with Children = 1)	0.51	0.50	0.15	0.36	0.50	0.50	0.19	0.39
School (Years)	11.23	2.03	12.47	3.20	11.12	2.12	13.32	2.85
Less than 12 Years Education	0.34	0.48	0.25	0.43	0.38	0.49	0.14	0.34
12 Years Education	0.51	0.50	0.36	0.48	0.49	0.50	0.35	0.48
13–15 Years Education	0.14	0.35	0.17	0.37	0.13	0.34	0.23	0.42
16 or More Years Education	0.01	0.07	0.22	0.42	0.00	0.00	0.28	0.45
Race (White = 1)	0.82	0.39	0.91	0.29	0.62	0.49	0.81	0.39
Live in SMSA	0.49	0.50	0.72	0.45	0.55	0.50	0.76	0.43
Region								
New England	0.03	0.17	0.05	0.22	0.01	0.11	0.04	0.20
Middle Atlantic	0.13	0.33	0.16	0.37	0.06	0.25	0.16	0.36
East North Central	0.21	0.41	0.22	0.42	0.17	0.37	0.17	0.38
West North Central	0.10	0.30	0.07	0.26	0.07	0.26	0.07	0.26
South Atlantic	0.29	0.45	0.16	0.37	0.25	0.43	0.20	0.40
East South Central	0.09	0.28	0.05	0.22	0.14	0.35	0.05	0.22
West South Central	0.06	0.23	0.09	0.29	0.16	0.37	0.08	0.27
Mountain	0.04	0.19	0.03	0.17	0.07	0.25	0.08	0.26
Pacific	0.06	0.23	0.17	0.38	0.07	0.25	0.15	0.35

(table continues)

TABLE 1, continued

	1977				1987			
	Low-Wage		Non-Low-Wage		Low-Wage		Non-Low-Wage	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Employment Variables	n=1483		n=3879		n=832		n=3867	
Hours Actually Worked	35.14	11.07	40.81	10.33	35.06	11.77	40.25	10.73
Actual Hourly Wage	6.58	14.93	10.25	6.65	4.78	2.57	9.04	5.18
Imputed Hourly Wage	6.00	1.23	10.99	2.29	4.49	1.11	9.59	2.41
Imputed Hourly Premium	0.53	0.11	0.71	0.13	0.82	0.13	0.94	0.14
Industry								
Agriculture, Forestry, Fishing	0.03	0.17	0.02	0.15	0.04	0.21	0.01	0.09
Mining	0.00	0.03	0.02	0.14	0.00	0.00	0.01	0.11
Construction	0.00	0.00	0.05	0.23	0.00	0.06	0.05	0.22
Manufacturing	0.18	0.38	0.22	0.41	0.15	0.36	0.23	0.42
Transportation, Communication, Utilities	0.01	0.11	0.10	0.30	0.00	0.07	0.10	0.30
Sales	0.21	0.40	0.12	0.33	0.32	0.47	0.13	0.34
Finance	0.07	0.26	0.04	0.19	0.03	0.16	0.06	0.24
Repair	0.04	0.18	0.04	0.20	0.03	0.17	0.05	0.22
Service	0.06	0.24	0.00	0.07	0.10	0.30	0.02	0.13
Entertainment	0.02	0.13	0.01	0.08	0.01	0.10	0.01	0.09
Professional	0.20	0.40	0.11	0.31	0.28	0.45	0.23	0.42
Public Administration	0.02	0.13	0.05	0.21	0.02	0.15	0.07	0.26
Unknown Industry	0.17	0.37	0.21	0.41	0.01	0.11	0.02	0.15
Occupation								
Professional/Technical	0.04	0.19	0.23	0.42	0.02	0.14	0.21	0.41
Manager	0.00	0.06	0.10	0.30	0.01	0.08	0.16	0.37
Sales	0.05	0.22	0.04	0.19	0.10	0.29	0.08	0.26
Clerical	0.31	0.46	0.10	0.30	0.17	0.38	0.17	0.37
Crafts	0.02	0.12	0.16	0.36	0.02	0.15	0.12	0.33
Operator	0.19	0.39	0.12	0.33	0.13	0.34	0.08	0.27
Transportation Operator	0.03	0.18	0.04	0.20	0.03	0.18	0.04	0.21
Service	0.27	0.44	0.09	0.29	0.38	0.49	0.08	0.26
Laborer	0.02	0.14	0.05	0.22	0.08	0.26	0.03	0.18
Farm Owner	0.00	0.05	0.02	0.13	0.01	0.08	0.00	0.03
Farm Laborer	0.02	0.13	0.00	0.05	0.03	0.18	0.01	0.09
Unknown Occupation	0.05	0.22	0.05	0.21	0.01	0.11	0.02	0.13

(table continues)

TABLE 1, continued

	1977				1987			
	Low-Wage		Non-Low-Wage		Low-Wage		Non-Low-Wage	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Insurance Variables	n=1483		n=3879		n=832		n=3867	
Employee Had Medicaid during survey	0.05	0.21	0.01	0.11	0.10	0.30	0.02	0.13
Has Spouse Who Obtains Emp.-provided Insurance	0.43	0.49	0.29	0.45	0.29	0.45	0.32	0.47
Employee Obtains Emp.-provided Insurance	0.51	0.50	0.74	0.44	0.44	0.50	0.75	0.43

income, in addition to relevant background characteristics.[16] The NMCES is from 1977, one year before passage and two years before enactment of the nondiscrimination law; the NMES is from 1987, when the full response to the law is expected to have occurred. Since the model applies to employees, we focus only on employees and their families, excluding those not employed and the self-employed during the survey period.

From the perspective of testing the impact of the nondiscrimination laws, the two times we observe are separated by a decade, a longer period than ideal for this test. Many other changes occurred over this period that could influence the probability of firm-based health insurance coverage. We use the experience of workers not at risk—those who are not low-wage and report no family health problems—as a control for all other changes that might have influenced the probability of a worker obtaining firm-based health insurance coverage. Nevertheless, this timing limitation means our empirical tests should be viewed only as suggestive.

Macroeconomic conditions were somewhat different in the two years. In 1977, the unemployment rate was 7.1 percent, 5.2 percent for men aged 20 and over, 7 percent for women of that age. In 1987, the comparable rates were 6.2 percent overall and 5.4 percent for both sexes among those aged 20 or older. Both years were in periods of economic expansion in terms of underlying cyclical patterns. The difference in macroeconomic conditions would suggest greater coverage in 1987, the year of lower unemployment. Hence our test of greater coverage in 1987 might reflect not just the law but better economic conditions.

Both the 1977 NMCES and 1987 NMES contain information on health expenditures by or on behalf of families and individuals, the financing of these expenditures, and each person's use of services. The household survey component involved personal and telephone interviews conducted at four-month

[16]The 1996–97 Medical Expenditure Panel Survey, when fully available, will also be appropriate for this research.

intervals. Baseline data on household composition, employment, and insurance characteristics were updated each quarter, and information on all uses of and expenditures for health care services and sources of payment was obtained. In addition to the core data, the survey has information on income, assets, and taxes. Also included are demographic characteristics of respondents (age, race/ethnicity, sex), tax filing status, home ownership, and type of occupation and industry.

The 1977 NMCES contains data from approximately 14,000 households interviewed six times over a period of 14–16 months from 1977 through early 1978. Each family provided information on health insurance coverage, family health, medical care utilization patterns, and employment. These were updated at each interview. Information on health insurance coverage was obtained in the household survey, then verified and supplemented with information from the Health Insurance/Employer Survey (HIES). Insurance companies, employers, unions, and other organizations identified in the household survey as sources of private insurance coverage were asked to verify reported coverage. Household information on medical treatment episodes was supplemented by information obtained from health care providers in a subsample of cases.

