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Decreasing Opportunities for Low-Wage Workers: The Role of the Nondiscrimination Law for Employer-Provided Health Insurance

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Abstract

As of 1978, the favorable tax treatment of fringe benefits, including health insurance, has been regulated via a nondiscrimination clause such that low-wage, full-time workers must be offered health insurance (and other benefits) that are offered to higher-wage workers by the firm. Part-time workers may be excluded from coverage, however, creating incentives for firms to hire some types of workers part time to deny them coverage. We hypothesize that firms will hire fewer workers whose relative costs have increased, that is, low-wage workers. These workers will be less likely to work for firms that offer coverage, and those that do will be more likely to work part time without being eligible for the firm's health insurance benefits. We use the 1988 and 1993 Employee Benefits Supplements to the Current Population Surveys and an employer premium imputation to examine these hypotheses. Both the descriptive and multivariate analysis are consistent with our hypotheses. We predict the probability of working for a firm that offers health insurance to decrease as premiums increase for both high- and low-wage workers. An increase in the premium is also associated with a decrease in the probability of part-time work, but an even greater decrease in the joint probability of part-time work with eligibility for health insurance.

Decreasing Opportunities for Low-Wage Workers:
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I. INTRODUCTION

This paper addresses the question of whether the growth in the health insurance component of fringe benefit packages has played a significant role in the deterioration of the low-skilled labor market in the last two decades by increasing the total employer cost of hiring a low-wage worker relative to a high-wage worker.

One possible explanation for the increase in inequality in jobs and a decline in the relative position of low-skilled workers may be changes in the fringe benefits that private firms may offer to employees. Since passage of the nondiscrimination laws in 1978,[1] private firms have been obliged to offer fringe benefits to all full-time workers (not just highly compensated employees) in order to receive favorable tax treatment. Thus pensions, health insurance, and a variety of other benefits—if offered by a private firm—must be offered across the board to all full-time employees. Since the cost of health insurance is a fixed cost that is not related to earnings, the cost of employing some workers relative to others will increase if these costs cannot be passed back to all workers through lowered wages. And as the real cost of health insurance benefits grows, this effect will become larger. Minimum wage laws set a floor on wages. Thus, for workers at or near the minimum wage, employers cannot reduce wages sufficiently to cover the cost of insurance. The increase in the cost of coverage, together with minimum wage laws, is likely to lead to a decrease in employment of these workers, most generally low-wage workers. This could be either in the form of reduced employment or in a shift to part-time employment if the benefit is not provided to part-time workers. Another response would be a shift to hiring an outside firm to do the employment task (e.g.,

[1]Including 401 (a) (4) of the Internal Revenue Act. See Appendix 1 for more details on the nondiscrimination clauses.

outsourcing). Thus, it is possible that the nondiscrimination law, which was written to benefit low-wage workers, may actually be contributing to some of their employment problems.

In this paper we explore the extent to which nondiscrimination laws, together with the increasing costs of the health insurance benefit, have led to a change in the composition of labor demands by skill and education level. We develop and test a model suggesting that as the cost of health insurance has increased, the nondiscrimination laws have led to a decline in the employment opportunities for full-time low-wage workers by firms providing extensive fringe benefits. This has fueled the decline in the demand for low-skilled workers and is in part responsible for the reduction in wages and in full-time positions for low skilled workers. To test these models and hypotheses, this paper uses the special supplements of the Current Population Surveys (CPS) for 1988 and 1993, which included an extensive set of questions on employee health insurance coverage with the usual labor force questions. Although they cover but a short period of time, the richness of these data provide the opportunity to explore the extent to which low-wage (low-skilled) workers are offered coverage compared to higher skilled workers and in relationship to the cost of coverage to the firm.

II. BACKGROUND AND SIGNIFICANCE

The sluggish growth in family incomes and the long-term trend toward increased income inequality in the United States has captured the attention of many analysts and policy makers in recent years. Between the peaks of the business cycle in 1979 and 1989, median family income grew only 4 percent (U.S. Bureau of the Census 1996; Mishel, Bernstein, and Schmitt 1996). Family incomes declined in the first four years of the next business cycle, from 1989 to 1993, and, despite an increase in incomes in 1994 and 1995, still have not returned to their 1989 level. The shares of income received by the highest income quintile increased from 43.8 percent to 48.7 percent from 1967 to 1995, while the shares received by the lowest

income quintile have decreased from 4.0 to 3.7 percent in the same period (Weinberg 1996). In addition, the Gini coefficient, a measure of income inequality, increased by 12.8 percent from 1967 to 1995.[2]

Although statistical reports have clearly identified an underlying trend toward increased income inequality, analysis and debate in recent years have focused on understanding the factors contributing to these long-run trends. Several studies have suggested that increased inequality in wages is the largest contributing factor to increased income inequality, even though wage declines have been offset by increased hours worked in the family (often by the female spouse).[3] Wage inequality has been increasing for more than twenty years, but the trends have shifted in recent years (Mishel, Bernstein, and Schmitt 1996). In the 1980s, high-wage earners fared better than middle-wage earners, who fared better than low-wage workers. Since the 1980s, however, most workers have seen declines in real wages, with only the highest-wage workers earning more. For example, the wages of the average male without a college education fell 10.1 percent from 1979 to 1989 and another 7.2 percent between 1989 and 1995. The wages of a young male high school graduate dropped 21.8 percent in the 1980s and another 6.9 percent in the 1989–95 period. A young female high school graduate earned 18.9 percent less in 1995 than in 1979. Wage declines were not concentrated among the least educated workers, however. Over the 1989–95 period, real wages declined for the bottom 80 percent of men and the bottom 60 percent of women.

Analysts have also sought explanations for this trend in increased wage inequality. Several leading theories have been offered as explanations for the increase in wage inequality (Solow 1994). A leading explanation for this trend favored by many economists is technological change, especially the increased use of computers, favoring high-skilled workers (Krueger 1993; Burtless 1994). However, other explanations

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[2]Small improvements in these measures were recorded in 1995 but these changes were not statistically significant.

[3]The studies reviewed here analyze persons in the workforce and, in most cases, focus only on males. Other studies (see, for example, Haveman and Buron 1994) focus on changes among work categories, including increases in part-time or part-year work, unemployment and joblessness, or reduced participation in the labor force. Such studies tend to focus more on the supply of labor than those that focus on changes in earnings.

have been cited, including the shift in jobs from manufacturing to services (Bluestone and Harrison 1986), the drop in unionization (Blackburn, Bloom, and Freeman 1990), sluggish growth in worker productivity (Mishel, Bernstein, and Schmitt 1996), increasing returns to education and particularly a college education (Murphy and Welch 1992; Acs and Danziger 1993), and the impact of international trade on wages and employment (Porterfield and Sizer 1996; Burtless 1995; Krugman and Lawrence 1995; Freeman 1994; Bhagwati and Dehejia 1994; Lawrence and Slaughter 1993). One study attributed two-thirds to three-fourths of the change in wage inequality to a large drop in the real value of the minimum wage, deunionization, the expansion of low-wage service-sector employment, and the increasing globalization of the economy through immigration and trade (Mishel, Bernstein, and Schmitt 1996).

What Role for Fringe Benefits?

In addition to the explanations offered above, another source of the sluggish growth in wages could be the cost of fringe benefits. Total compensation for employees consists of wages plus fringe benefits and the cost of fringe benefits is significant and has been increasing for many years. There are several indicators of this trend. First, wages have become a smaller share of compensation: the ratio of wages to total compensation declined by roughly 14 percent from 1955 to 1994 and by 5.5 percent from 1975 to 1994 (Social Security Administration 1996). Second, the current aggregate cost of fringe benefits as measured by the amount of "tax expenditures" lost by excluding from federal personal income taxes the employer's contribution to fringe benefits is high: the exclusion for medical insurance was $65 billion in 1996, while the exclusion of pension contributions in employer plans was roughly $55 billion. Since these measures capture only lost tax revenues, the dollar value of fringe benefits is much larger, perhaps four times higher than the lost tax revenues.

A third indicator of the growth of fringe benefits comes from the Employment Cost Index (ECI), maintained by the Bureau of Labor Statistics (BLS), a broad measure of trends in total compensation, wages, and fringe benefits. From the second quarter of 1982 to the third quarter of 1996, the ECI shows an

increase of nearly 108 percent in the benefits paid to workers, far above the 73 percent increase in wages and salaries (see Table 1).

What is the impact of rising fringe benefits on workers, especially low-wage workers? Slower growth in wages, and/or changes in employment (hours worked) are both possible. Slower growth would be due to the increased share of one component of compensation, fringe benefits, crowding out another form, cash wages. Much, if not all, of the cost of fringe benefits is passed through to employees. As outlined by Gruber and Krueger (1991), the amount of pass-through will depend on the elasticities of demand and supply for labor, as well as a term they describe as the "value" of the insurance to the employee. A worker will accept lower wages to the extent that she values the benefits. If she values the benefits at less than a dollar-for-dollar basis, employers will be faced with paying higher cash salaries and hence will hire fewer workers (assuming labor supply is not perfectly inelastic).[4] Thus, the provision of employer-provided benefits comes with concomitant effects on employment and wages, and these are both considered here. Empirical evidence suggests that employers pass most of the costs (perhaps 80 percent) of employer-sponsored coverage onto employees, but that the remaining costs may result in employment effects (Aaron and Bosworth 1994; Gruber and Krueger 1991; Winterbottom, and Zedlewski 1994; Summers 1989).

For the reasons cited here, it is important to explore the effect of fringe benefits both on the employment and wages of workers, especially low-wage workers. There are a couple of reasons why one would expect fringe benefits to have a stronger effect on low-wage workers. First, high-wage workers

[4]In addition, as already noted, the minimum wage limits the ability of an employer to "pass through" the cost of fringe benefits to low-wage employees.

TABLE 1
Change in Total Compensation, Wages and Benefits, 1982–96

	Current Dollars			Real Dollars		
	Total Compensation	Wages & Salaries	Benefits	Total Compensation	Wages & Salaries	Benefits
Employment Cost Index (1982:1=100)						
1982:1	100.0	100.0	100.0	100.0	100.0	100.0
1996:3	181.3	172.7	207.6	108.6	103.4	124.4
Total percentage increase	81.3	72.7	107.6	8.6	3.4	24.4
Average annual percentage increase	4.34	3.98	5.36	0.59	0.24	1.57
For specific subperiods						
1982–86	5.20	4.81	6.47	1.56	1.18	2.79
1986–90	4.32	3.96	5.51	0.04	-0.31	1.17
1990–94	3.83	3.24	5.30	0.39	-0.18	1.81
1994–96	2.95	3.07	2.38	0.14	0.26	-0.42

Source: U.S. Bureau of Labor Statistics, Employment Cost Index (ECI).
Note: Calculations in real dollars computed using CPI-U.

may be more likely to demand fringe benefits either because they value the benefits more than low-wage workers or they are more likely to face lower marginal tax rates. Second, firms may not be willing or able to pass these costs back to their low-wage employees and this may exacerbate the employment problem, especially for low-wage workers. Employers may not be able to pass through the costs because of the nondiscrimination laws and minimum wage laws.

The Nondiscrimination Law Governing Fringe Benefits

Beginning in 1978, private firms have been obliged under nondiscrimination laws, including 401 (a) (4) of the Internal Revenue Act, to offer fringe benefits to all full-time workers (not just highly compensated employees) in order for fringe benefits provided by the firm to receive favorable tax treatment. As of 1978 this requirement was extended to include health insurance. (Appendix 1 presents an excerpt from the revenue code.) The nondiscrimination law can be viewed as a mandate: if a firm decides to offer fringe benefits to its high-wage workers, the government mandates that it must offer benefits across the board to all full-time employees, including low-wage workers.

For several reasons, the nondiscrimination laws may have negative consequences on the population they are meant to help: low-wage workers. Nondiscrimination laws may lead to a lowering in the demand for low-wage workers because their cost (wages plus fringe benefits) increases relative to other, higher-paid workers. These problems are exacerbated for the lowest-wage workers because firms may not be willing or able to pass the costs of fringe benefits back to their lowest-wage employees. Minimum wage laws limit the ability of firms to pass the costs back to their low-wage workers because the wage cannot be lowered below the minimum wage. Employers will then find it attractive to substitute capital for such labor (limited by cost and technology); and to hire services from vendors (i.e., to outsource) rather than hire low-wage service workers themselves. Hence the demand for numerous services that were performed by low-wage workers in generally high-wage firms will be reduced through substitution using capital and/or outside service firms.

It is possible for employers to get around the effects of nondiscrimination laws on total compensation through changing the employment of low-wage workers. In particular, employers can increasingly hire low-wage workers as part-time workers, thus making them not qualified for the nondiscrimination rules, or they can "outsource" tasks normally assigned to low-wage workers. Alternatively, employers who decide to offer benefits to all workers, including low-wage workers, may also respond by hiring some low-wage workers to work for longer hours, in order to spread the fixed-cost fringe benefits across more hours. We concentrate on the first of these possible responses in this paper.

Previous Evidence on the Impact of Fringe Benefits on Employment

There is empirical evidence suggesting that the use of part-time workers has increased (Table 2). Between 1968 and 1993, the percentage of workers employed part-time increased from 14.9 percent to 18.8 percent. In addition, the average number of hours worked has declined slightly from 39.7 to 39.2 hours from 1968 to 1995. However, average hours worked declined significantly, from 39.7 to 37.7 hours from 1968 to the bottom of the recession in 1982, but have increased significantly since 1982. Similarly, most of the increase in the percentage of workers working part-time occurred between 1968 and 1982, with a slight drop in this percentage after 1982.