The 1987 NMES also interviewed about 14,000 households over a 16-month period.[17] The survey has a stratified multistage area probability design and a total sample of roughly 35,000 individuals who completed all rounds of data collection. Population subgroups of special policy interest were oversampled: poor and low-income families, the elderly, the functionally impaired, and blacks and Hispanics. Those oversampled were interviewed four times. Similar information to that obtained in 1977 (health insurance coverage, family health, medical care utilization, and employment) was requested at each interview.[18] Most utilization reports were verified by obtaining data from providers.

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[17]See "Sample Design of the 1987 Household Survey, National Medical Expenditure Survey," Agency for Health Care Policy and Research, Publication Number 91-0037, for more detail on this data set.

[18]Information gathered includes each person's self-reported coverage under private health insurance and public programs. In addition, the data describe self-reported health status and difficulties in moderate physical activities. The household and jobs survey covers a broad range of personal background variables: age, sex, race,

Data on private insurance were obtained from a subset of employers. Adults 18 to 64 are included in the final insurance model if they meet all the following criteria:

- have valid personal information responses (including marital status, health status, and demographic information);
- have information for at least one job (hours worked, weeks worked, wages, industry and occupation, and indication of whether the employee is a policyholder of employer-provided health insurance) at which they worked at least one hour per usual week (nonworkers are therefore excluded);[19]
- are not self-employed;
- have the following complete information for a spouse (if present) under 65: employment status, whether a policyholder of employer-provided insurance, health status;
- have complete health status information for children over age 4.

Table 1 provides definitions, means, and standard deviations of the variables for each survey. They are reported separately for workers predicted to have low wages and those predicted to have higher wages, as follows. We separate those workers who could and could not pay 100 percent for insurance coverage offered by their employer through a reduction in cash earnings. Low-wage workers are those whose imputed hourly wage is less than two times the minimum wage at the time of the survey.[20] The estimates of the premiums are computed using the same data sets (NMCES and NMES). The wage imputation estimates are in Table 2. Dollar amounts for both years have been adjusted for inflation to 1982–84 levels.

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ethnicity, Hispanic ancestry, marital status, family relationships, educational status, employment status, occupation, industry, wages and salary, length of time at work, characteristics of the workplace, union membership, and military service.

[19]For workers with more than one reported job, we utilize the job deemed by the surveys to be the "main" job. Criteria for determining the main job include hours per week, wage, and presence of utilized benefits.

[20]A factor of 2 is chosen due to the use of imputed wages and premiums rather than actual premiums. Due to "regression to the mean," fewer workers are predicted to have low wages than is actually true. A factor of 2 creates pools of predicted low-wage and non-low-wage individuals whose sizes mimic the pools based on actual wages and premiums.

TABLE 2
Results of Wage and Premium Imputations

	Wage Imputation		Premium Imputation	
Variable	1977 Coefficient	1987 Coefficient	1977 Coefficient	1987 Coefficient
Intercept	-0.77	-1.17	0.11	0.52**
	1.79	1.40	0.09	0.25
Age	24.10**	50.95**	0.99**	2.54**
(Years/100)	4.63	3.75	0.24	0.66
Age	-24.61**	-51.96**	-0.91**	-2.24**
$(Years/100)^2$	5.55	4.53	0.29	0.80
New England	0.06	0.52	0.07**	0.00
	0.61	0.45	0.03	0.08
Mid-Atlantic	0.06	0.68*	0.03	-0.04
	0.51	0.35	0.03	0.06
East North Central	0.06	-0.56	0.06**	0.00
	0.50	0.34	0.03	0.06
West North Central	-0.16	-0.61	0.05	-0.12*
	0.56	0.40	0.03	0.07
South-Atlantic	-0.26	-0.79**	-0.04	-0.21**
	0.50	0.34	0.03	0.06
East South Central	-0.28	-1.51**	-0.02	-0.19**
	0.58	0.42	0.03	0.07
West South Central	0.73	-0.95**	-0.05*	-0.20**
	0.56	0.39	0.03	0.07
Pacific	0.90*	0.44	0.06**	-0.06
	0.52	0.36	0.03	0.06
Live in SMSA	0.70**	0.83**	0.04**	0.05*
(Yes =1)	0.21	0.18	0.01	0.03
Education	-1.84**	-4.02**	-0.01	0.11**
Less than 12 Years	0.34	0.28	0.02	0.05
Education	-1.70**	-3.21**	-0.01	0.01
12 Years	0.30	0.22	0.02	0.04
Education	-1.50**	-2.55**	0.02	0.03
13–15 Years	0.32	0.22	0.02	0.04

(table continues)

TABLE 2, continued

	Wage Imputation		Premium Imputation	
	1977	1987	1977	1987
Variable	Coefficient	Coefficient	Coefficient	Coefficient
Industry	2.67**	4.50**	0.22**	0.17
Mining	1.06	1.17	0.05	0.21
Industry	2.91**	2.24**	0.12**	0.16
Construction	0.97	1.00	0.05	0.18
Industry	1.21	1.51	0.12**	0.25
Manufacturing	0.87	0.93	0.05	0.17
Industry	2.05**	2.96**	0.13**	0.22
Transportation	0.91	0.95	0.05	0.17
Industry	0.75	-0.03	0.07	0.18
Sales	0.89	0.95	0.05	0.17
Industry	0.66	0.58	0.07	0.19
Finance	0.94	0.97	0.05	0.17
Industry	0.72	1.07	0.05	0.18
Repair	0.95	0.99	0.05	0.18
Industry	-0.51	0.04	0.02	0.13
Service	1.19	1.07	0.06	0.19
Industry	-0.32	1.05	0.08	0.33
Entertainment	1.33	1.18	0.07	0.21
Industry	0.52	-0.16	0.08*	0.22
Professional	0.90	0.94	0.05	0.17
Industry	1.47	1.44	0.12**	0.19
Public Administration	0.97	0.96	0.05	0.17
Industry	0.92	1.50	0.11**	0.32*
Unknown	0.87	1.07	0.05	0.19
Occupation	1.94	2.89**	-0.06	-0.22
Professional	1.32	1.00	0.07	0.18
Occupation	2.32*	3.99**	-0.08	-0.30*
Manager	1.33	1.00	0.07	0.18
Occupation	0.83	1.70*	-0.09	-0.14
Sales	1.38	1.03	0.07	0.18

(table continues)

TABLE 2, continued

	Wage Imputation		Premium Imputation	
Variable	1977 Coefficient	1987 Coefficient	1977 Coefficient	1987 Coefficient
Occupation	0.80	1.59	-0.04	-0.21
Clerical	1.32	0.99	0.07	0.18
Occupation	1.57	1.61	-0.03	-0.19
Crafts	1.32	1.00	0.07	0.18
Occupation	0.82	0.77	-0.06	-0.23
Operative	1.31	1.00	0.07	0.18
Occupation	0.47	0.30	0.01	-0.19
Transportation	1.36	1.03	0.07	0.18
Occupation	0.98	0.66	-0.05	-0.22
Service	1.32	1.00	0.07	0.18
Occupation	0.88	0.01	-0.07	-0.18
Labor	1.36	1.03	0.07	0.18
Occupation	2.03	-0.76	0.02	0.44
Farm Owner	1.72	2.33	0.09	0.41
Occupation	1.15	0.95	-0.05	0.21
Unknown	1.36	1.19	0.07	0.21
Race	0.68**	0.65**		
(White =1)	0.28	0.17		
Sex	-1.58**	-2.24**	-0.09**	-0.11**
(Female = 1)	0.21	0.16	0.01	0.03
n	4729	5491	4729	5491
R^2	0.0883	0.289	0.076	0.034
Adjusted R^2	0.0807	0.284	0.068	0.028
F	11.648	56.823	10.1	5.14
Prob > F	0.0001	0.0001	0.0001	0.0001

The first set of variables concerns health:

- **Self-reported general health.** We constructed a dichotomous variable based on individual reports of fair or poor health, using the same two categories in both years.[21]
- **Limited in activities.** This dummy variable captures whether an individual reports health conditions that limit the ability to perform moderate physical activities.
- **Mental illness.** This dummy variable attempts to capture whether a person has a serious mental illness by flagging whether the individual has a recorded treatment visit (in- or outpatient) in which a mental disorder (ICD-9-CM codes 290–319) is noted.[22]
- **Age**. Each person's age is included in the analysis as a measure of health as well as an indicator of work experience.