There is also some evidence that firms have raised their levels of outside contracting. Abraham and Taylor (1996) present Bureau of Labor Statistics (BLS) data to provide evidence that firms have increasingly resorted to outsourcing some services. Over the period from 1972 to 1993, evidence suggests that building services establishments grew 288 percent, compared to 50 percent total employment growth in the nonagricultural sector. Similarly high rates of growth occurred in engineering and architectural services (124 percent), and accounting, auditing, and bookkeeping employment (151 percent). In addition, using an establishment-level sample from the Industry Wage Surveys from 1979 to 1986, they also find that the proportion of firms contracting these services out grew over the period,

TABLE 2
Percentage of Persons Age 16 or Older at Work in Nonagricultural Industries, by Full- or Part-Time Status, 1968–1995

Year	Total at Work (1000s)	% Full-Time Schedules	Part-Time	Part-Time for Economic Reasons				Average Hours	
			% Part-Time Schedules	% for Economic Reasons	% Usually Work Full-Time	% Usually Work Part-Time	% on Voluntary Part-Time	Total at Work	Workers on Full-Time Schedules
1968	68044	85.1	14.9	2.5	1.3	1.2	12.4	39.7	43.4
1969	70018	84.5	15.5	2.6	1.4	1.2	12.9	39.5	43.4
1970	70731	83.6	16.4	3.1	1.7	1.4	13.3	38.7	42.7
1971	71375	83.2	16.8	3.4	1.7	1.8	13.4	38.9	43.0
1972	74080	83.2	16.8	3.3	1.5	1.8	13.5	39.0	43.1
1973	76789	83.4	16.6	3.1	1.4	1.6	13.5	39.0	43.1
1974	78078	82.9	17.1	3.5	1.7	1.8	13.6	38.7	42.8
1975	77381	81.6	18.4	4.6	2.1	2.4	13.8	38.4	42.7
1976	80199	82.0	18.0	4.2	1.7	2.5	13.8	38.4	42.6
1977	83363	82.0	18.0	4.0	1.5	2.5	13.9	38.5	42.8
1978	87246	82.3	17.7	3.8	1.5	2.3	13.9	38.7	42.9
1979	89875	82.4	17.6	3.8	1.5	2.3	16.0	38.6	42.7
1980	90209	81.6	18.4	4.5	1.9	2.6	13.9	38.3	42.5
1981	91377	81.4	18.6	4.9	1.9	3.0	13.7	37.9	42.0
1982	90552	79.8	20.2	6.5	2.4	4.1	13.8	37.7	42.3
1983	92038	80.0	20.0	6.5	2.0	4.5	13.5	38.1	42.7
1984	96246	81.1	18.9	5.7	1.7	4.0	13.2	38.6	42.9
1985	98303	81.3	18.7	5.4	1.7	3.8	13.3	38.9	43.2
1986	100821	81.3	18.7	5.3	1.6	3.7	13.4	38.9	43.3
1987	103448	81.6	18.4	5.0	1.5	3.4	13.5	38.8	43.1
1988	106101	81.6	18.4	4.7	n/a	n/a	13.7	39.3	43.6
1989	108101	81.9	18.1	4.3	n/a	n/a	13.8	39.4	43.7
1990	108697	82.0	18.0	4.5	n/a	n/a	13.6	39.3	43.5
1991	107865	81.1	18.9	5.3	n/a	n/a	13.5	39.1	43.5
1992	108457	81.1	18.9	5.6	n/a	n/a	13.2	38.9	43.2
1993	110340	81.2	18.8	5.5	n/a	n/a	13.3	39.4	43.7
1994	114233	n/a	n/a	3.9	n/a	n/a	14.9	39.1	43.3
1995	116071	n/a	n/a	3.7	n/a	n/a	14.7	39.2	43.2

Source: 1968–87 data, U.S. BLS (labor force statistics derived from the CPS);1988–95, U.S. BLS:*Employment and Earnings* (monthly data).

especially janitorial services and computer services, accounting for significant portions of the growth in employment in these industries (ranging from 20 to 40 percent).

The relationship between wages and employment of workers has been the focus of empirical literature over the years. A small subset of this literature has specifically focused on the effect of employee benefits on the employment of workers (especially low-wage workers) and the hours worked by these workers. Cutler and Madrian (1996) examine the implications of quasi-fixed labor costs on hours demanded per worker. Although their theoretical construct does not distinguish between offering health insurance benefits to some or all workers, specifically the possibility of excluding part-time workers from eligibility, their findings suggest that rising health insurance costs have increased hours worked by 3 percent, controlling for changes in the demand for skilled workers and predicted wages (since benefits are likely to be correlated with wages).

Montgomery and Cosgrove (1993), using a General Accounting Office (GAO) data set of child-care establishments, estimate the effects of fringe benefits on the demand for part-time hours. Using a model with only insurance benefits (versus other benefits that are more likely to be variable in costs) as the independent variable of interest, they find that insurance costs are more than twice as likely to reduce the fraction of hours worked by part-time workers as compared to other fringe benefits.

Another recent study examines the question of desired versus actual labor supply. Estimates of labor supply using observed hours of work may be biased if workers are limited by firms in the number of hours that they can work (Dickens and Lundberg 1993). Using a structural model of labor supply, the authors explore hours worked under the assumption that a worker has a finite choice set in hours associated with jobs, with “desired hours” restricted by the employer and “observed hours” found only in the data. The findings suggest that desired hours are somewhat higher than observed hours, more so for nonwhites. This finding is consistent with our hypothesis that there may be employment effects associated with the

nondiscrimination clause; workers may wish to work full time but, due to a combination of their skills and the nondiscrimination clause, are prevented from obtaining a full-time job that offers benefits.

Evidence on the Impact of Fringe Benefits on Wages

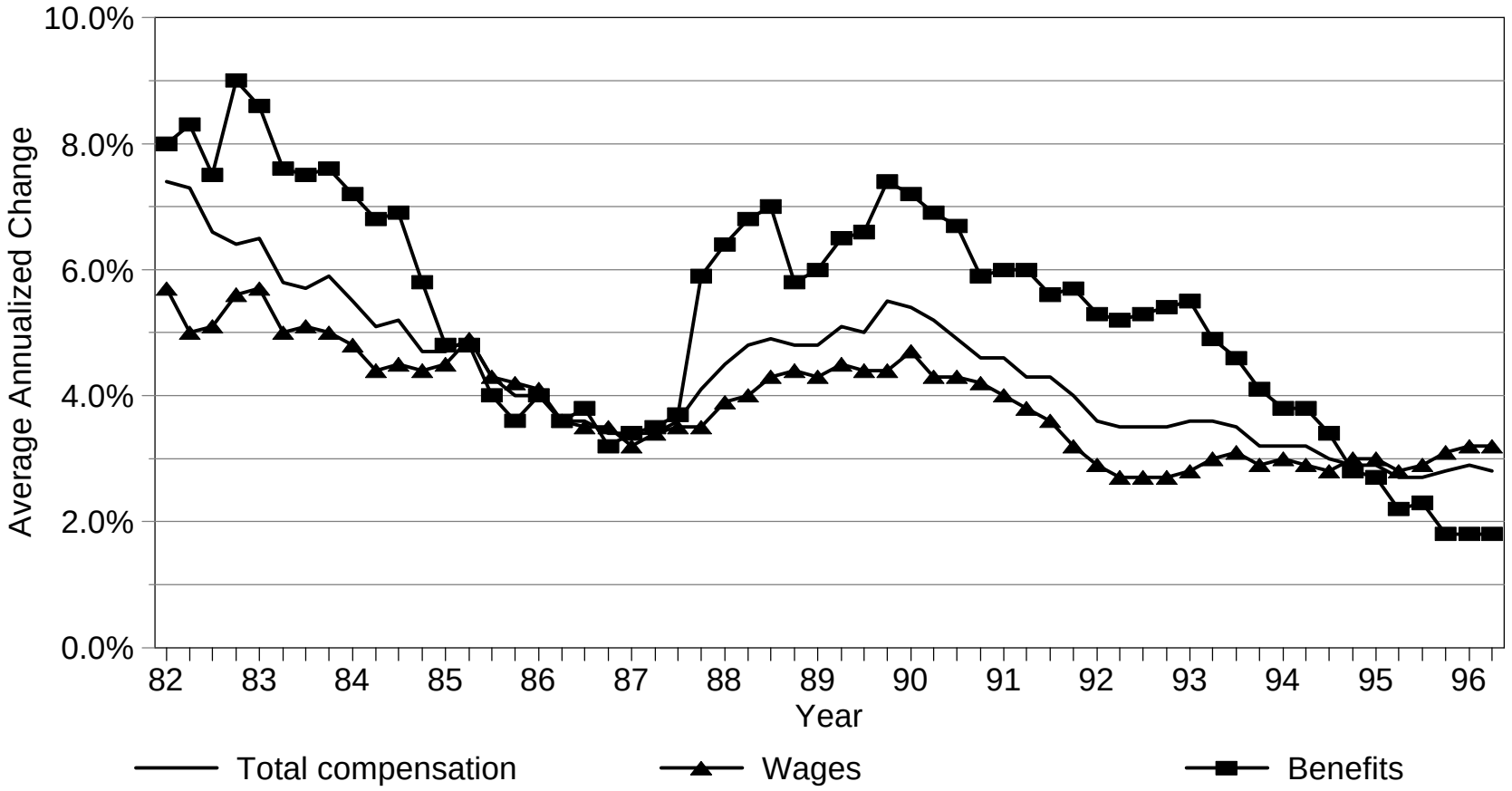
As noted above, higher fringe-benefit costs may be passed through to workers, with the amount of pass-through dependent on the elasticities of demand and supply for labor, as well as a term described as the "value" of the benefits to the employee (Gruber and Krueger 1991). Empirical studies suggest that employers pass most of the costs of employer-sponsored coverage onto employees, but that the remaining costs may result in employment effects (Aaron and Bosworth 1994; Gruber and Krueger 1991; Loprest, Winterbottom, and Zedlewski 1994; Summers 1989). Loprest, Winterbottom, and Zedlewski (1994), in a survey of these studies using widely accepted estimates of the appropriate elasticities, concluded that about 80 percent of health insurance premiums were borne by the worker in the form of lower wages.

The empirical findings suggest that while the increase in total compensation may be expected to reflect increases in the marginal productivity of workers, the rising cost of fringe benefits may "crowd out" increases in wages, as employers are forced to use most increases in total compensation to pay for fringe benefits. Trends in these data tend to support this hypothesis (Figure 1). From the second quarter of 1982 to the third quarter of 1996, the average annual growth in real total compensation has been 0.59 percent, but real wages increased by only 0.24 percent annually (see Table 1). In contrast, benefits increased by 1.57 percent annually during this period, suggesting that the growth in benefits contributed to the slower growth of wages, relative to total compensation, during this period. In fact, in almost every quarter since the ECI has been collected, the growth in fringe benefits has exceeded the growth in total compensation, resulting in lower growth in wages than the growth in total compensation. A notable exception is the seven-quarter period ending in the third quarter of 1996, in which the growth in wages has exceeded the growth in fringe benefits (Figure 1).

FIGURE 1

Change in Employment Cost Index

(Average annualized change in current dollars, 1982-96)



Source: U.S. BLS, Employment Cost Index, seasonally adjusted annual average change.

Little (1995) also found evidence that payments for employer-sponsored health insurance and social security benefits have exacerbated the between-group and within-group wage inequality. Little found that, in recent years, changes in health insurance provision have tended to favor high-wage workers, increasing inequality in total compensation. Blank (1990) explores the quality of part-time jobs by exploring the impact of part-time status on wages. She finds that occupation wage differentials between part-time and full-time workers are not as pronounced as would be expected. Female part-time service workers appear to earn higher average wages, while male part-time workers earn less except in the professional category.

The limited literature in this area suggests that employers have responded to the increase in the cost of health insurance benefits in general, and the imposition of the nondiscrimination law in particular through slowing the rate of increases in wages and increasing hours worked among low-wage workers who are employed full-time. However, the evidence of a relationship between the nondiscrimination law and the changes in the employment patterns and wages of part-time workers is quite limited. This paper seeks to explore further evidence that might support the hypothesis that the nondiscrimination law has contributed to the deteriorating employment and income picture for low-wage workers.

III. THEORETICAL APPROACH

Firms make several decisions in the employment process, deciding whether it pays to offer health insurance to employees, whether to hire workers full time or part time, and what wages to pay to workers. In response, workers choose from an array of employment opportunities that may differ across several characteristics, including insurance coverage, hours, and wages. How do health insurance costs, and specifically the nondiscrimination clause, affect these decisions? This is the issue of importance here, because we are exploring the possibility that health insurance costs and the nondiscrimination clause are affecting the employment prospects and wages of low-wage workers, relative to high-wage workers.

The hiring decision process can be simplified to (1) the firm decides whether to offer health insurance to any employees, (2) the firm then makes hiring decisions, including which workers to hire for full- and part-time work, and (3) the individual chooses to work as a full-time/part-time worker at a firm that offers/does not offer health insurance benefits at a given wage.

Insurance Offer Decision

Employers offer insurance if the benefits of offering insurance to employees exceed the costs associated with this decision, i.e., if the firm increases profit by offering insurance benefits to employees. On the face of it, the costs of insurance to the employer are equal to the premiums paid on behalf of employees. However, the decision is much more complicated than that. Since employers pass most of the costs of employer-sponsored coverage on to employees (Gruber and Krueger 1991), then it might seem that neither employers nor employees would face incentives to obtain insurance coverage through the workplace. This point ignores some important factors that encourage employers to offer insurance to their employees.

First, employees could prefer to obtain their health insurance through their employer (rather than from some other source) and employers, in order to maximize their production, would seek to accommodate these employees by acting as their "agent" in the health insurance process. Employees might prefer employer-sponsored health insurance because employees can obtain insurance at a cheaper price when it is obtained through the employer, primarily because insurance purchased through employers is excluded from income taxation (Pauly 1986; Feldstein 1973) and because employees are often able to obtain insurance at a lower premium than would be offered to them as individuals because of lower loading fees in the employer group (CBO 1991). Second, employers could reap some direct and indirect benefits from offering insurance if the productivity of workers increases when the employer offers insurance. This could occur if offering insurance allows the firm to attract higher-quality employees for some occupations, discourages employee turnover, and/or increases workers' health status through increased access to medical care.

To the firm, the costs of providing insurance includes two components: (1) the direct costs of administering the insurance through the firm, and (2) the net costs of the insurance to the employer after some share of these costs have been passed on to the employee. As noted above, this share may be significantly less than 100 percent of the employer-paid health insurance premium (Loprest, Winterbottom, and Zedlewski 1994).

Up to this point, it has been assumed that employers offer insurance either to all their employees or to none, and no distinction has been made between total employment and total hours worked. When employers have the flexibility to hire some workers full-time, some part-time, and outsource some employment, then they can selectively provide insurance to only certain of these employees; in such cases, the impact of insurance on employment and earnings becomes more complex. This also adds the potential for differential impact on high-wage and low-wage workers. Unless the full cost of benefits are borne by all employees, increasing benefit levels will lead to demand curves shifting further downward for firms that offer benefits; to the extent high-wage workers bear the full cost, or nearly the full cost, but low-wage workers bear a smaller share, employment effects will be more likely and larger for low-wage workers. As noted above, two federal regulations—the minimum wage and nondiscrimination laws—will exacerbate these problems, as employers will have an incentive to demand fewer workers than are willing to work at the minimum-wage level or to increasingly substitute part-time/temporary workers for full-time workers. At the same time, since health insurance is a fixed per-worker cost, firms that still offer the benefits will demand more hours from insured workers.

We present the essential features of our theoretical model in Appendix 2. The model leads to a number of important testable hypotheses. The model suggests that rising health insurance premiums will shift the labor demand curves of those firms offering benefits downward, making employment effects more likely. Firms may then find it profitable to offer the benefits only to some workers, particularly if high-wage workers value the provision of fringe benefits more than low-wage workers. For low-wage workers, it

is increasingly likely that the nondiscrimination and minimum wage laws will lead the firms to demand fewer workers than are willing to work at that wage/benefit level, leading firms to increasingly substitute part-time/temporary workers. At the same time, since health insurance is a fixed per-worker cost, firms that still offer the benefits will demand more hours from insured workers.

This gives rise to two key hypotheses for empirical testing in this paper:

(1) Firms that offer health insurance will be less likely to hire low-wage workers.

(2) Firms that offer health insurance will be more likely to hire low-wage workers to work part-time.

Since we use workers as the unit of observation rather than firms, we actually test the following two hypotheses:

(1) Low-wage workers will be less likely to work for firms that offer health insurance.

(2) Low-wage workers will be more likely to work part-time for firms that offer health insurance and be denied an individual offer of benefits.

IV. ECONOMETRIC METHODS

We are interested here in two important related decisions of employers and employees, both affected by the size of health insurance premiums: (a) whether the employee is offered insurance coverage by the employer, and (b) whether the employee works part time or full time. These probabilities can be expressed as: $P(I_i^o=1|X_{oi})$ for the probability that the worker is offered insurance and $P(PT=1|X_{pi})$ for the probability that the worker works part-time, where $I_i^o=1$ if the worker I is offered insurance,and $PT_i=1$ if the worker works part-time. The decisions are assumed to be a function of characteristics affecting the offer decision (denoted as X_{oi}), as well as characteristics affecting the acceptance decision (X_{pi}).

Here, this decision process can be modeled using two equations: (a) an equation that explains the relationship between individual characteristics and the probability of getting an insurance offer, and (b) an

equation that explains the relationship between individual characteristics and the probability of working part-time. Following standard analysis of decision models in the economics literature (Greene 1993), these probabilities can be modeled in the following way:

$$\begin{gathered} Offer*_i = X_{oi}*\beta_o + \varepsilon_o \\ Parttime*_i = X_\pi*\beta_p + \varepsilon_p \\ Offer_i,\ Parttime_i = 1\ if\ Offer*_i,\ Parttime*_i > 0,\ = 0,\ otherwise \\ \varepsilon_o,\ \varepsilon_p \sim \eta(0,0,1,\rho) \end{gathered} \quad \textbf{(1)}$$

Offer$^*_i$ and Part-time$^*_i$ are not observed directly, but observed if for individual I their value exceeds zero.

Given the correlation between these two decisions, a bivariate probit model is the appropriate method for estimation of these equations (Greene 1993). In this model, the error terms are assumed to have a bivariate standard normal distribution with correlation ρ. Modeling these probabilities as a bivariate probit allows estimation of the correlation between the unobserved factors that affect both the probability of being offered insurance and the probability of working only part-time. It is important to estimate these equations with the possibility that the errors are correlated because assuming ρ = 0 could introduce bias into the measured coefficients. A positive correlation would indicate that workers with offers of health insurance would be more likely to work part-time and a negative correlation would indicate the opposite. A priori we expect the sign to be negative.

It is likely that firms will make these three decisions simultaneously. Thus, examining the relationship between insurance offers and benefits, hours, and wages should ideally be done within the context of a simultaneous equations model. In this paper, we simplify and estimate the *Wages* model first and then employ this equation to create a predicted value of wages which is included in our bivariate model of part-time and offered health insurance (our measure of benefits).

We estimate equation (2), and substitute the resulting predicted wages from equation (5) into the bivariate probit model, represented by equations (3) and (4).

$$Wages = \alpha_0 + \alpha_1 * Offer + \alpha_2 * Parttime + \alpha_3 * WInst + A * X + \varepsilon_w \quad \textbf{(2)}$$

$$Parttime = \beta_0 + \beta_1 * Offer + \beta_2 * wages + \beta_3 * HInst + B * X + \varepsilon_{p'} \quad \textbf{(3)}$$

$$Offer = \gamma_0 + \gamma_1 * Premium + \gamma_2 * wages + \gamma_3 * OInst + \Gamma * X + \varepsilon_{o'} \quad \textbf{(4)}$$

$$wages = \hat{\alpha}_0 + \hat{\alpha}_3 * WInst + \hat{\alpha} * X \quad (5) \quad \textbf{(5)}$$

where X is a vector of worker/job characteristics, the $\hat{\alpha}_i$'s are the estimated coefficients from equation (2), and *WInst, HInst,* and *OInst* are instrumental variables for wages, part-time status, and offer.[5] The coefficients of equation (2) will be biased with the inclusion of endogenous variables on the right-hand side, but including this prediction does not bias the coefficient estimates in equations (3) and (4), because only the exogenous variables are used to form the prediction, and the result is a wage based on working full-time with the overall or mean probability of being offered fringe benefits.

[5]To estimate this model, it is necessary to choose these instrumental variables. Following Blank (1990), several possible instrumental variables are considered here. For wages, we rely on measures of region which are a proxy for state unemployment rate and other macroeconomic conditions that differ by region. For part-time status, we use family characteristics, such as the presence of a child under the age of 6, household size, female interacted with child under 6 years, and spouse income. For offer, we use spouse-offered insurance. These parameters are exactly identified if there is only one instrument each for hours and wages, and overidentified if there are multiple instruments.

V. DATA

Ideally, in order to test this model, we would utilize data on employees collected within firms so that we would have matched firm and employee data. Unfortunately, such data are not available. Instead we use data on employees which are unique in the level of detail on benefits provided by the firms for which they work. Data from the Survey of Employee Benefits supplement to the May 1988 and April 1993 Current Population Surveys (CPS) are used to answer the questions posed here.[6] These supplemental surveys are rich in detailed information on employment and health insurance coverage. Although the supplements include only employed persons over age 14, information about the socioeconomic, demographic, and health insurance status of all households common to the two months is available on the

[6]The CPS is a monthly survey administered by the U.S. Census Bureau to a representative sample of about 57,000 households, including more than 150,000 persons. In the March survey, respondents are asked about their health insurance coverage during the calendar year preceding the survey and are counted as insured if they had health insurance at any time during that period. Respondents are organized into eight "rotation" groups. Respondents in each group are interviewed for eight months over the course of a year and a half, with each group interviewed during their first four months in the sample, not interviewed for the next eight months, and then interviewed again in months 13 through 16. Thus, each respondent in a rotation group is interviewed for the same four months in two consecutive years, and is then dropped from the sample. New rotation groups are added each month. All household members over the age of 14 are interviewed. One parent or guardian answers the questionnaire for all children (under age 14) in the household for whom they are responsible. In 1988 and again in 1993, the March survey was matched with the sample of employed workers interviewed in depth in the Survey of Employee Benefits about pension, leave, and health benefits received from their employers. This supplemental sample consisted initially of all of the respondents in rotation groups common to the March and May 1988 surveys and common to the March and April 1993 surveys. The sample was further reduced by omitting children under 14 and respondents over age 14 who were not employed. Thus, only employed persons are included in the supplemental surveys.

Different health insurance information is available in the two files. In 1988, data from the supplement to the CPS are linked with data from the March Annual Demographic Surveys. However, questions concerning health insurance cover two different time periods—March and May. In the May supplement, survey respondents are asked about their employer-sponsored health insurance status, while in the March survey they are asked whether they were covered by health insurance at any time during the previous calendar year (i.e., 1987 in the case of the 1988 file). These answers may be inconsistent. For example, an individual may respond that they were offered employer-sponsored insurance and accepted it in May, though in March they reported themselves as uninsured. Thus, in 1988 it is impossible to determine whether workers not covered by their employer have insurance elsewhere. The 1993 file is also linked to the March survey. However, a few additional questions were added in the 1993 supplement, including a question asking directly about current health insurance coverage.

file containing the Survey of Employee Benefits supplement. The Census Bureau has merged the files so that data from each of the three months are available for each individual in each household.

In both the 1988 and 1993 surveys, employed workers (age 14 and older) were asked whether they were covered by employer-provided health insurance, and if not, why not. Some people worked for firms that offered coverage to the workers in the firm, some did not. Some workers in firms offering coverage were not offered employer insurance for various reasons, while others rejected coverage even when it was offered. Thus, it is possible to know if the individual works for a firm that offers coverage, whether the individual was offered coverage, and if the individual accepted. This is unusual in that most surveys of health insurance coverage simply obtain data on whether those surveyed are currently covered and, if so, by what type of insurance, and if they have been covered all year.

For the data used here, the characteristics of each adult respondent (worker) are linked to everyone else in the family, including spouses and children. This is important because the spouse characteristics may help to determine how an employee's decisions are impacted by the characteristics and decisions of the spouse. This is especially important under two circumstances: First, the insurance coverage of a worker's spouse could be an important determinant of a worker's decision to accept jobs with and without insurance offers. Second, the characteristics of a spouse, especially the availability of insurance coverage from a spouse, are likely to impact a worker's decision to work full-time or part-time. For example, since part-time jobs are less likely to offer insurance coverage, a worker will be less likely to accept a part-time job if the spouse is not covered by health insurance.

We omit from our sample workers missing information on their probability of offer, those who have no wage information, and those whose imputed hourly wage is less than $1 or greater than $250. We also omit self-employed workers, since their decision to buy insurance is very different from a firm's

decision to provide insurance for its workforce. Respondents older than age 65 are excluded as well since they are covered by Medicare.[7]

VI. DESCRIPTIVE RESULTS

Table 3 presents the definitions of variables used here, with descriptive statistics for each variable in the entire sample. In the table, the first three variables describe the nature of the health benefits offered by the firm. These are followed by our estimate of the direct cost to the firm of providing health insurance, which is based on a procedure developed for imputation to the CPS by Charles Nelson of the Census Bureau.[8] Individual and firm characteristics follow. Four sets of descriptive statistics are presented: the full, merged sample from 1988 and 1993, this sample weighted, and two subsamples (low-wage workers and higher-wage workers). We separate out low-wage workers as they are the group for whom a firm will be less able to pass on the full cost of the health insurance premium even if they were to work full-time. The cost of the health insurance premium and the minimum wage are both employed in defining the low-wage and non-low-wage groups. Roughly 15 percent of the sample fall into the low-wage category.[9]

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[7]We omit 3705 observations for missing wage information, 285 with wages less than $1 or greater than $250, 2212 over age 65, and 3890 self-employed.

[8]The procedure uses data from the National Medical Care Expenditure Survey (NMES) data for 1977. See Appendix B, *Current Population Report*, P-60, no. 182, August 1992, for more detail. The authors obtained a copy of the computer code for imputing the premium values from Charles Nelson and are grateful for his advice on implementing this procedure.

[9]The cutoff point, LOWCUT, is defined as the real minimum wage plus the average cost of health insurance to the firm divided by 1750 (working 50 weeks a year for 35 hours per week.). Any worker whose hourly wage is below that point is designated a low-wage worker. We also tried a cut-off point of $6 per hour and the results are similar.