Table 1 presents the means of these variables for the respondent, the spouse (when present), and any children in the household. For example, in 1977, 11 percent of non-low-wage workers had poor or fair health, and 15 percent of low-wage workers reported fair or poor health. The difference is greater in 1987, when the comparable figures were 11 percent and 18 percent, respectively. A similar but less-marked pattern describes the spouses of these workers: in 1977, 13 percent of spouses of non-low-wage workers and 15 percent of spouses of low-wage workers reported poor or fair health; in 1987 these percentages were 13 and 16 percent, respectively. A higher proportion of low-wage workers has a child with reported poor or fair health: 11 versus 8 percent in 1977, and 10 versus 7 percent in 1987. The age variable reported in the table is for the employee. The means show that low-wage workers are on average younger than non-low-wage employees and that both subgroups are on average a bit younger in 1987 than in 1977.

The sociodemographic variables include the sex of the employee, marital status of the employee, and a combination of the two (that is, whether the employee is a married female). The means highlight

[21]In 1977, respondents reported excellent, good, fair, or poor overall health. In 1987, a "very good" category was added.

[22]This misses individuals with mental disorders who were not treated during the survey period. This is unfortunate, but we do not have another way to identify those with a mental disorder.

the fact that many low-wage workers are women, and this was more the case in 1977 than a decade later. The marital variable shows a similar pattern among the two groups: far more employees were not married in 1987 than a decade earlier. The next two variables measure whether the employee has children and the interaction between the employee's sex and presence of children. The groups are generally comparable in terms of children, with the exception of the non-low-wage group in 1987, in which there were fewer children present in the employee's household on average. Also included is the educational level for adults, including four dummy variables: less than high school, high school graduate, some college, and a college degree or more. The patterns are as expected: more employees in the low-wage group have limited education, and far higher proportions of employees in the non-low-wage group have more education. Concerning race of the employee, we note that the proportion of the workforce that is white declined over this decade and that in both years there were more minorities in the low-wage group than in the non-low-wage group. The variables for metropolitan statistical area suggest that many low-wage workers lived in nonmetropolitan areas.

The last set of variables measures health insurance coverage. In both groups the employee is more likely to hold employer-provided coverage than is the spouse—as expected, since not all spouses are employed. Of particular interest is the pattern of coverage among employees: a far higher proportion of non-low-wage workers has coverage in both years; comparing 1987 to 1977, however, we see that over the decade those in the low-wage group have a lower probability of coverage while those in the non-low-wage group were as likely to be covered in 1987 as in 1977.

Also included is a dummy variable indicating the proportion of employees with Medicaid coverage at any point over the survey period.[23] As expected, the proportion with such coverage is far higher in the low-wage group than in the higher-wage group in both 1977 and 1987. The pattern also

[23]Medicaid is a publicly financed joint federal-state program that provides coverage to some low-income persons.

shows a large increase in the proportion with Medicaid coverage in 1987 over 1977 for the low-wage group. This is consistent with the expansion of Medicaid in the 1980s, especially to young children, as well as the decline in real wages over the decade.

We also present an estimate of the health insurance premium a firm would face for each hour worked by the employee (based on full-time employment for one year). It is an imputed value based on all workers in the NMCES/NMES surveys for whom we had complete employment and background data and who obtained insurance through employment during the period of the survey (5,491 observations in 1977 and 4,729 in 1987). The imputation uses coefficients from an ordinary least squares model fitting the hourly total premium to the following independent variables: 12 dummy variables for industry, 11 for occupation, eight for census regions, three for the employee's level of schooling, and one each for metropolitan area or not, age, age squared, race, and sex.[24] Table 2 presents results of the imputation regression.

The means presented in Table 1 highlight the increasing cost of health insurance to firms in general.[25] As a ratio to the imputed wage rate, the premium doubled for low-wage workers, going from 9 percent to 18 percent. The increase and proportion are both less for non-low-wage workers but also increased substantially compared with imputed wages, rising from 6.5 percent to nearly 10 percent. The cost to the firm for health insurance (its contribution or premium) on average is higher for the non-low-wage group. We believe this is consistent with both a greater share paid by the firm and more extensive coverage. This is consistent with a greater value of firm-based coverage among higher-wage (and higher marginal tax) workers. It is also consistent with the idea that employers having large pools of low-wage workers attempt to reduce insurance costs by obtaining cheaper, less-comprehensive plans and/or by

[24]We use an imputed wage rather than actual wage to remove the potential endogeneity between two forms of compensation: wage and insurance coverage.

[25]The premiums are adjusted to 1982–84 levels using the employment cost index of the Bureau of Labor Statistics.

contributing a smaller share to the premium. Employers who hire significant numbers of high- and low-skilled workers might choose to offer a menu of plans to their employees, setting employee premium shares such that lower-wage workers select lower-cost insurance; however, for larger firms this is constrained by the nondiscrimination law that requires similar take-up rates of insurance packages across wage groups.

The imputed hourly wage rates (see Table 2 for the imputations) show the expected difference across groups as well as the overall decline in real wages over the 1977–87 period. The reported decline is greater among those in the low-wage groups: the 1987 imputed wage is 75 percent of that for 1977 while among the non-low-wage workers the 1987 imputed wage is 87 percent of the 1977 wage. This may represent a decline in the ability composition of the low-wage workers in 1987 compared with those in 1977, or it may reflect the weaker labor market for low-wage workers. To the extent that it reflects the former, the poorer labor market outcomes in the form of wages and health insurance coverage may be explained in part by the composition of the group.

Also included is an extensive set of employment-related variables such as hours worked, industry, and occupation. The final variables included are expected medical expenditures with and without insurance coverage for the employee alone, for the spouse of the employee if present, and total expenditures for all dependent children of the employee. These are based on simulations from a kernel-smoothed regression, explained in the next section. Here we simply note that the imputed real expenditures for those without insurance declined among both wage groups.

V. ESTIMATION OF EMPLOYER-PROVIDED COVERAGE

To explore who has employer-provided health insurance coverage as well as to test the influence of the minimum wage law and/or the nondiscrimination law on the probability of coverage, we estimate a probit model for four separate groups. The employee (and his or her family) is the unit of observation,

and the dependent variable is whether or not the worker obtains health insurance through employment. It should be noted that this variable does not account for workers who are offered insurance but decline it, nor does it account for the level of coverage (single, couple, or family).

The models were run separately for 1977 and 1987 and results are reported in Table 3. Within each year, the models were run for the sample predicted to have low wages and compared to the non-low-wage sample to test our hypothesis that those most in need of coverage were less likely to be offered coverage and were thus not aided by passage of the law. We hypothesize that all workers with families having higher medical expenditures will be less likely to obtain coverage in both years, reflecting employers' desire to avoid the increasing costs of providing health insurance. We also expect that low-wage workers with higher medical costs will be far less likely to obtain coverage than other low-wage workers and all high-wage workers. They are the group for whom employers have difficulty in passing on the cost of coverage and who may, as a result, increase the cost of employing others.