TABLE 3
Variable Definitions, Means, and Standard Deviations

Variable	Definition	Full Sample Mean	(S.E.)	Weighted Means, Full Sample		LOWWAGE Workers (Wage<LOWCUT)		HIGHWAGE Workers (Wage≥LOWCUT)	
FOFFER	= 1 if firm offers health insurance, else 0	.834	(.372)	.830	(.782)	.550	(.498)	.885	(.319)
IOFFER	= 1 if firm offers to worker, else 0	.773	(.419)	.767	(.880)	.383	(.486)	.843	(.364)
ACCEPT	= 1 if covered by employer, else 0	.665	(.472)	.663	(.984)	.223	(.417)	.745	(.436)
RHICOST[a]	Employer premium imputation	1972	(773)	1998	(1611)	2167	(591)	1937	(796)
PARTTIME	= 1 if PARTTIME	.164	(.370)	.162	(.766)	.453	(.498)	.111	(.314)
WAGE1	Hourly wage, if known, else usual weekly earnings/usual hours	9.94	(7.62)	10.00	(16.33)	3.72	(.760)	11.06	(7.76)
LOWCUT	Real minimum wage + RHICOST/1750	4.52	(.448)	4.54	(.933)	4.64	(.361)	4.50	(.459)
LOW WAGE	=1 if real hourly wage<LOWCUT	.153	(.360)	.157	(.756)	—	—		
AGE	Age/100	.376	(.118)	.372	(.247)	.336	(.140)	.383	(.112)
MALE	= 1 if male	.506	(.500)	.520	(1.04)	.331	(.471)	.538	(.499)
MIDWEST	= 1 if Census region Midwest	.261	(.439)	.251	(.903)	.293	(.455)	.255	(.436)
NEAST	= 1 if Census region northeast	.225	(.418)	.198	(.829)	.170	(.376)	.235	(.424)
WEST[b]	1 if Census region west	.200	(.400)	.204	(.840)	.187	(.390)	.202	(.401)
FRM1000	Firm size>1000	.412	(.492)	.421	(1.03)	.262	(.440)	.439	(.496)
FIRMMED[c]	100<Firm size≤1000	.185	(.389)	.180	(.800)	.124	(.330)	.196	(.397)
INDMAN	Manufacturing industry	.196	(.397)	.201	(.834)	.114	(.318)	.211	(.408)
INDFIN	Finance industry	.0663	(.249)	.0691	(.528)	.0285	(.167)	.0732	(.260)
INDTRADE	Trade industry	.191	(.393)	.195	(.826)	.406	(.491)	.152	(.359)
INDTRANS[d]	Transportation industry	.0767	(.266)	.0772	(.556)	.0254	(.157)	.0860	(.280)
AHRSWK	Usual Hours	37.31	(13.76)	37.06	(28.80)	32.39	(16.61)	38.19	(12.99)
OCCOPER	Operator occupations	.227	(.419)	.228	(.874)	.186	(.389)	.234	(.424)
OCCPROF	Professional services occupations	.254	(.435)	.246	(.897)	.0814	(.273)	.284	(.451)
OCCSERV[e]	Service occupations	.121	(.326)	.121	(.679)	.302	(.459)	.0877	(.283)
SINC2030	20,000<Spouse Income≤30,000	.122	(.327)	.118	(.672)	.0911	(.288)	.128	(.334)
SINC3040	30,000< Spouse Income≤40,000	.0645	(.246)	.0618	(.501)	.0432	(.203)	.0684	(.252)
SINC40P[f]	Spouse Income>40,000	.0553	(.229)	.0546	(.473)	.0356	(.185)	.0588	(.235)
Y1992	% in 1992 data	.479	(.500)	.499	(1.04)	.574	(.495)	.461	(.499)
CLASGOV	Gov. class of worker	.194	(.396)	.182	(.803)	.0970	(.296)	.212	(.409)
HHSIZE	Household size	3.12	(1.46)	3.11	(3.08)	3.35	(1.67)	3.08	(1.42)

(table continues)

TABLE 3, continued

Variable	Definition	Full Sample Mean	(S.E.)	Weighted Means, Full Sample		LOWWAGE Workers (Wage<LOWCUT)		HIGHWAGE Workers (Wage≥LOWCUT)	
KIDLT6	Child < 6 in household	.237	(.425)	.230	(.877)	.194	(.395)	.245	(.430)
FKIDLT6	Female w/child < 6 in household	.109	(.311)	.102	(.630)	.143	(.350)	.102	(.304)
EDUCHS	Highest education level, high school	.477	(.499)	.477	(1.04)	.619	(.486)	.451	(.498)
EDUCCOLL[g]	Highest education level, some college	.488	(.500)	.486	(1.04)	.309	(.462)	.520	(.500)
URBAN	1 if urban	.724	(.447)	.795	(.841)	.620	(.485)	.743	(.437)
NONWHITE	1 if nonwhite	.121	(.326)	.143	(.729)	.151	(.358)	.115	(.319)
TENLT1YR	Job tenure < 1yr	.169	(.375)	.174	(.789)	.373	(.484)	.132	(.338)
TEN1T4	1–4 years job tenure	.355	(.479)	.363	(1.00)	.435	(.496)	.340	(.474)
TEN5T9[h]	5–9 years job tenure	.192	(.394)	.188	(.814)	.107	(.309)	.207	(.405)
UNION	= 1 if covered by collective bargaining contract/union	.203	(.402)	.205	(.841)	.0468	(.211)	.231	(.422)
FOFFPEN	Firm offers pension	.649	(.477)	.646	(.996)	.398	(.487)	.696	(.460)
MARRIED	1 if married	.640	(.480)	.619	(1.01)	.468	(.499)	.671	(.470)
FMARR	(1-MALE) *MARRIED	.300	(.458)	.282	(.936)	.358	(.480)	.291	(.454)
SPINS	Spouse has health insurance	.523	(.499)	.499	(1.04)	.311	(.463)	.562	(.496)
N		35,382		35,382		5,431		29,951	

Source: 1988 and 1993 CPS, Employee Benefits Supplement, excluding self-employed.
Notes: All variables in 1988 real dollars.
[a]Source: Nelson imputation from NMCES and CPS.
[b]Omitted category, south.
[c]Omitted category, firm size less than 100 workers.
[d]Omitted category , service industries.
[e]Omitted category, technical occupations.
[f]Omitted category, spouse income less than $20,000.
[g]Omitted category, highest level of education, primary.
[h]Omitted category, ten or more years of tenure.

Turning to the insurance coverage variables, as expected according to the definitions of the three variables on insurance coverage, the highest proportion of workers are employed by a firm that offers coverage (83 percent) but a smaller proportion are themselves offered coverage (77 percent). Only two-thirds of all workers actually accept an offer. However, the interesting feature of Table 3 is that the probability of firm offer, individual offer, and part-time status varies between the groups of workers in the ways that are consistent with the hypotheses identified above. High-wage workers are far less likely to work part-time, and far more likely to work for firms that offer health insurance benefits, and are much more likely to have an individual offer. High-wage workers are more than twice as likely as low-wage workers to have an insurance offer. Low-wage workers reported an average premium cost for the employer share of health insurance nearly $200 (or nearly 12 percent) higher for their firms compared to the value reported by high-wage workers. This could reflect the likelihood that low-wage workers have lower overall health, tend to work for firms in which the employees face greater risks, or work for smaller firms that face higher risk premiums and/or administrative charges. For example, low-wage workers are more likely to work for smaller firms. Unfortunately, from the perspective of wishing to achieve greater health insurance coverage, the final variable in the table shows that not only are the low-wage workers less likely to be offered coverage in their own employment but they are also less likely to have a spouse who has health insurance coverage.

Low-wage workers are *far* more likely—more than four times as likely—to be employed part-time than are high-wage workers; nearly 50 percent of the low-wage workers in our sample work part-time. This compares to the overall weighted proportion of about 16 percent. Low-wage workers differ in other ways from the average or the high-wage worker in our sample. They are somewhat younger than the high-wage workers (33.6 compared to 38.3 years on average), more likely to be female (nearly two-thirds compared to just under half), less likely to work for the largest-size firms, much more likely to be employed in a trade or in the service industry, less likely to work for the government sector, and less likely to have any education

beyond high school. They are somewhat more likely to live in the industrial Midwest than in the Northeast or West. They are not more likely to have young children than higher-wage workers.

The variable means and standard deviations for the sample years 1988 and 1993 are presented in Appendix 3 (see Appendix Table 3.1). The probability of firm offer, individual offer, and coverage has declined over time, and the imputed premium cost to the employer has grown in real terms over this period. In addition, these results show an increasing trend toward more part-time work over this six-year period. They also show the increasing share of workers who are in the low-wage sample rather than the high-wage sample (12.5 to 18.3). This is consistent with the hypothesis that the increasing cost of health insurance has led to a decline in full-time options for low-skilled workers.

Table 4 provides a more detailed exploration of the tie between worker characteristics and whether or not the firm for which they work offers coverage. We interpret it here as the demand side of the labor market.[10] The results show a very different pattern of distribution of part time and low wage by the two types of firms: firms that offer coverage and those that do not. Those who work for firms that offer coverage are more than twice as likely to be full-time, high-wage workers than those who work for firms that do not offer coverage (compare 82 to 42 percent). On the other hand, less than 5 percent of workers in firms that offer insurance are low-wage part-time workers compared to more than 21 percent in firms which do not offer coverage. Firms that offer coverage also have a far smaller proportion of workers who work full-time but are low-wage workers (6 versus 21 percent). Combining the low-wage groups, we find that more than 40 percent of the workforce of firms that do not offer coverage is made up of low-wage workers, as compared to only slightly more than 10 percent of the workforce of firms that offer insurance. Again, this likely reflects the inability of firms to pass the cost of the health insurance

[10]We discuss this table as though the data were collected by firms, which makes the implicit or underlying assumption that the sample of workers is also representative of workers within all firms.

TABLE 4
Weighted Probabilities of Characteristics, Conditional on FOFFER

Pr(X | FOFFER)	No Firm Offer	Firm Offer
PARTTIME, LOWWAGE	21.49	4.04
PARTTIME, HIGHWAGE	15.46	7.86
FULLTIME, LOWWAGE	20.81	6.17
FULLTIME, HIGHWAGE	42.24	81.94
PARTTIME, Wage<$6	28.34	6.60
PARTTIME, Wage≥$6	8.61	5.29
FULLTIME, Wage<$6	33.09	16.24
FULLTIME, Wage≥$6	29.95	71.86
Tenure <1 Year	31.53	14.27
1–4 Years of Tenure	44.26	34.14
5–9 Years of Tenure	13.57	19.63
10+ Years of Tenure	10.65	31.96
Less Than High School	8.65	2.73
High School	58.45	45.47
Some College	32.89	51.80
INDALLOT	53.63	44.11
INDFIN	3.87	7.53
INDMAN	8.65	22.45
INDTRANS	3.35	8.62
INDTRADE	30.50	17.29
OCCTECH	43.46	39.86
OCCOPER	22.28	22.91
OCCPROF	12.10	27.20
OCCSERV	22.16	10.04

Source: Authors' calculations from 1988 and 1993 CPS, Employee Benefits Supplement.

premium fully to these workers. The remaining cells are also consistent with expectations. They suggest that firms which offer coverage may well "discriminate against" low-wage workers; they hire a limited number and of these, hire few to work full-time, which would make them eligible for the health insurance benefit.[11]

Tables 5 and 6 explore the tie between health insurance coverage and work characteristics. On average, workers with health insurance, both full- and part-time, work more hours. In general, covered workers also have higher average wages and the wages of full-time workers are higher than those of part-time workers. As expected, the imputed employer premium is higher for those workers who do not accept coverage than it is for those who do. All of these findings are consistent with the predictions of our model.

Perhaps even more striking is the difference in probability of offer and coverage by low and high wage and part-time/full-time status, shown in the top section of Table 6. Less than half of low-wage/part-time workers work for a firm that offers health insurance benefits to anyone in the firm, compared to 91 percent of high-wage/full-time workers. The difference in the probability of individual offer is even more striking since only a quarter of part-time/low-wage workers have an offer of health insurance benefits through their employer, compared to 88 percent of full-time/high-wage workers, and roughly a half of full-time/low-wage workers and part-time/high-wage workers. While these results show that firms are much less likely to offer part-time workers benefits, it might also reflect the short job tenures of low-wage and part-time workers, since workers with short job tenures are often denied coverage for a specified period (rarely exceeding one year). To isolate these effects, the bottom panel of Table 6 presents these values for workers who are employed by a firm that offers coverage to at least some of its employees and who have a job tenure of more than one year. The results indicate that even part-time

[11]Our evidence is not at all based on firm intent; rather we observe that they simply act in a way consistent with discrimination.

TABLE 5
Variable Means (S.D.), by Full- and Part-Time Status and Health Insurance Coverage

	PARTTIME, ACCEPT=0		PARTTIME, ACCEPT=1		FULLTIME, ACCEPT=0		FULLTIME, ACCEPT=1	
AHRSWK	27.14	(15.29)	31.18	(13.34)	37.48	(14.14)	39.63	(12.22)
WAGE1	5.84	(4.44)	8.68	(6.58)	7.71	(6.23)	11.56	(8.08)
RHICOST	2173	(659)	1862	(761)	2159	(667)	1877	(807)
N	4,541		1,221		7,271		22,349	

Source: Authors' calculations from 1988 and 1993 CPS, Employee Benefits Supplements.

TABLE 6
Probability of Offer, Conditional on Part-Time/Wage Status

Offer	PARTTIME LOWWAGE	PARTTIME HIGHWAGE	FULLTIME LOWWAGE	FULLTIME HIGHWAGE
FOFFER	49.15	71.62	59.92	90.66
IOFFER	24.62	51.93	49.71	88.37
ACCEPT	8.16	30.83	34.14	79.92
% of Sample	6.96	9.42	8.39	75.23
Workers with Firm Offer, Job Tenure over One Year Only				
IOFFER	54.32	76.14	92.04	98.81
% of Subsample	2.87	7.75	4.65	84.73

workers with tenures exceeding one year are less likely to be offered insurance, with only slightly more than half of the part-time low-wage workers offered coverage compared to more than three-quarters of the part-time workers who are high wage. However, nearly all of the low-wage full-time workers are offered coverage, as would be required by the nondiscrimination laws. However, there is one other notable factor: only 7.5 percent of the workforce of these firms is made up of low-wage workers—less than half of the overall proportion of low-wage workers.

These sample descriptive statistics clearly suggest that firms are acting to minimize their cost of health insurance coverage. The outcome of this is that low-skilled workers face very limited opportunities to work for firms that offer health insurance benefits. This could also be viewed as firms taking advantage of the loopholes in the nondiscrimination law. However, simple descriptive statistics do not provide evidence of causality. For example, it might be that all of these worker characteristics are correlated with skill level and firm characteristics which affect both the probability of part-time work and the probability of health insurance offer. To address these possibilities, a more complete multivariate analysis designed to provide a better test of our model follows.

VII. ECONOMETRIC RESULTS

Table 7 presents the core bivariate probit regression results for the model with two dependent variables: part-time and working for a firm that offers health insurance. The estimates are presented for the entire sample and separately for low-wage and high-wage workers. The separation is based on our calculation of whether or not the firm can pass on the cost of health insurance to the worker if they were to work full-time. For each subsample, the models are estimated with and without a variable measuring the predicted wage; the results change in minor ways between the two models, and, as one would expect, become slightly less precise with the addition of the predicted wage.

TABLE 7
Bivariate Probit Estimation Results, Dependent Variable = PARTTIME, FOFFER

	Full Sample				HIGHWAGE Sample				LOWWAGE Sample			
Variable	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
PARTTIME Equation												
Constant	.44	(.12)*	.32	(.13)*	-.14	(.15)	-.20	(.16)	.51	(.22)*	.37	(.29)*
CLASGOV	.010	(.028)	.029	(.029)	-.095	(.032)*	-.081	(.033)*	.44	(.071)*	.46	(.073)*
AGE	-13.27	(.51)*	-14.11	(.65)*	-10.91	(.64)*	-11.56	(.81)*	-12.64	(1.00)*	-13.37	(1.40)*
AGE2	17.20	(.65)*	18.09	(.77)*	14.39	(.79)*	15.09	(.95)*	17.00	(1.29)*	17.79	(1.67)*
FIRMMED	-.20	(.027)*	-.20	(.027)*	-.16	(.032)*	-.17	(.032)*	-.21	(.061)*	-.21	(.061)*
FIRM1000	-.15	(.023)*	-.17	(.024)*	-.14	(.027)*	-.16	(.029)*	-.039	(.046)	-.055	(.051)*
INDFIN	.15	(.050)*	.14	(.050)*	.11	(.056)*	.10	(.056)	.57	(.12)*	.56	(.13)*
INDALLOT	.57	(.034)*	.57	(.034)*	.54	(.040)*	.54	(.040)*	.69	(.074)*	.69	(.074)*
INDTRADE	.69	(.036)*	.72	(.040)*	.50	(.044)*	.52	(.048)*	.79	(.074)*	.82	(.085)*
INDTRANS	.48	(.049)*	.45	(.051)*	.47	(.054)*	.45	(.056)*	.56	(.14)*	.53	(.14)*
MALE	-.20	(.031)*	-.27	(.043)*	-.15	(.039)*	-.21	(.056)*	-.12	(.054)*	-.18	(.092)*
OCCOPER	.087	(.030)*	.11	(.031)*	.048	(.036)*	.063	(.038)*	.13	(.059)*	.14	(.062)*
OCCPROF	-.23	(.027)*	-.31	(.044)*	-.19	(.031)*	-.24	(.051)*	-.22	(.075)*	-.28	(.11)*
OCCSERV	.35	(.027)*	.38	(.032)*	.33	(.037)*	.36	(.043)*	.097	(.045)*	.13	(.063)*
EDUCHS	-.16	(.050)*	-.21	(.053)*	-.13	(.068)*	-.16	(.073)*	-.017	(.079)	-.051	(.092)
EDUCCOLL	-.092	(.052)	-.18	(.066)*	-.057	(.070)	-.12	(.088)	.24	(.085)*	.17	(.13)
NONWHITE	-.11	(.028)*	-.083	(.031)*	-.15	(.035)*	-.13	(.038)*	-.14	(.053)*	-.13	(.059)*
UNION	-.18	(.029)*	-.21	(.033)*	-.10	(.031)*	-.13	(.036)*	-.014	(.096)	-.038	(.10)
MARRIED	-.54	(.037)*	-.57	(.039)*	-.47	(.044)*	-.49	(.047)*	-.53	(.086)*	-.55	(.090)*
FMARR	.67	(.045)*	.68	(.045)*	.67	(.054)*	.68	(.054)*	.55	(.097)*	.56	(.098)*
TENLT1YR	.65	(.033)*	.72	(.048)*	.52	(.039)*	.58	(.058)*	.55	(.084)*	.62	(.12)*
TEN1T4	.42	(.030)*	.48	(.040)*	.35	(.033)*	.39	(.046)*	.44	(.082)*	.49	(.11)*
TEN5T9	.19	(.033)*	.22	(.037)*	.18	(.036)*	.20	(.040)*	.22	(.094)*	.25	(.10)*
URBAN	-.13	(.021)*	-.17	(.028)*	-.074	(.026)*	-.11	(.036)*	-.020	(.039)	-.053	(.060)
Y1993	.13	(.019)*	.14	(.019)*	.11	(.023)*	.12	(.023)*	-.044	(.039)	-.038	(.040)*

(table continues)

TABLE 7, continued

Variable	Full Sample Model 1		Full Sample Model 2		HIGHWAGE Sample Model 1		HIGHWAGE Sample Model 2		LOWWAGE Sample Model 1		LOWWAGE Sample Model 2	
PWAGE	—		.042	(.019)	—		.029	(.022)	—		.040	(.055)
SINC2030	.15	(.033)*	.15	(.033)*	.096	(.038)*	.095	(.038)*	.30	(.071)*	.30	(.071)*
SINC3040	.33	(.040)*	.33	(.040)*	.31	(.045)*	.30	(.045)*	.37	(.097)*	.36	(.097)*
SINC40P	.53	(.040)*	.52	(.040)*	.50	(.045)*	.49	(.045)*	.51	(.11)*	.50	(.11)*
HHSIZE	.11	(.0067)*	.11	(.0067)*	.11	(.0085)*	.11	(.0086)*	.083	(.012)*	.083	(.012)*
KIDLT6	-.18	(.046)*	-.18	(.046)*	-.17	(.053)*	-.16	(.053)*	-.17	(.11)	-.16	(.11)
FKIDLT6	.35	(.053)*	.35	(.053)*	.40	(.061)*	.40	(.061)*	.22	(.12)	.22	(.12)
FOFFER Equation												
Constant	.32	(.12)*	.29	(.13)*	.81	(.15)*	.74	(.16)*	.28	(.23)	.32	(.30)
CLASGOV	.58	(.036)*	.59	(.038)*	.56	(.042)*	.58	(.044)*	.67	(.078)*	.67	(.081)*
AGE	5.30	(.54)*	5.06	(.68)*	4.36	(.68)*	3.61	(.86)*	.88	(1.01)	1.07	(1.43)
AGE2	-7.18	(.68)*	-6.91	(.81)*	-6.08	(.84)*	-5.27	(1.01)*	-2.02	(1.30)	-2.22	(1.69)
FIRMMED	.89	(.030)*	.89	(.030)*	.88	(.036)*	.87	(.036)*	.89	(.062)*	.90	(.062)*
FIRM1000	1.02	(.026)*	1.01	(.029)*	1.00	(.032)*	.99	(.035)*	1.04	(.050)*	1.04	(.055)*
INDFIN	-.25	(.051)*	-.25	(.052)*	-.33	(.057)*	-.34	(.058)*	-.12	(.13)	-.12	(.13)
INDALLOT	-.70	(.033)*	-.70	(.033)*	-.69	(.038)*	-.69	(.038)*	-.75	(.076)*	-.75	(.076)*
INDTRADE	-.68	(.036)*	-.67	(.040)*	-.53	(.043)*	-.50	(.049)*	-.75	(.074)*	-.75	(.084)*
INDTRANS	-.31	(.051)*	-.32	(.053)*	-.32	(.056)*	-.34	(.058)*	-.34	(.15)*	-.33	(.15)*
MALE	-.028	(.031)	-.045	(.045)*	-.10	(.040)*	-.16	(.058)*	-.095	(.054)*	-.081	(.096)*
OCCOPER	-.092	(.028)*	-.087	(.030)*	-.098	(.033)*	-.081	(.035)*	-.070	(.060)	-.073	(.063)
OCCPROF	.19	(.029)*	.17	(.047)*	.17	(.033)*	.11	(.054)*	.080	(.077)	.097	(.12)
OCCSERV	-.24	(.029)*	-.23	(.035)*	-.17	(.040)*	-.14	(.046)*	-.056	(.047)	-.065	(.067)
EDUCHS	.42	(.049)*	.41	(.053)*	.31	(.062)*	.28	(.068)*	.42	(.086)*	.43	(.098)*
EDUCCOLL	.63	(.051)*	.61	(.068)*	.50	(.064)*	.42	(.086)*	.52	(.091)*	.54	(.14)*
NONWHITE	-.15	(.029)*	-.15	(.031)*	-.15	(.036)*	-.13	(.038)*	-.043	(.053)	-.048	(.059)

(table continues)

TABLE 7, continued

Variable	Full Sample				HIGHWAGE Sample				LOWWAGE Sample			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
UNION	.40	(.035)*	.39	(.038)*	.31	(.038)*	.29	(.042)*	.63	(.11)*	.64	(.11)*
MARRIED	-.12	(.038)*	-.13	(.040)*	-.16	(.045)*	-.17	(.047)*	-.060	(.082)	-.055	(.086)
FMARR	-.19	(.040)*	-.19	(.041)*	-.20	(.049)*	-.19	(.050)*	-.13	(.087)	-.13	(.088)
TENLT1YR	-.68	(.035)*	-.66	(.052)*	-.65	(.040)*	-.59	(.061)*	-.34	(.087)*	-.36	(.12)*
TEN1T4	-.48	(.032)*	-.46	(.043)*	-.45	(.036)*	-.40	(.050)*	-.32	(.085)*	-.33	(.11)*
TEN5T9	-.22	(.036)*	-.21	(.039)*	-.23	(.040)*	-.21	(.043)*	-.13	(.099)*	-.14	(.11)
URBAN	.22	(.022)*	.21	(.029)*	.18	(.026)*	.15	(.037)*	.089	(.042)*	.098	(.063)
Y1993	-.010	(.021)	-.0075	(.021)	.013	(.024)	.020	(.025)	.040	(.045)	.038	(.047)
PWAGE	—		.011	(.021)	—		.033	(.024)	—		-.011	(.059)
SPINS	.29	(.030)*	.29	(.031)*	.23	(.036)*	.23	(.036)*	.33	(.063)*	.33	(.063)*
RHICOST	-2.09	(.15)*	-2.11	(.15)*	-2.09	(.17)*	-2.13	(.17)*	-.77	(.38)*	-.76	(.38)*
ρ	-.32	(.013)*	-.32	(.013)*	-.32	(.017)*	-.32	(.017)*	-.20	(.025)*	-.20	(.025)*
Log-likelihood	-21,794		-21,791		-15,132		-15,130		-5,932		-5,932	
N	33,541		33,541		28,7476		28,7476		5,065		5,065	

Source: Authors' calculations from 1988 and 1993 CPS, Employee Benefits Supplements.
*Statistically significant at the 5% level.

The primary purpose of these estimates is to measure the limit on opportunities due to the cost of insurance and the requirement of nondiscrimination rules. Thus the estimation models need to (and do) control for a wide variety of other factors that might lead workers to choose to work part time (presence of young children), or to work for a firm that does not offer coverage (spouse has coverage). The control variables used here include background sociodemographic characteristics, several variables measuring the income of one's spouse for those with a spouse, and a variety of measures describing the worker's job. Also included in the FOFFER equation is the expected cost to the firm of offering coverage and whether or not one's spouse has health coverage through his or her own place of employment. The model is identified by the inclusion of presence of young children and the interaction with sex, household size, and spouse income, which are included only in the part-time equation, and by the inclusion of the cost of health insurance to the firm and whether or not one's spouse has employer-based coverage in the offer equation. The resulting coefficients on these control variables are consistent with expected relationships based on existing literature.

The results seem to support the central hypotheses identified above. In particular, workers who are more likely to work in firms that offer health insurance coverage are less likely to work part-time in these firms. This result is found by noting that the signs are reversed on several of the variables in the two equations, especially those reflecting job characteristics: firm size, industry, occupation, union coverage, job tenure, and educational status. To cite a specific example, the signs on the coefficients indicate that a worker working for a large firm is more likely to work in a firm that offers insurance coverage, but less likely to work part-time for that firm. This finding is consistent with the central hypotheses explored here because it indicates that jobs that offer insurance coverage are also less likely to be part-time jobs. Another result which supports our central hypotheses is the estimated correlation, or ρ, between the two equations, which is negative and significant in all circumstances. This result provides evidence that unmeasured worker characteristics that are associated with firm offers of insurance are also associated with lower

probabilities of part-time work, again suggesting that firms that offer insurance coverage are less likely to hire workers part-time (unless they are low-wage workers). Also consistent with our hypotheses is the finding that employees who work for firms that face higher costs in providing health insurance are less likely to work for a firm that offers coverage (as reflected in the negative and significant coefficient on the variable RHICOST).[12]

In a related set of estimates, we run the same model but substitute individual offer (IOFFER) for FOFFER as one of the two dependent variables. There are three notable differences in the estimates: (1) larger coefficients and greater significance on the cost of health insurance to the firm (in all six cases the sign remains negative);(2) the predicted wage becomes positive in the low-wage sample estimate although it remains not statistically significant; and (3) the ρ increases in size and statistical significance.[13]

In terms of the control variables, the most significant finding is that persons with very low levels of education (less than high school) are both more likely to work part-time with the exception of the estimates on EDUCCOLL in the part-time portion of the bivariate probit in the low-wage sample and less likely to work for a firm that offers coverage. We interpret this to mean that those with less education (generally low-skilled workers) face limited opportunities for full-time jobs that offer coverage. In the high-wage sample, persons with higher predicted wages are more likely to work for firms which offer coverage. These are the same employees for whom the tax advantage of employer-based coverage is greatest. Low-wage workers who work for the government are able to combine working part-time and working for an employer who offers health insurance.

Finally, in Table 8 we present bivariate estimates over the subsample of workers who work for firms which offer coverage to at least some of their employees and who have worked for them for at least

[12]This is also evidence that firms with a higher cost of coverage are less likely to offer coverage.

[13]These estimates are available from the authors upon request.