We concentrate on a rather parsimonious specification. In addition to three measures of imputed expected medical expenditures (employee, spouse, and children), we include sex, marital status, and the interaction of the two for the worker; imputed wages; the imputed hourly premium; whether the spouse obtains insurance through her/his own employment; whether the worker has children; and an interaction between sex and the presence of children in the family. From the perspective of the employee, we expect to find positive signs on expected expenditures, on sex (female), and on the presence of children since these are all measures of expected utilization or value of coverage to employees and their families. From the perspective of the employer, we expect to find negative signs on all of the variables related to expected expenditures and on the imputed premiums. This means that the only unambiguous sign should be a negative sign on imputed premiums. We expect the negative impact of higher imputed premiums to be greater in 1977 than in 1987 among low-wage workers since the real value of the minimum wage was

TABLE 3
Results of Probit Regressions of Probability a Worker Obtains Insurance through Employment
(by predicted wage group and year)

	1977				1987			
	Low-Wage		Non-Low-Wage		Low-Wage		Non-Low-Wage	
Variable	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.
Constant	-0.35	-0.14	-0.47**	-0.14	-0.79**	-0.31	-0.32*	-0.09
	(0.27)		(0.18)		(0.33)		(0.19)	
Sex	0.17	0.07	0.20*	0.06	0.59**	0.23	0.47**	0.14
(Female =1)	(0.21)		(0.12)		(0.19)		(0.09)	
Marital Status	0.25	0.10	0.35**	0.10	-0.02	-0.01	0.49**	0.15
(Married = 1)	(0.28)		(0.1)		(0.33)		(0.09)	
Marital Status x Sex	-0.42	-0.17	-0.63**	-0.19	-0.08	-0.03	-0.89**	-0.27
(Married Female = 1)	(0.28)		(0.13)		(0.35)		(0.11)	
Imputed Hourly Wage	0.10**	0.04	0.06**	0.02	0.25**	0.10	0.14**	0.04
(1982–84 Dollars)	(0.03)		(0.01)		(0.05)		(0.01)	
Imputed Hourly Premium	0.43	0.17	1.12**	0.34	-0.88**	-0.35	-0.25	-0.07
(1982–84 Dollars)	(0.32)		(0.21)		(0.35)		(0.17)	
Spouse Holds Employer Insurance	-0.80**	-0.32	-0.80**	-0.24	-0.06	-0.02	-0.50**	-0.15
(Yes = 1)	(0.09)		(0.06)		(0.13)		(0.06)	
Worker's Imputed Med. Exp.	-5.00E-05	-1.99E-05	1.10E-04**	-3.31E-05	-1.40E-04**	-5.52E-05	-8.00E-05**	-2.40E-05
(1982–84 Dollars)	(0.0001)		(0.0)		(0.0001)		(0.00002)	
Spouse's Imputed Med. Exp.	-1.00E-05	-3.99E-06	2.00E-05	6.02E-06	8.00E-05	3.15E-05	3.00E-05	8.99E-06
(1982–84 Dollars)	(0.0001)		(0.00004)		(0.0001)		(0.00004)	

(table continues)

TABLE 3, continued

	1977				1987			
	Low-Wage		Non-Low-Wage		Low-Wage		Non-Low-Wage	
Variable	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.	Coeff.	Marg.
Children's Imputed Med. Exp. (1982–84 Dollars)	-1.00E-04 (0.00009978)	-3.99E-05	-3.00E-05 (0.0001)	-9.03E-06	-2.30E-04** (-0.0001)	-9.06E-05	1.00E-05 (0.00004)	3.00E-06
Children in Household (Yes = 1)	0.13 (0.26)	0.05	0.04 (0.08)	0.01	0.62* (0.34)	0.25	-0.22** (0.09)	-0.07
Children x Sex (Female with Children =1)	-0.25 (0.264)	-0.10	-0.23** (0.1)	-0.07	-0.69* (0.35)	-0.27	0.04 (0.1)	0.01
n	1483		3879		832		3867	

Note: Standard errors in parentheses.

considerably lower in 1987 than in 1977 ($3.79 in 1977 versus $2.95 in 1987, both in 1982–84 dollars), hence representing a more binding constrain in the earlier year.[26]

The nondiscrimination law was designed to limit the ability of larger firms to discriminate, and this should lead to greater equalization of the probability that workers across wage groups or those with high expected family medical expenditures are covered. However, the law may have led to a splitting apart of the labor market such that a combination of smaller firms not subject to the nondiscrimination law and firms that decided not to comply with the law or to drop coverage would reduce the probability that workers with low wages and/or those high expected expenditures would have coverage. Any increase in the difference in the probability that low-wage versus non-low-wage workers with high expected expenditures have coverage is viewed as evidence that the nondiscrimination law may not have helped the particular subgroup of the population that has both low wages and families with high medical expenditures.

The results are presented in Table 3.[27] Results for the control variables indicate that in most cases women are more likely than men to have firm-based insurance. The coefficient is positive in all cases and statistically significant at the 5 percent level in three of the four estimates. In the non-low-wage estimates, married employees are more likely to have employer-based coverage. This finding is in accord with the view that employees with families gain more from coverage than do single employees. The interaction variable between the two is negative and statistically significant in three of the four models. The sizes of the coefficient and the related marginal impact suggest that, with the exception of the low-wage group in 1987, employed married women were less likely to have firm-based coverage than other

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[26]In nominal terms, the minimum wage was $2.30 in 1977 and $3.35 in 1987.

[27]The reported standard errors of the probit regressions do not take into account the variability of estimates from the imputed wage, premium, and expenditure regressions. Because the authors found no appropriate closed-form solution for the standard errors of multidimensional kernel regressions, an appropriate extension of analytical solutions for the one-dimensional standard error (a bootstrapping method) was employed to correct the insurance model standard errors. See below.

sex-marital status groups. This does not simply reflect the higher probability that they were covered via their husbands' insurance, since spouses' coverage is also included in the model. That variable has the expected negative sign and is statistically significant in three of the four samples. The dummy variable controlling for the presence of a child is significant only in 1987. The interaction of presence of a child and the employee being female is significant in two of the four cases, suggesting that when a child is present there is a greater probability of having coverage (consistent with the spouse findings), but that when the worker is the mother, the probability tends to be lower. The combined effect suggests that on average, female employees with children are less likely to have coverage than their childless or male counterparts.[28] The combination of results on marriage and sex with those on children and sex of the employee suggests that employed single or married women with children are less likely to have employer-based coverage.

The central variables of interest are expected medical expenditures, which serve as indices of health problems as well. The expected expenditures are included as separate measures for the employee, the employee's spouse, and the employee's children (rows 8–10 in Table 3).[29] The results for employees are consistent throughout the four samples: the higher the expected expenditures, the lower the probability of employer-based coverage.[30] And the coefficients are statistically significant in all but the case of the low-wage worker in 1977. Those with greater medical-based need for coverage are less likely to have that coverage. The negative association between expected expenditures of the employee and the probability of coverage is greater among the low-wage population in 1987 but not in 1977. At the means, the marginal impact is approximately –.06 for the low-wage group for 1987 and –.02 for the non-low-

[28]The exception to this is the negative association of having children with the probability of coverage in 1987 among the non-low-wage group.

[29]For children, the expected expenditures represent the sum over all dependent children of the employee.