TABLE 8
Bivariate Probit Results, Only Workers with Job Tenure Less Than One Year and Firm Offer of Insurance Dependent Variables = IOFFER, PARTTIME

	Full Sample				HIGHWAGE Sample				LOWWAGE Sample			
Variable	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
PARTTIME Equation												
Constant	.56	(.17)*	.44	(.18)*	.051	(.20)	-.051	(.21)	.82	(.40)	1.04	(.50)
CLASGOV	-.33	(.034)	.026	(.036)	-.12	(.037)*	-.094	(.039)*	.59	(.11)*	.56	(.11)*
AGE	-13.75	(.73)*	-14.98	(.91)*	-11.52	(.83)*	-12.48	(1.05)*	-14.63*	(1.83)	-13.15	(2.50)*
AGE2	17.33	(.88)*	18.65	(1.06)*	14.80	(1.00)*	15.82	(1.21)*	19.21	(2.30)*	17.52	(2.94)*
FIRMMED	-.046	(.035)	-.056	(.035)	-.027	(.039)	-.035	(.039)	-.11	(.10)	-.10	(.10)
FIRM1000	-.032	(.030)	-.062	(.032)	-.024	(.034)	-.048	(.036)	.0030	(.076)	.037	(.086)
INDFIN	.13	(.064)*	.11	(.065)	.12	(.068)*	.11	(.069)	.47	(.22)*	.49	(.22)*
INDALLOT	.52	(.046)*	.51	(.046)*	.52	(.050)*	.52	(.050)*	.51	(.15)*	.51	(.15)*
INDTRADE	.65	(.048)*	.70	(.053)*	.52	(.054)*	.57	(.060)*	.78	(.14)*	.73	(.16)*
INDTRANS	.47	(.060)*	.42	(.063)*	.46	(.064)*	.42	(.068)*	.49	(.23)*	.54	(.24)*
MALE	-.21	(.044)*	-.32	(.062)*	-.20	(.051)*	-.29	(.073)*	-.064	(.10)	.043	(.17)
OCCOPER	.10	(.042)*	.13	(.044)*	.091	(.046)*	.12	(.049)*	.080	(.12)	.053	(.12)
OCCPROF	-.18	(.035)*	-.28	(.058)*	-.15	(.038)*	-.24	(.063)*	-.16	(.12)	-.028	(.20)
OCCSERV	.44	(.040)*	.49	(.046)*	.38	(.048)*	.43	(.056)*	.19	(.082)*	.12	(.11)
EDUCHS	-.24	(.075)*	-.30	(.080)*	-.26	(.087)*	-.31	(.093)*	-.015	(.16)	.051	(.19)
EDUCCOLL	-.14	(.078)*	-.27	(.097)*	-.18	(.089)*	-.28	(.11)*	.35	(.17)*	.49	(.25)*
NONWHITE	-.20	(.040)*	-.17	(.043)*	-.21	(.044)*	-.18	(.048)*	-.28	(.10)*	-.32	(.11)*
UNION	-.11	(.033)*	-.15	(.039)*	-.042	(.035)	-.077	(.042)	-.11	(.13)	-.068	(.14)
MARRIED	-.52	(.052)*	-.55	(.055)*	-.48	(.057)*	-.51	(.061)*	-.59	(.16)*	-.55	(.16)*
FMARR	.69	(.061)*	.71	(.062)*	.67	(.069)*	.69	(.069)*	.71	(.18)*	.70	(.18)*
TENL1T4	.35	(.035)*	.43	(.049)*	.30	(.037)*	.36	(.054)*	.44	(.12)*	.34	(.16)*
TEN5T9	.14	(.038)*	.18	(.042)*	.15	(.040)*	.18	(.045)*	.17	(.13)	.11	(.14)
URBAN	-.14	(.029)*	-.20	(.040)*	-.087	(.033)*	-.14	(.046)*	-.10	(.072)	-.037	(.11)
Y1993	.13	(.026)*	.14	(.026)*	.11	(.028)*	.12	(.029)*	.28	(.071)*	.017	(.073)

(table continues)

TABLE 8, continued

Variable	Full Sample Model 1		Full Sample Model 2		HIGHWAGE Sample Model 1		HIGHWAGE Sample Model 2		LOWWAGE Sample Model 1		LOWWAGE Sample Model 2	
PWAGE	—		.057	(.024)*	—		.045	(.027)	—		-.074	(.092)
SINC2030	.12	(.040)*	.11	(.040)*	.084	(.045)	.082	(.045)	.31	(.11)*	.31	(.11)*
SINC3040	.29	(.048)*	.29	(.048)*	.31	(.052)*	.30	(.052)*	.21	(.16)	.22	(.16)
SINC40P	.55	(.048)*	.54	(.048)*	.54	(.053)*	.54	(.053)*	.45	(.15)*	.46	(.15)*
HHSIZE	.10	(.0094)*	.10	(.0094)*	.10	(.011)*	.10	(.011)*	.059	(.022)*	.060	(.022)*
KIDLT6	-.20	(.063)*	-.20	(.063)*	-.17	(.067)*	-.17	(.067)*	-.28	(.27)	-.28	(.27)
FKIDLT6	.35	(.070)*	.35	(.070)*	.36	(.076)*	.36	(.075)*	.41	(.28)	.41	(.28)
IOFFER Equation												
Constant	.52	(.23)*	.57	(.24)*	1.21	(.29)*	1.28	(.31)*	.39	(.48)	.14	(.59)
CLASGOV	-.31	(.046)*	-.33	(.049)*	-.26	(.053)*	-.27	(.057)*	-.54	(.11)*	-.51	(.12)*
AGE	13.90	(.92)*	14.58	(1.16)*	10.78	(1.12)*	11.20	(1.40)*	14.85	(2.00)*	13.23	(2.78)*
AGE2	-16.89*	(1.16)	-17.62	(1.38)*	-13.35*	(1.39)	-13.76	(1.66)*	-18.52*	(2.58)	-16.77	(3.30)*
FIRMMED	.0026	(.046)	.0066	(.046)	.0068	(.053)	.011	(.053)	-.041	(.11)	-.048	(.11)
FIRM1000	-.041	(.039)	-.027	(.042)	-.0059	(.045)	.0072	(.049)	-.22	(.086)*	-.26	(.094)*
INDFIN	-.29	(.083)*	-.28	(.084)*	-.24	(.091)*	-.23	(.092)*	-.87	(.27)*	-.90	(.27)*
INDALLOT	-.44	(.063)*	-.44	(.063)*	-.35	(.069)*	-.35	(.069)*	-.88	(.21)*	-.89	(.21)*
INDTRADE	-.53	(.065)*	-.56	(.070)*	-.35	(.074)*	-.37	(.081)*	-.87	(.20)*	-.81	(.22)*
INDTRANS	-.28	(.085)*	-.25	(.088)*	-.17	(.093)	-.15	(.097)	-.81	(.28)*	-.86	(.29)*
MALE	.076	(.053)	.12	(.075)	.020	(.064)	.068	(.090)	-.020	(.11)	-.14	(.19)
OCCOPER	-.031	(.053)	-.046	(.056)	-.026	(.061)	-.040	(.064)	-.030	(.13)	.0012	(.14)
OCCPROF	.23	(.046)*	.28	(.076)*	.23	(.052)*	.27	(.085)*	.065	(.13)	-.077	(.22)
OCCSERV	-.21	(.050)*	-.24	(.059)*	-.14	(.065)*	-.17	(.074)*	.027	(.092)	.10	(.13)
EDUCHS	-.090	(.12)	-.064	(.13)	-.13	(.16)	-.11	(.17)	-.27	(.23)	-.35	(.27)
EDUCCOLL	-.14	(.12)	-.080	(.14)	-.18	(.16)	-.13	(.18)	-.48	(.23)*	-.64	(.33)*
NONWHITE	.23	(.057)*	.21	(.060)*	.15	(.065)*	.13	(.069)	.53	(.13)*	.58	(.14)*

(table continues)

TABLE 8, continued

Variable	Full Sample				HIGHWAGE Sample				LOWWAGE Sample			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
UNION	.37	(.049)*	.39	(.054)*	.27	(.054)*	.29	(.059)*	.56	(.16)*	.51	(.18)*
MARRIED	.27	(.072)*	.29	(.076)*	.22	(.084)*	.23	(.089)*	.49	(.18)*	.45	(.19)*
FMARR	-.55	(.072)*	-.56	(.075)*	-.57	(.083)*	-.57	(.086)*	-.57	(.20)*	-.55	(.20)*
TEN1T4	-.75	(.053)*	-.79	(.074)*	-.74	(.060)*	-.78	(.083)*	-.67	(.15)*	-.56	(.21)*
TEN5T9	-.31	(.060)*	-.33	(.067)*	-.33	(.067)*	-.35	(.074)*	-.29	(.17)	-.23	(.19)
URBAN	.13	(.038)*	.16	(.051)*	.11	(.045)*	.14	(.060)*	-.030	(.082)	-.10	(.12)
Y1993	-.038	(.035)	-.043	(.036)	-.016	(.041)	-.021	(.042)	.021	(.087)	.037	(.089)
PWAGE	—		-.027	(.033)	—		-.024	(.037)	—		.083	(.11)
SPINS	.092	(.056)	.093	(.056)	.11	(.066)	.11	(.066)	.12	(.13)	.0087	(.14)
RHICOST	-2.62	(.26)*	-2.63	(.26)*	-2.53	(.28)*	-2.53	(.28)*	-1.93	(.76)*	)2.01	(.79)*
ρ	-.69	(.015)*	-.69	(.015)*	-.68	(.018)*	-.68	(.018)*	-.62	(.034)*	-.62	(.034)*
Log-likelihood	-9,065		-9,062		-7,113		-7,112		-1,666		-1,666	
N	24,159		24,159		22,387		22,387		1,772		1,772	

Source: Authors' calculations from 1988 and 1993 CPS, Employee Benefits Supplements.
*Statistically significant at the 5% level.

one year.[14] A comparison of Tables 7 and 8 provides a method for exploring the *direct* effects of the nondiscrimination clause on the employment patterns of workers (especially low-wage workers). This is because Table 8 limits the sample to those workers who would be affected by the nondiscrimination clause, i.e., workers who work for firms that offer coverage and workers that have long enough job tenures to qualify for coverage. The first thing worthy of note is that only 35 percent (1,772) of the low-wage workers are included in this sample, compared to nearly 80 percent of the high-wage workers. Thus nearly two-thirds of low-wage workers are either working for firms that do not offer coverage or have worked for a firm that offers coverage for less than one year. Additional evidence that firms are using the loophole to exclude part-time workers from coverage comes in the form of a more negative ρ than estimated in the FOFFER/PARTTIME probit. To illustrate this, think of an extreme example where all firms hire part-time workers, regardless of whether they offer health insurance to some or all workers, but none offer part-time workers individual coverage. In the FOFFER bivariate probit, the ρ would be equal to zero, but in the IOFFER bivariate probit, the ρ would be equal to -1. In reality, not all firms hire part-time workers, and not all firms exclude part-timers from their health insurance coverage, so the estimates of the correlations between error terms in the two cases will not be as exact. However, we do find estimates consistent with this story, since the estimates are $\rho = -.32$ in the firm offer bivariate probit and $\rho = -.69$ in the individual offer bivariate probit.

In further comparisons of Tables 7 and 8 (and of the subsamples) some central findings indicate that:

- large firms are less likely to offer coverage to low-wage employees in this sample, in which only firms that offer coverage are included.

[14]We exclude workers with tenure of less than a year from this estimation, because if they do not have an individual offer at the sample period, they may have one in the future, after a probationary work period.

- the higher the cost of health insurance to the firm, the less likely the firm is to offer individual insurance coverage, especially to low-wage workers.

This finding is found by comparing the size and statistical significance of the coefficient on the RHICOST variable in the IOFFER equation to the FOFFER equation. This again suggests that firms attempt to reduce their employment cost by avoiding coverage to low-wage workers.

The bivariate probit results allow us to examine the association of one specific variable with the probability of offer or part-time status while controlling for other factors. However, the nonlinearity of the model makes it difficult to gauge the magnitude of the effects measured because the coefficient estimates are not the marginal effects of each variable on the associated probabilities. Some variables affect both the probability of firm offer and part-time, and it is difficult to assess which effect will dominate from looking at the coefficient estimates. To assess the magnitude of measured effects, we compute the predicted joint probabilities of working part-time and working in a firm with an insurance offer using the model results.[15] Predicted probabilities are computed for each respondent in the sample. We start by assigning each respondent the actual values of their observed independent variables. Thus for this "baseline case," we simply present the joint predicted probabilities of part-time work and firm offers, compared to the actual sample statistics. The results of this exercise using the FOFFER/PARTTIME regression are reported in Table 9 with similar results employing the IOFFER/PARTTIME regression reported in Table 10.

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[15]Following Greene (1995, p. 458), the expected values of the variables *Part-time** and *Offer** are given by:

$$E(Parttime^{*}|Offer, X, HInst, \rho) = \beta_p * X_p + \frac{\rho*(2*Offer-1)*\phi[(2*Offer-1)*\beta_o X_o]}{\Phi[(2*Offer-1)*\beta_o X_o]}$$

$$E(Offer^{*}|Parttime, X, OInst, \rho) = \beta_o * X_o + \frac{\rho*(2*Parttime-1)*\phi[(2*Parttime-1)*\beta_p X_p]}{\Phi[(2*Parttime-1)*\beta_p X_p]}$$

$$where \quad \phi = standard\ normal\ pdf, \ \Phi = standard\ normal\ cdf$$

Note that these equations account for the correlation between these two decisions. In each case, if the expected value is positive, the individual is predicted to be part-time (or have a firm offer).

The strength of this simulation method lies in the ability to estimate directly the marginal effect of a change in worker characteristics on the associated probabilities. This can be accomplished by changing worker characteristics one at a time, while holding all others constant at their observed values, and recomputing the predicted probabilities. For example, the tables isolate the effects of health insurance premiums of various amounts. We highlight these results, as they are closely tied to our hypotheses, and the variation in premiums partially helps us identify our model, since we do not have data from both before and after the nondiscrimination clause.

As developed above, when health insurance premiums are high, or increase significantly, we predict this will have two possible effects on low-wage workers. First, fewer firms will offer insurance, and second, firms that do offer insurance will seek to deny low-wage workers coverage, either through hiring low-wage workers part-time or through outsourcing and hence denial of coverage (and employment) to low-wage workers.

Our results tend to confirm these predictions.[16] Table 9 shows that as health insurance premiums increase from the sample minimum premium to the sample maximum premium, the probability that a low-wage worker would work for a firm offering insurance declines from 58.0 to 35.6 percent, providing evidence in support of the first hypothesis. (The results for high-wage workers are also consistent with the hypothesis that firms will drop coverage if the cost of the benefit increases substantially, but in both simulations, a larger fraction of high-wage workers are predicted to work for a firm that offers insurance.)

[16]Recall as well that the estimated ρ in the FOFFER/PARTTIME and IOFFER/PARTTIME bivariate probits provides evidence consistent with firms taking advantage of the loophole in the nondiscrimination laws.

TABLE 9

Predicted Proportions of Workers Working Part-Time and with Firm Offers of Insurance
(Expected values based on PARTTIME/FOFFER bivariate probit regression)

	LOW WAGE WORKERS				HIGH WAGE WORKERS			
	% with firm offer				% with firm offer			
	Total	Part-Time	Full-Time	% Part-Time	Total	Part-Time	Full-Time	% Part-Time
Actual	55.2	22.3	33.0	45.4	88.7	8.0	80.8	11.1
Baseline	50.6	20.4	30.3	44.0	96.8	1.3	95.5	1.7
Real health insurance premium								
Sample minimum	58.0	24.3	33.7	45.5	99.5	2.4	97.1	2.5
Mean-one S.D.	52.1	21.1	31.1	44.6	98.6	1.8	96.8	2.1
Mean	50.8	20.3	30.5	44.1	97.2	1.4	95.9	1.8
Mean+one S.D.	49.3	19.5	29.7	43.5	94.9	1.0	93.9	1.6
Sample maximum	35.6	13.5	22.1	39.6	65.3	0.1	65.2	0.8
Education								
Less than high school	35.9	11.1	24.8	34.7	90.8	0.9	89.9	1.8
High school	50.9	16.3	34.6	37.2	96.1	0.9	95.2	1.4
College	55.2	28.0	27.2	57.1	98.2	1.6	96.6	2.0
Firm size								
< 100	28.4	8.5	19.9	43.1	97.4	1.1	96.3	1.7
Medium (100–999)	96.4	32.9	63.5	34.9	99.9	2.0	98.0	2.0
> 1,000	97.9	47.6	50.3	49.1	100.0	2.5	97.5	2.5

Source: Authors' calculations based on bivariate probit results reported in Table 7 (see text for methods).

TABLE 10

Predicted Proportions of Workers Working Part-Time and with Individual Offers of Insurance Only for Workers with Firm Offers (FOFFER=1) and Job Tenure of One Year or More (expected values based on PARTTIME/IOFFER bivariate probit regression)

	LOW WAGE WORKERS				HIGH WAGE WORKERS			
	% with firm offer				% with firm offer			
	Total	Part-Time	Full-Time	% Part-Time	Total	Part-Time	Full-Time	% Part-Time
Actual	77.6	20.5	57.1	38.0	97.0	6.4	90.6	8.3
Baseline	84.3	23.6	60.7	35.5	99.5	2.5	97.0	2.6
Real health insurance premium								
Sample minimum	96.1	37.6	58.5	41.0	100.0	3.2	96.8	3.2
Mean-1 S.D.	87.2	27.6	59.6	37.5	99.9	2.9	97.0	3.0
Mean	84.6	24.1	60.5	35.8	99.6	2.6	97.0	2.7
Mean+1 S.D.	81.4	20.7	60.7	34.2	98.8	2.1	96.7	2.4
Sample maximum	49.0	2.8	46.2	22.2	87.4	0.1	87.3	0.4
Education								
< High school	95.4	43.0	52.4	46.9	100.0	3.3	96.7	3.3
High school	89.2	34.5	54.7	43.3	99.5	2.4	97.1	2.5
College	82.9	31.4	51.5	45.8	99.5	2.6	96.9	2.7
Firm size								
< 100	81.7	20.8	60.9	37.4	99.3	2.1	97.3	2.7
Medium (100–999)	81.0	16.1	64.8	32.7	99.4	2.0	97.3	2.6
> 1,000	77.1	15.7	61.4	34.7	99.3	2.1	97.2	2.7

Source: Authors' calculations based on bivariate probit results reported in Table 8 (see text for methods).

We also have some support for the second hypothesis. Tables 9 and Table 10 both show that low-wage workers are much less likely to be working part-time for a firm that offers coverage at all (FOFFER = 1) or get an individual offer (IOFFER = 1) as health insurance premiums increase. For example, as health insurance premiums increase from the sample minimum amount to the sample maximum amount, the proportion of low-wage workers working part-time in a firm that offers insurance declines from 15.2 to 8.2 percent, all else equal.[17] But, (from Table 10), as the size of the health insurance premium increases from the sample minimum to the sample maximum, the proportion of low-wage workers working part-time *and with an individual offer of insurance* declines from 40.9 to 5.2 percent (given that the worker has a job tenure in excess of one year and works for a firm that offers insurance). Both of these findings support the proposition that firms with higher health insurance premiums seek to substitute away from low-wage workers working part-time and with insurance offers.[18]

These findings are also consistent with the expectation that higher premiums will have a greater impact on the probability of offers to low-wage workers than on the probability of offers to high-wage workers. For high-wage workers, the probability of a firm offer does not fall steeply until premiums exceed the mean premium plus one standard deviation. The likelihood of insurance offers declines more rapidly for low-wage workers.

In the analysis of the results from Table 10, the reader should be reminded that only a small subset of low-wage workers work for such firms and hence are included in this table. Nevertheless, it is important

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[17]The basis of this result is that, in our econometric specifications, premiums directly affect the probability of insurance offer, and through the probability of part-time conditional on offer. Higher premiums decrease the likelihood of a firm offer of insurance, and because ρ is negative, decrease the incentive for firms to hire lower-paid/low-skilled workers part time. Hence, we derive our result that firms are using part-time workers and excluding them from coverage from our estimates of ρ.

[18]Note also that over a smaller range (minimum cost observed to plus one standard deviation above the mean) the proportion of low-wage workers with individual offers of health insurance who are hired full time actually *increases* from 58.5 to 60.1 percent (Table 10). This may be consistent with our hypotheses, since it suggests that firms will increase hours worked for low-wage workers who have offers of coverage as premiums increase, at least within some range.

to note that as the insurance premium increases, far fewer workers are expected to be offered coverage but the impact is mostly on low-wage workers. Specifically, as the health insurance premium increases, the proportion of low-wage workers working part time without an insurance offer increases from 2.8 percent of low-wage workers to 37.6 (from the sample minimum to the sample maximum imputed premium) percent of low-wage workers. In contrast, the proportion of high-wage workers working part-time without an individual insurance offer increases only from 0.1 percent to 3.2 percent of high-wage workers as the premium increases by the same amount.

The remaining findings presented in Tables 9 and 10 present the marginal effect of other key variables that are predictive of part-time work and insurance statuses. They show the following: Workers with more education are more likely to work for a firm that offers insurance, regardless of whether they are low- or high-wage earners. Shifting workers to large firms would be expected to increase the probability that they work for a firm that offers insurance, again regardless of income level. Curiously, the proportion of part-time workers is projected to increase as education increases. This finding may reflect an anomalous result for a small group of highly educated low-wage workers. There is a U-shaped effect of firm size associated with the probability of working part-time being lowest in medium-sized firms for low-wage workers, but an increasing fraction of high-wage part-time workers with increasing firm size. In Table 10, however, there is a different pattern over firm size for low-wage workers. It appears, given that a firm offers insurance to anyone, the probability of a low-wage worker having an individual offer of insurance actually *decreases* with firm size, driven by part-time workers being excluded from coverage.

VIII. CONCLUSIONS

This paper has considered whether the growth in the standard fringe benefit package has played a significant role in the deterioration of the low-skilled labor market in the last two decades.

Empirical support is found for both of the major hypotheses—in the descriptive findings as well as in the results of multivariate analyses. In particular, low-wage workers are much less likely to work for firms that offer health insurance and much more likely to work part time than high-wage workers. Evidence is found to support the hypothesis that firms offering insurance to any of their workers substitute away from low-wage workers. Moreover, as a firm's health insurance premiums increase, it is less likely to offer coverage at all; but contingent on continuing to offer coverage, the probability that a firm will deny benefits to its part-time workers increases. In the multivariate model, we find that there is a negative correlation between the probability of a firm offer and part-time employment, and an even larger negative correlation between individual offer and part-time work, which is consistent with firms' excluding low-wage/part-time workers from coverage.

These findings suggest that the nondiscrimination law, which was written to benefit low-wage workers, may actually be contributing to some of their employment and income problems. For example, we found that when health insurance premiums rise, fewer workers are employed by firms that offer coverage, but those that do tend to deny low-wage workers coverage either through hiring such workers part-time or through hiring fewer low-wage workers (and presumably outsourcing). The combination of increased costs for providing coverage and regulation of the nondiscrimination law may have decreased opportunities, especially for low-wage workers, both in fewer full-time job opportunities and more part-time work without health insurance eligibility.

A full test of this model would require a fully simultaneous model, firm-based data, and a longer time horizon. Nevertheless, we believe the evidence presented here is rather compelling in arguing that the nondiscrimination law may be partly responsible for the significant deterioration in the employment opportunities facing low-wage (low-skilled) workers in the last two decades.

Appendix 1

Nondiscrimination Clause

The following is the relevant passage from the 1978 legislation requiring that employers offer insurance to all employees. Section 105 pertains to amounts received under accident and health plans. (Reprinted from U.S. Tax Code, Title 26, Subtitle A, Chapter 1, Subchapter B, Part III, Section 105: (h); http://www.fourmilab.ch/ustax/www/t26-A-1-B-III-105.html)

(h) Amount paid to highly compensated individuals under a discriminatory self-insured medical expense reimbursement plan

(1) In general

In the case of amounts paid to a highly compensated individual under a self-insured medical reimbursement plan which does not satisfy the requirements of paragraph (2) for a plan year, subsection (b) shall not apply to such amounts to the extent they constitute an excess reimbursement of such highly compensated individual.

(2) Prohibition of discrimination

A self-insured medical reimbursement plan satisfies the requirements of this paragraph only if

(A) the plan does not discriminate in favor of highly compensated individuals as to eligibility to participate; and

(B) the benefits provided under the plan do not discriminate in favor of participants who are highly compensated individuals.

(3) Nondiscriminatory eligibility classifications

(A) In general

A self-insured medical reimbursement plan does not satisfy the requirements of subparagraph (A) of paragraph (2) unless such plan benefits

(i) 70 percent or more of all employees, or 80 percent or more of all the employees who are eligible to benefit under the plan if 70 percent or more of all employees are eligible to benefit under the plan; or

(ii) such employees as qualify under a classification set up by the employer and found by the Secretary not to be discriminatory in favor of highly compensated individuals.

(B) Exclusion of certain employees

For purposes of subparagraph (A), there may be excluded from consideration

(i) employees who have not completed 3 years of service;

(ii) employees who have not attained age 25;

(iii) part-time or seasonal employees;

(iv) employees not included in the plan who are included in a unit of employees covered by an agreement between employee representatives and one or more employers which the Secretary finds to be a collective bargaining agreement, if accident and health benefits were the subject of good faith bargaining between such employee representatives and such employer or employers; and

(v) employees who are nonresident aliens and who receive no earned income (within the meaning of section 911(d)(2)) from the employer which constitutes income from sources within the United States (within the meaning of section 861(a)(3)).

(4) Nondiscriminatory benefits

A self-insured medical reimbursement plan does not meet the requirements of subparagraph (B) of paragraph (2) unless all benefits provided for participants who are highly compensated individuals are provided for all other participants.

(5) Highly compensated individual defined

For purposes of this subsection, the term “highly compensated individual” means an individual who is

(A) one of the 5 highest paid officers,

(B) a shareholder who owns (with the application of section 318) more than 10 percent in value of the stock of the employer, or

(C) among the highest paid 25 percent of all employees (other than employees described in paragraph (3)(B) who are not participants).

(6) Self-insured medical reimbursement plan

The term “self-insured medical reimbursement plan” means a plan of an employer to reimburse employees for expenses referred to in subsection (b) for which reimbursement is not provided under a policy of accident and health insurance.

Appendix 2

Theoretical Model

The issues discussed in the text suggest a large number of factors will affect the employer's choices to offer a fixed-cost insurance premium (that can be denied to part-time workers), demand full-time and part-time workers, and allocate high-wage and low-wage workers between categories. To explore this fully, consider the following model of employer choice.

The employer's decision to offer insurance. Firms offer health insurance to some of their employees if profits with the benefits are greater than profits without offering the benefits. Thus, they will choose a package of total compensation (wages plus benefits) that minimize costs, subject to the restriction that worker's utility levels must be kept at a level that is required to keep the firm competitive in the labor force for these workers (Dowd and Feldman 1987). Using this framework, Feldman et al. (1995) show that a firm will offer insurance if the firm's "demand" price or "reservation" price for insurance (P_d) exceeds the supply price for insurance in the market (P_s):

$$\begin{aligned} &P_d > P_s \quad \textit{given by} \\ &Z_d\ \gamma_d + v_d > Z_s\ \gamma_s + v_s \\ &v_d - v_s > Z_s\ \gamma_s - Z_d\ \gamma_d \end{aligned} \qquad \textbf{(2.1)}$$

where Z_d and Z_s are, respectively, the characteristics of the firm and insurer that determine the demand and supply prices and γ_s and γ_d are parameters to be estimated, and v_s and v_d are normally distributed error terms with mean zero and variances equal to σ_s and σ_d, respectively. The model specified in equation (2.1) can be used to specify an estimation equation for the employer's decision to offer health insurance benefits.