[30]We ran the same equation over a smaller sample for which we eliminated all observations in which the worker had Medicaid coverage at some point during the interval of the survey. The results did not change appreciably from those reported above.

wage group. Using the marginal coefficient to approximate discrete changes, we expect that each $1,000 increase in a worker's expected expenditures decreases the probability of obtaining insurance by 6 percent for low-wage workers, but only 2.4 percent for non-low-wage workers as of 1987. The coefficients on the variable measuring expenditures for the employee's spouse are mixed but positive in three of four cases, but are never statistically significant.

The results for children's expected medical expenditures are consistent with the hypothesis that the nondiscrimination law did not improve coverage for the low-income population. The coefficient on this variable is negative among three of the four samples, but it is significant only for the low-wage group in 1987. The sign on children's expenditures among the high-wage group in 1987 is positive but not significant, suggesting that perhaps the law may have helped this group. The coefficients for 1977 are negative in both groups, but the coefficient and marginal effect for the low-wage group are more than four times those of the non-low-wage group. The coefficient on children's expenses for the low-wage group in 1987 suggests that for a $1,000 increase in a child's medical expenditures, the expected decrease in the probability of coverage is 9 percent. The coefficients are difficult to interpret, however, so in the section below we present simulation results after varying the level of expected expenditures.

The results for imputed wages and imputed premiums suggest that persons with higher expected wages are more likely to be offered coverage. Although this might at first seem surprising, and argue against compensating wage differentials, recall that the wages are imputed values assuming insurance is offered. The results therefore suggest a greater probability of offering coverage to more highly skilled, and hence more highly productive, employees. These are also the employees for whom the minimum wage is least binding.

The coefficient on the premium has the expected negative sign in 1987. The negative coefficient is largest for low-wage employees in 1987, also consistent with an expectation that low-wage workers are

less likely to be offered coverage. The higher the premium, the larger the expected effect. The positive and significant coefficient on the premium for non-low-wage workers in 1977 is unexpected.

We employ bootstrapping to test for the robustness of these probit results. Essentially we ran the same model one hundred times with random resamples (with replacement) from the original population. These results provide evidence that our model is robust. The results of the bootstrapping for three variables of interest—the imputed wage, premium, and children's expected medical expenditures—are presented in Figures 3, 4, and 5.

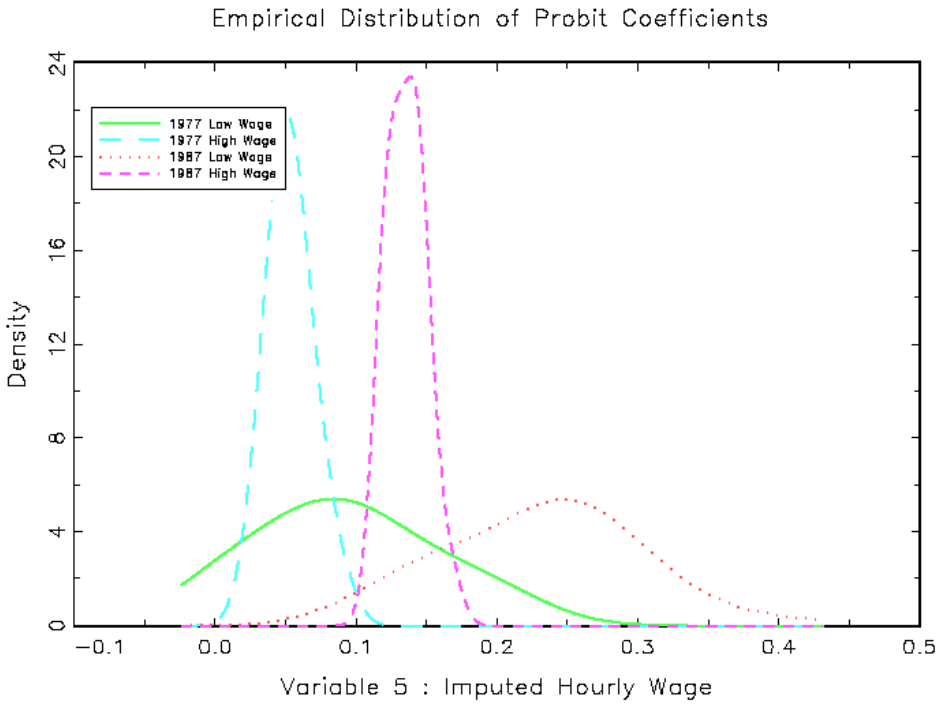
- Higher hourly wages imply higher probability of obtaining insurance (Figure 3). The impact of wage on probability of insurance is greater in 1987 than in 1977, and is greater for low-wage workers than for non-low-wage workers. If the nondiscrimination rules were effective, we would have expected to see the difference between wage groups disappear in 1987.
- Higher imputed premiums imply higher probability of obtaining insurance in 1977, but lower probability in 1987 (Figure 4). The positive impact of premiums in 1977 is less for low-wage workers, and the negative impact of premiums in 1987 is greater for low-wage workers.
- Higher employee's children's expected expenditures generally imply lower probability of obtaining insurance, except for non-low-wage workers in 1987 (Figure 5). The negative association is greater for low-wage workers, and the difference increased from 1977 to 1987.

To get a better sense of the magnitude of the impact of health expenditures on probability of obtaining insurance, we conduct a simulation in which we vary the expected expenditure. All other variables are held constant at their actual value. We do a similar exercise to examine how changes in the imputed wage rate and imputed premiums affect the probability of obtaining coverage.[31]

Figures 6, 7, and 8 present the results of our simulations. In each figure, the lines show the simulated relationship of the variable of interest to the probability that a worker has coverage; each line shows the simulation for one of the two years for one of the wage subgroups. In the case of the imputed

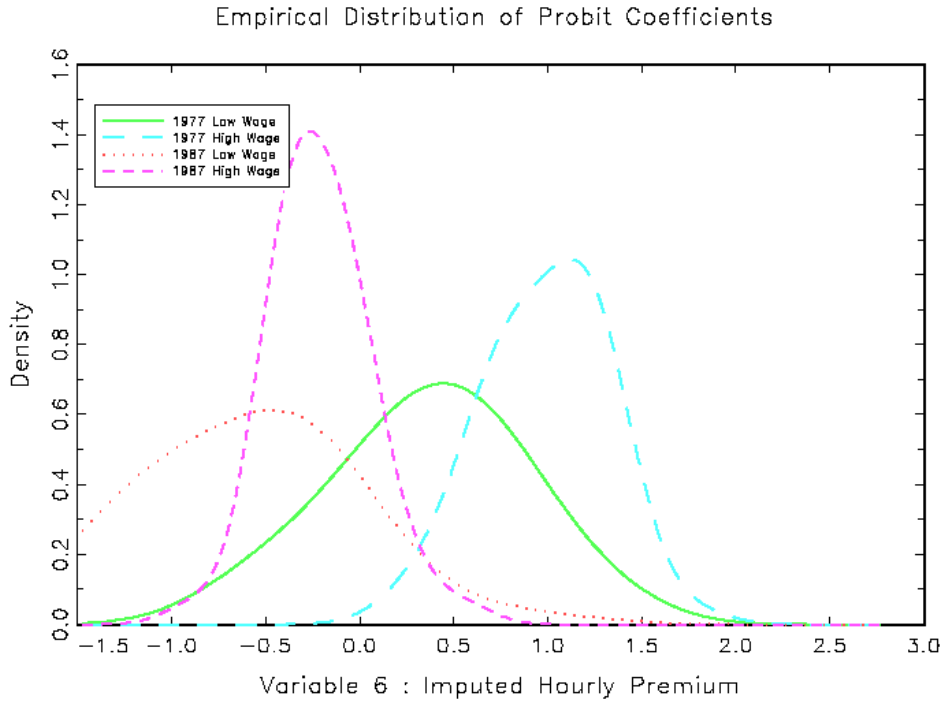
[31]Workers' expected expenditures also provided evidence of a similar role in reducing the probability of coverage. However, workers' health also may influence their productivity via both time missed from work and morbidity. Because of this dual role, we focus on children's health, although we recognize that this too might reduce workers' productivity.