Choosing the mix of full-time and part-time workers. Another factor important in the model considered here is the mix of full-time and part-time workers. To consider this, consider the firm's production function for good y for the jth firm which is assumed to be:

$$F_j(N_f, H_f, N_p, H_p) \qquad \textbf{(2.2)}$$

where N_f is the number of full-time workers, H_f full-time hours, N_p the number of part-time workers, and H_p the number of part-time hours.[1] Assume that F_j is twice-differentiable in all inputs, and that the first derivatives are positive with decreasing returns to scale in all inputs. If we assume for simplicity that firms do not offer benefits to part-time workers, labor costs are represented by (2.3). Wages for full-time workers who are offered fringe benefits are lowered by a certain amount, depending on how much workers value the benefits.

$$N_f * (W_f(p*B, H_f)*H_f + p*B) + N_p * H_p * W_p$$
$$\textit{where } B = 1 \textit{ if benefit offer, } 0 \textit{ if no offer}$$
$$p = \textit{Price of benefit} \qquad \textbf{(2.3)}$$
$$\partial W(p*B, H_f)/\partial p*B < 0$$
$$\partial W(p*B, H_f)/\partial H_f > 0$$

Equation (2.3) states that the costs for full-time workers depend on p, the price of the quasi-fixed cost benefit (fixed per worker, but not fixed in that firms decide how many workers to hire), and that full-time wages depend also on the package of benefits for the worker, since workers value the benefits package and accept lower wages in return for some of the benefits.[2] Leisure is assumed to be a normal good; wages must increase in hours.

Firms are limited in their ability to pass through the costs of benefits to workers through wages, particularly for workers who are low-wage. Profits are therefore a function of number of full- and part-time workers, hours worked by each type, benefits, wages, the minimum wage, and the price of the good produced:

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[1]This discussion is drawn largely from Cutler and Madrian (1996).

[2]If better-quality workers are attracted by benefits, the predicted employment effects would be smaller, because wages would be affected in two ways: they would increase with the increased marginal product from better-quality workers, and decrease with how much workers value the benefit.

$$\pi_j = F(N_f, H_f, N_p, H_p) - N_f*(\max[W_f(B, H_f), wmin]*H_f + p*B) - N_p*H_p*W_p \quad \textbf{(2.4)}$$
$$where\ wmin = minimum\ wage$$

Firms maximize equation (2.4), with the price of the output good normalized to one. As modeled here, under the nondiscrimination clause part-time workers are excluded from receiving benefits. After the firm optimizes, let H_f* be the optimal hours demanded for full-time workers by the firm. If W_f (p*B,H_f*) is greater than wmin, firms are unconstrained in their setting of wages, hours, and number of full-time workers demanded. As p*B increases, it becomes more likely that W_f(p*B,H*) is less than the minimum wage, then firms maximize (2.4), replacing W_f(p*B,H_f) with the minimum wage. Assuming a simple functional form for the production technology and wage adjustment approximation for benefits yields:

$$\pi_j = (N_f*H_f + N_p*H_p)^{\gamma} - N_f*(\max[W_f(1 - c*p*B/H_f), wmin]*H_f + p*B) - N_p*H_p*W_p \quad \textbf{(2.5)}$$
$$where\ c = rate\ at\ which\ workers\ value\ benefit$$
$$W_f = market\ wage\ rate,\ B = 0,\ H_f = 0$$

Differentiating π_j with respect to numbers of full- and part-time workers, hours worked by full-time workers (assuming that firms set part-time hours at the maximum allowable before workers are considered full-time, H_p, and hence eligible for benefits), and the level of benefits, yields the following derived demands, if W_f(p*B,H_f*) is greater than the minimum wage, where H_f* is the optimum hours demanded of full-time workers by the firm:

$$N_f = N_f^*$$

$$H_f^* = \frac{(1 - c*W_f)*\alpha*\gamma*p*B}{\delta - W_f*\alpha}$$

$$N_p^* = \frac{\alpha*(\delta - W_f*\alpha + N_f*p*B*(W_f*c - 1))}{\delta - W_f*\alpha}$$

$$\text{where } H_p = \overline{H_p}$$
$$\alpha = \gamma*(\gamma/W_p)^{\gamma/(1-\gamma)}$$
$$\delta = (\gamma/W_p)^{1/(1-\gamma)}$$

These results show that the number of part-time workers is increasing in the price of benefits, as long as (W_f*c-1) is positive.[3]

If the minimum wage binds, the equivalent demands are as follows:

$$N_f^* = \frac{\psi^2*\gamma - wmin*\lambda - W_p*\gamma*\lambda + W_p*\theta^2*wmin}{p*B*(\psi*\gamma - W_p*\theta)}$$

$$H_f^* = \frac{p*B*\theta}{\psi*\gamma - wmin*\theta}$$

$$N_p^* = \frac{\theta*(\psi^2*\gamma^2 - wmin*\theta*\psi*\gamma - W_p\theta*\psi*\gamma - \psi^2\gamma + wmin*\lambda + W_p\gamma*\lambda)}{\overline{H_p}(\psi*\gamma - W_p\theta)(\psi*\gamma - wmin*\theta)}$$

$$\text{where } \theta = (\gamma/W_p)^{1/(1-\gamma)}$$

$$\psi = (\gamma/W_p)^{\gamma/(1-\gamma)}$$

$$\lambda = (\gamma/W_p)^{(\gamma+1)/(1-\gamma)}$$

[3]This result would be smaller in magnitude if the production function allowed the marginal product of part-time workers to be smaller than full-time workers, but the effect would remain.

From the equations above, the number of full-time workers is decreasing and the hours of full-time workers are increasing in the cost of benefits, as expected. The next step is to check whether N_p* is greater under the first, unconstrained wage pass-through model, or under the second, where the minimum wage binds firms actions.

Worker's choice. In the typical setup for the worker's choice problem, workers choose to maximize utility, derived from total compensation (TC) and leisure (L), where total compensation consists of TC = W + B, where W is wages and B is the benefits. Thus, the worker maximizes:

$$\begin{aligned} &\max\ U = U(C, L) \\ &\textit{where}\quad C = W*H + B + A \\ &\qquad\quad H = T - L \end{aligned} \tag{2.6}$$

where C is consumption, L is hours of leisure, W is the worker's wage, H hours worked, T the total hours available for work and leisure, B the value of the benefits package, and A the amount of nonlabor income available for consumption.

Workers when searching for jobs are assumed to have a finite choice set (Dickens and Lundberg 1993). As noted in equation (2.6) above, jobs have a set of characteristics, including wages, benefits, and hours. Thus people will choose the offer that yields the maximum utility or remain unemployed, if no offers yield a combination of characteristics. As described in the employer's model above, firms solve a simultaneous decision model choosing benefits, wages, hours, and the number of full-time and part-time workers it seeks, subject to the federal regulations governing benefits and wages. Given that a person chooses to be employed, a worker will choose a job from the pool of available of offers, taking into account all of the aspects of the job.

APPENDIX 3
Additional Descriptive Statistics

APPENDIX TABLE 3.1
1988 and 1993 Variable Means and Standard Deviations

	1988 Sample		1993 Sample	
Variable	Mean	(S.E.)	Mean	(S.E.)
FOFFER	.842	(.365)	.824	(.381)
IOFFER	.788	(.409)	.755	(.430)
ACCEPT	.689	(.463)	.638	(.481)
RHICOST[a]	1908	(610)	2042	(913)
PARTTIME	.153	(.360)	.178	(.383)
WAGE1	9.84	(6.12)	10.14	(11.60)
LOWWAGE	.125	(.331)	.183	(.387)
AGE	.375	(.120)	.377	(.116)
MALE	.521	(.500)	.490	(.500)
MIDWEST	.259	(.438)	.262	(.440)
NEAST	.223	(.416)	.227	(.419)
WEST[b]	.186	(.389)	.214	(.410)
FRM1000	.399	(.490)	.425	(.494)
FIRMMED[c]	.213	(.409)	.155	(.362)
INDMAN	.183	(.387)	.182	(.386)
INDFIN	.0686	(.253)	.0637	(.244)
INDTRADE	.183	(.387)	.199	(.399)
INDTRANS[d]	.0786	(.269)	.0744	(.262)
AHRSWK	39.30	(11.51)	35.18	(15.53)
OCCOPER	.268	(.443)	.182	(.386)
OCCPROF	.257	(.437)	.250	(.433)
OCCSERV[e]	.112	(.315)	.131	(.337)
SINC2030	.117	(.321)	.128	(.334)
SINC3040	.0653	(.247)	.0637	(.244)
SINC40P[f]	.0581	(.234)	.0522	(.222)
CLASGOV	.193	(.395)	.196	(.397)
HHSIZE	3.17	(1.47)	3.06	(1.45)
KIDLT6	.295	(.456)	.174	(.379)
FKIDLT6	.133	(.339)	.0831	(.276)
EDUCHS	.513	(.500)	.438	(.496)
EDUCCOLL[g]	.447	(.497)	.532	(.499)
URBAN	.721	(.449)	.727	(.445)
NONWHITE	.116	(.320)	.126	(.332)
TENLT1YR	.171	(.377)	.167	(.373)
TEN1T4	.364	(.481)	.345	(.500)

(table continues)

APPENDIX TABLE 3.1, continued

Variable	1988 Sample Mean	(S.E.)	1993 Sample Mean	(S.E.)
TEN5T9[h]	.178	(.382)	.208	(.406)
UNION	.207	(.405)	.198	(.398)
FOFFPEN	.727	(.445)	.563	(.496)
MARRIED	.662	(.473)	.615	(.487)
FMARR	.296	(.457)	.303	(.460)
SPINS	.560	(.496)	.483	(.500)
N	18,467		16,982	

Source: 1988 and 1993 CPS, Employee Benefits Supplements, excluding self-employed.
Note: All variables in 1988 real dollars.
[a]Source: Nelson imputation from NMCES and CPS.
[b]Omitted category, south.
[c]Omitted category, firm size less than 100 workers.
[d]Omitted category , service industries.
[e]Omitted category, technical occupations.
[f]Omitted category, spouse income less than $20,000.
[g]Omitted category, highest level of education, primary.
[h]Omitted category, 10 or more years of tenure.

APPENDIX TABLE 3.2
Sample Means and Standard Deviations

Variable	Full Sample Mean	Full Sample (S.E.)	LOWWAGE Workers (Hourly wage<6)		HIGHWAGE Workers (Hourly wage≥6)	
FOFFER	.803	(.398)	.622	(.485)	.889	(.314)
IOFFER	.745	(.436)	.503	(.500)	.860	(.347)
ACCEPT	.636	(.481)	.354	(.478)	.770	(.421)
RHICOST	1999	(767)	1998	(640)	2000	(820)
PARTTIME	.169	(.375)	.340	(.474)	.0872	(.282)
WAGE1	9.60	(7.47)	4.41	(.96)	12.08	(7.93)
AGE	.368	(.119)	.340	(.136)	.382	(.108)
MALE	.521	(.500)	.368	(.482)	.593	(.491)
MIDWEST	.266	(.442)	.276	(.447)	.261	(.439)
NEAST	.230	(.421)	.171	(.377)	.258	(.438)
WEST	.190	(.393)	.184	(.388)	.193	(.395)
FRM1000	.371	(.483)	.264	(.441)	.422	(.494)
FIRMMED	.172	(.377)	.139	(.346)	.188	(.391)
INDMAN	.242	(.428)	.155	(.362)	.283	(.451)
INDFIN	.0798	(.271)	.0524	(.223)	.0928	(.290)
INDTRADE	.235	(.424)	.385	(.487)	.164	(.370)
INDTRANS	.0756	(.264)	.0295	(.169)	.0976	(.297)
INDALLOTH	.367	(.482)	.378	(.485)	.362	(.481)
AHRSWK	37.16	(13.97)	33.84	(15.80)	38.72	(12.74)
OCCOPER	.261	(.439)	.222	(.416)	.279	(.449)
OCCPROF	.209	(.407)	.0795	(.271)	.271	(.444)
OCCSERV	.113	(.317)	.236	(.424)	.0546	(.227)
SINC2030	.116	(.320)	.0944	(.292)	.126	(.331)
SINC3040	.0575	(.233)	.0413	(.199)	.0652	(.247)
SINC40P	.0480	(.214)	.0283	(.166)	.0573	(.232)
Y1992	.478	(.500)	.527	(.499)	.454	(.480)
HHSIZE	3.13	(1.47)	3.26	(1.57)	3.08	(1.42)
KIDLT6	.241	(.428)	.208	(.406)	.257	(.437)
FKIDLT6	.108	(.311)	.142	(.349)	.0922	(.289)
EDUCHS	.514	(.500)	.627	(.484)	.460	(.498)
EDUCCOLL	.447	(.497)	.310	(.462)	.513	(.500)
URBAN	.734	(.442)	.640	(.480)	.779	(.415)
NONWHITE	.111	(.314)	.139	(.346)	.0981	(.298)
TENLT1YR	.169	(.375)	.373	(.484)	.132	(.338)
TEN1T4	.355	(.479)	.435	(.490)	.340	(.474)
TEN5T9	.192	(.394)	.107	(.309)	.207	(.406)

(table continues)

APPENDIX TABLE 3.2, continued

Variable	Full Sample Mean	(S.E.)	LOWWAGE Workers (Hourly wage<6)		HIGHWAGE Workers (Hourly wage≥6)	
UNION	.141	(.348)	.0519	(.222)	.183	(.387)
FOFFPEN	.602	(.490)	.411	(.492)	.693	(.461)
MARRIED	.627	(.483)	.505	(.500)	.686	(.464)
N	28,503		9,195		19,308	

Source: 1988 and 1993 CPS, Employee Benefits Supplement, private sector employees only.

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