FIGURE 3



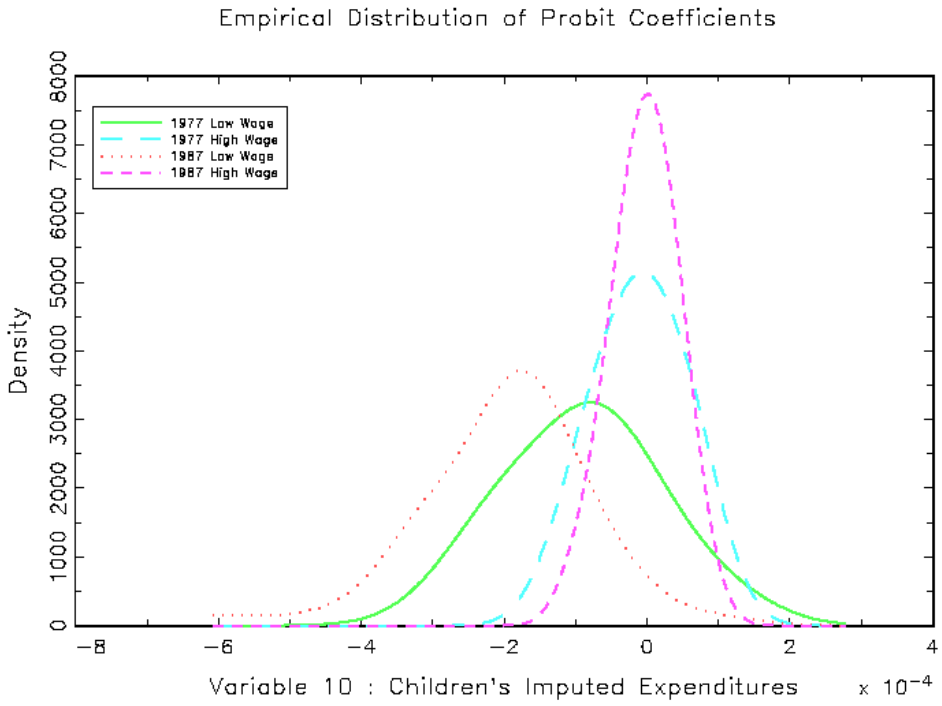
Bootstrapping results for the probit coefficient on imputed wage denoting the impact of imputed wage on the probability a worker obtains insurance, by wage group over time.

FIGURE 4



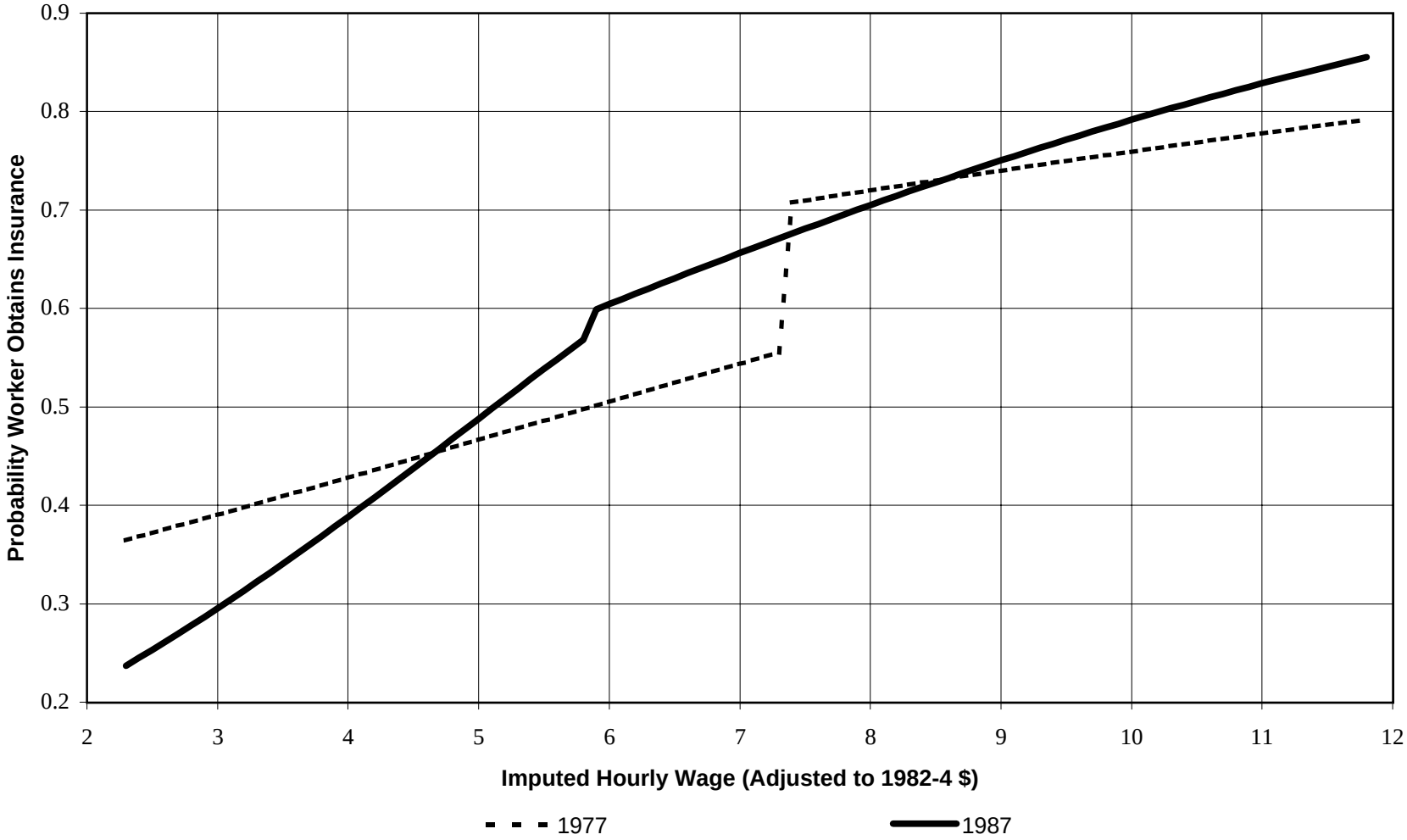
Bootstrapping results for the probit coefficient on imputed premium denoting the impact of imputed premium on the probability a worker obtains insurance, by wage group over time.

FIGURE 5



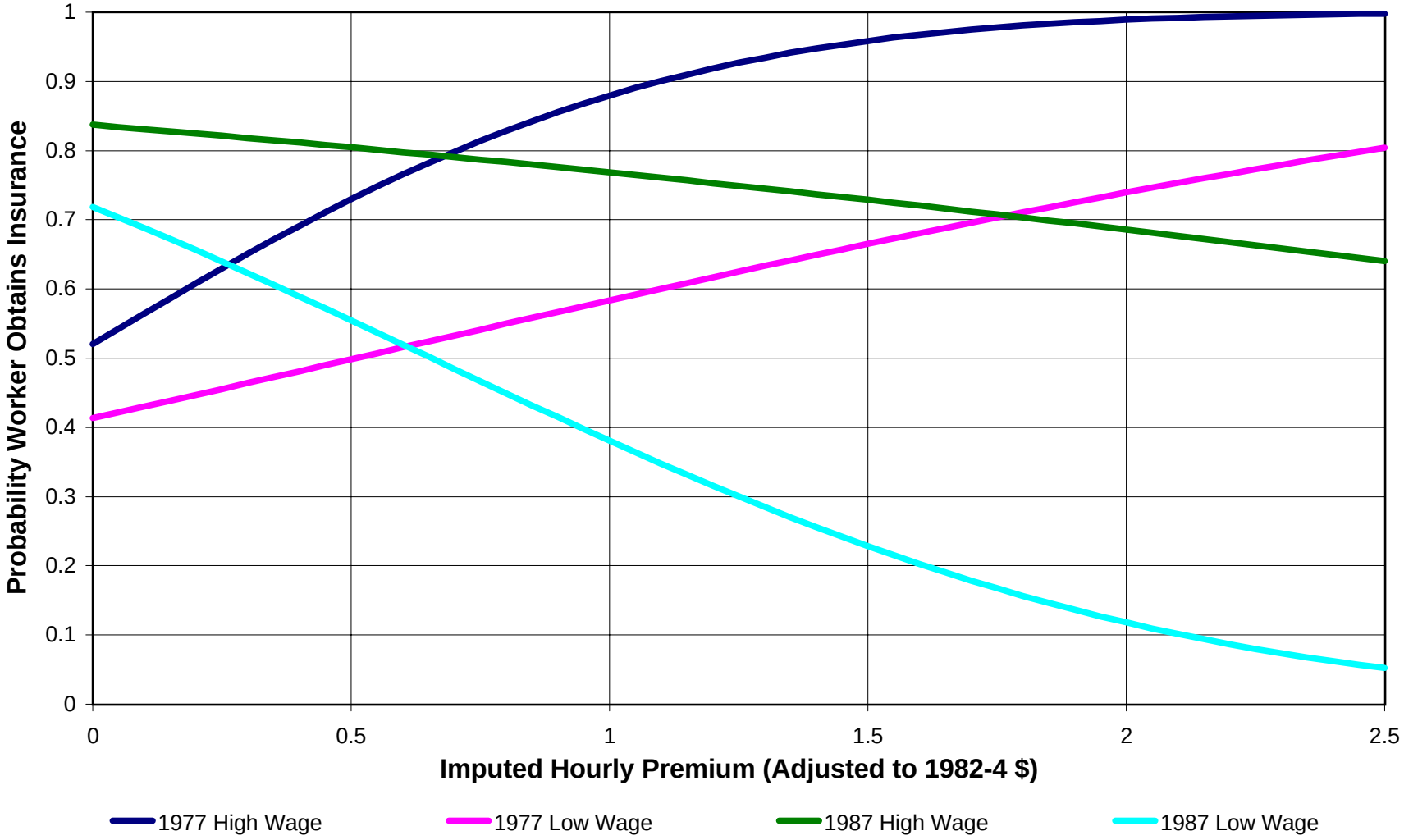
Bootstapping results for the probit coefficient on imputed children's expenditures denoting the impact of children's expenditures on the probability a worker obtains insurance, by wage group over time.

FIGURE 6
Effect of Varying Wage on Probability of Worker Coverage



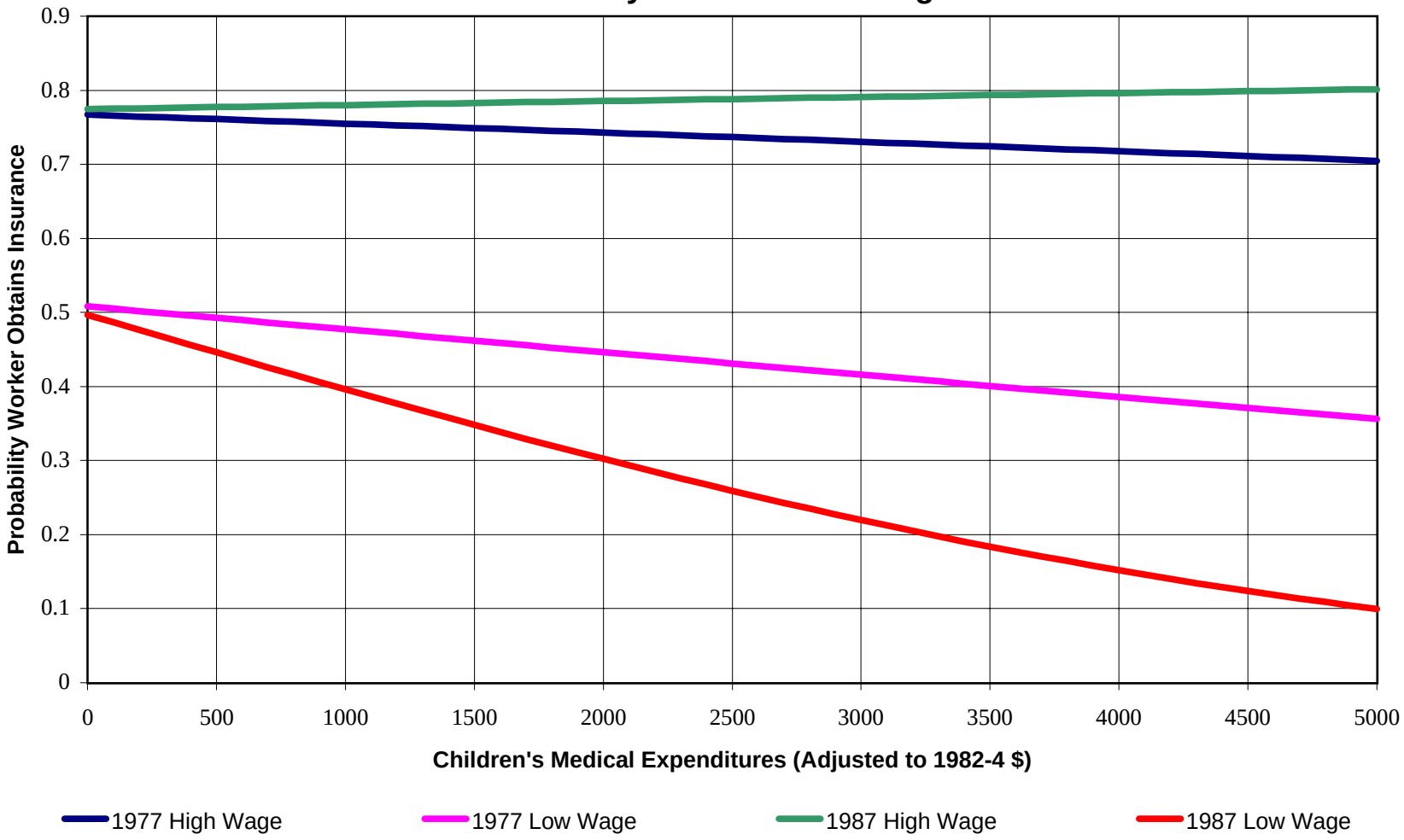
Simulation results for the impact of increasing the imputed wage on the probability a worker obtains insurance over time.

FIGURE 7
Effect of Varying Premium on Probability of Worker Coverage



Simulation results for the impact of increasing the imputed premium on the probability a worker obtains insurance, by wage group over time.

FIGURE 8
Effect of Varying Children's Medical Expenditures on Probability of Worker Coverage



Simulation results for the impact of increasing the imputed children's medical expenditure on the probability a worker obtains insurance, by wage group over time.

wage, the lines represent only each year, since the wage is the basis of separation of the low-wage and non-low-wage groups. These simulations hold all else constant regarding the employee and family and only change the imputed premium, the imputed wage, or expected children's expenditure, one at a time.

The patterns are somewhat consistent with the hypothesis that the minimum wage is associated with a reduction in coverage. Figure 6 provides a picture of the expected effect of varying the wage and shows that the probability of a low-wage worker having coverage is far lower for those whose wage is near the minimum wage. In 1977, the probability increases from about 35 percent to 85 percent as hourly wage increases from $2 to $12 (with a large, discrete jump as the low-wage barrier is crossed). In 1987, the probability increases from about 25 percent to about 80 percent. Though there is not much of a discrete jump, it is interesting to note that the slope is steeper to the left of the barrier, suggesting that increases in wage have larger impacts on probability of insurance for low-wage workers. It also illustrates that the simulated probability is lower in 1987 than in 1977 when the minimum wage was less binding. The minimum wage seems insufficient as the entire explanation for lower coverage of low-wage workers in 1987.

The pattern for premiums (Figure 7) suggests that our expected result—that firms would not choose to provide coverage to those with higher expected premiums—is the case only for 1987. In 1987, the association is *far* stronger among the low-wage sample. As hourly premium increases from $0 to $2.50, the probability of insurance declines from about 70 percent to about 5 percent for 1987 low-wage workers. This suggests that the nondiscrimination laws seem not to have had their desired effect.

Figure 8 demonstrates that, particularly for low-wage workers in 1987, increasing children's expected medical expenditures decreases the probability that a worker obtains health insurance (except for a slight increase for 1987 non-low-wage workers). For non-low-wage workers, the impact of increasing children's expenditures from $0 to $5,000 is small (a slight decrease from about 75 percent to about 70 percent in 1977 and a slight increase from about 75 percent to about 80 percent in 1987). For

low-wage workers in 1977, the decrease in probability over the same range is greater (from about 50 percent to about 35 percent), and is much greater in 1987 (from about 50 percent to about 10 percent).

Recall from the empirical model that there are two effects of children's expenditures on probability of insurance: it increases the demand for insurance (which should increase the probability) and increases the employer's cost of insurance (which should decrease the probability). Figure 8 is consistent with the notion that for low-wage workers, the supply-side effect on cost outweighs the demand induced by greater need for insurance. Low-wage workers experience a steeper decline in probability of insurance as children's expenditures increase than do non-low-wage workers. The difference in slopes between wage groups is greater in 1987 than in 1977, suggesting that the nondiscrimination rules did not succeed in equalizing coverage opportunities between wage groups.

VI. DISCUSSION

In summary, the probability of having employer-based health insurance was lower in 1987 than in 1977 among low-wage workers, especially those with high expected medical expenditures (i.e., those with families in which one or more members had poor or fair health, a limitation on physical activity, or mental illness). Low-wage workers with high expected medical expenditures were less likely to have private employer-based coverage in 1987, after enactment of the nondiscrimination law, and this reduction in probability of such coverage is far greater than for otherwise similar families.

Why might this be the case? According to the explanation given earlier, the health insurance premium is a fixed cost, and when added to cash compensation it raises the cost of a low-wage worker more than that of a non-low-wage worker (the proportional increase in compensation is greater for the low-wage worker given firm-based coverage). A worker who has high expected medical expenditures, or whose family has such expected expenditures, has the added disadvantage that firms hiring that individual may experience increased health insurance premiums for all workers in the firm (particularly

in small firms). The minimum wage reduces the employer's ability to shift the added cost to the low-wage worker. And we expect that other employees in the firm will be unwilling to accept a cut in real wages to accommodate this potential increase in premiums. Firms would therefore be forced to cover the cost as an addition to their total costs were they to offer these workers coverage. Evidence suggests they are unwilling to do so.

Before introduction of the nondiscrimination law, firms maximized profits by offering coverage to some workers but not to others; after enactment, the underlying economics did not change. Even though it was no longer possible to legally offer only some full-time employees coverage for the firm to gain federal tax subsidies, firms subject to the law seem to have found ways to continue to offer benefits in essentially the same pattern as before the enactment of the laws.

Are there other ways to accomplish the objective of increasing private employer-based coverage? One way might be to move to a sliding-scale contribution system, so that low-wage workers (or their employers) pay less for the insurance. The contribution might be a percentage of earnings up to higher earnings levels, at which the full cost would apply. General revenues or other specified taxes would be used to pay the difference.[32] Another approach would be to make the tax advantage a tax credit rather than a tax subsidy, with a cap on the maximum amount of the credit to make the change fiscally neutral.[33]

At the level of the firm, employers could be given a subsidy toward the premium cost for low-wage workers. The cost of this subsidy could be raised by capping the maximum allowable premium that is not subject to taxation, or by using general revenues, including savings to programs that now cover some of the low-income population, or some combination of the two.

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[32]Some reduction in current public expenditures for medical care would be expected under this scenario. The savings from these reductions could be utilized for the required subsidies to the sliding-scale premium schedule. Additional funds are likely to be required, however.

[33]Changing to a tax credit would increase the value of the "tax subsidy" to those at lower marginal tax rates. The cap might decrease the value to higher-income families.

Regarding the group with high expected expenditures, a pool of funds could be created at the state level to cover their above-average expenditures or to cover these only for low-income families. Employees would get a standard package of coverage at a standard premium, but the additional expenditures would be pooled through a state-based fund.[34] This arrangement would be designed to provide the higher-risk pool of employees and their families with the standard package, rather than more extensive benefits. All insurers and health care providers would be possible sources of funds for the pool. If the pool were limited to those in low-wage families, the resource requirements would be far smaller and less distorting than if this policy were adopted for all families.

Increasing the health insurance coverage of all families in the United States is a goal that would increase equality of utilization and hence potentially increase equality of health itself. The evidence presented here suggests that this goal has not been accomplished.

[34]This is similar in concept to the high-risk pools run by a number of states. The difference is that the pool would only cover costs over and above some threshold.

References

Congressional Budget Office. 1991. "Rising Health Care Costs: Causes, Implications, and Strategies." Washington, DC: Government Printing Office.

Cooper, Philip F., and Barbara Steinberg Schone. 1997. "TRENDS: More Offers, Fewer Takers for Employment-Based Health Insurance: 1987 and 1996." *Health Affairs* 16 (6): 142–149.

Gruber, J., and B. Madrian. 1997. "Employment Separation and Health Insurance Coverage." *Journal of Public Economics* 66: 349–382.

Gruber, J., and J. Poterba. 1995. "Tax Subsidies to Employer-Provided Health Insurance." Working Paper # 5147, National Bureau of Economic Research.

Hardle, W., and O. Linton. 1994. "Applied Nonparametric Methods." In *Handbook of Econometrics*, Vol. 4. Amsterdam: Elsevier.

Manning, Willard, et al. 1987. "Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment." *American Economic Review*. 77(3): 251–277.

Sheils, John, and Paul Hogan, 1999. "Cost of Tax-Exempt Health Benefits in 1998." *Health Affairs* 18(2): 176–181.

Silverman, B. W. 1986. *Density Estimation for Statistics and Data Analysis*. London: Chapman and Hall.

Summers, L. H. 1989. "Some Simple Economics of Mandated Benefits." *American Economic Review* 79(2): 177–183.

U.S. Bureau of the Census. Health Insurance Coverage, various years. Available on the Web at <http://www.census.gov/hhes/www/hlthins.html>.

Wolfe, Barbara, Amy Wolaver, and Timothy McBride, 1998. "Government Mandates, Health Insurance, and the Deterioration of the Low-Wage Labor Market: Are They Connected?" In *The State of Social Welfare, 1997*, edited by Peter Flore, Philip de Jong, Julian LeGrand, and Jun-Young Kim. Aldershot, England: Ashgate Publishing. Pp.143–190.