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Do unions reduce the wage penalty experienced by obese women?

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Abstract

Unions have been shown to reduce wage inequality, thus resulting in higher wages for certain disadvantaged groups. Overweight individuals, especially women, generally receive lower wages than thinner individuals with similar socioeconomic characteristics. This paper demonstrates that union wage protection extends to overweight women in the U.S. Specifically, obese women do not experience a wage penalty when employed in jobs covered by collective bargaining.

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1. Introduction

There is a substantial amount of research documenting a wage advantage associated with union employment. For instance, Hirsch and Macpherson (2009) find a union wage differential in the U.S. of 17% from1983 to 2009. The wage advantage is experienced by males and females, as well as for both private and public-sector workers. Research also indicates unions are relatively more beneficial to workers that generally receive lower pay. For example, Peoples Jr. (1994) provides evidence that unions reduce the wage gap between black and white workers, and Kahn (2004) finds a similar union effect on the wage gap between production and office workers.

A separate line of research indicates that employee compensation is affected by body weight. For example, Averett and Korenman (1996) and Cawley (2004) conclude that overweight women are paid less than otherwise similar women of normal weight (as determined by Body Mass Index). Baum and Ford (2004) suggest that both men and women suffer a weight-related wage penalty, although the penalty is more pronounced for women.

In general, women appear relatively less interested in obtaining union employment and less likely to be employed in union jobs (Even and Macpherson, 1993; Sinclair, 1995). However, union employment may protect women from wage penalties that are either more severe for women, such as obesity, or perhaps even exclusive to women, such as the penalty for having children (i.e. Waldfogel, 1997). Even manufacturing unions have demonstrated an interest in protecting workers beyond those typically thought of as "blue-collar". For instance, Boris (2010) discusses the United Auto Workers fight to extend benefits to gay, lesbian, and bisexual members.

This study examines a question yet to be addressed in the literature: do unions protect obese females from the wage disadvantage documented in prior research? Using panel data from the Longitudinal Survey of Youth (1979), we find this is indeed the case. Specifically, obese women whose pay is covered by collective bargaining do not experience the same wage penalty received by obese women in non-unionized jobs. In fact, for our sample, there is no statistical difference between the pay of obese and non-obese women employed in jobs with pay covered by collective bargaining.

2. Methodology and Results

As the wage effects of obesity are more robust with respect to women, we omit males from the subsequent analysis. The data come from the National Longitudinal Survey of Youth 1979, and represents an (unbalanced) panel for the following years: 1990, 1992, 1994, 1996, 1998, and 2000. The choice of years is limited by the availability of required data, some of which is only collected biannually. Based on the years analyzed, the age range for the sample is between 25 and 43. The total number of women who provide full information in at least one of the analyzed years is 6143.

The models are estimated using random effects for the following two reasons. First, random effects may be more desirable when the time-dependent information is less than the cross sectional information (Hsiao, 2003). Our data contain a large cross-section of women over a six year range, with observations for many women not available in each of the six years. Second, there is little variation in the obesity status of each individual over time, thus the fixed effects estimator may not be efficient in this case (Wadud *et al*., 2010).

Table 1 provides descriptive statistics for the variables of most interest. DeBeaumont (2009) finds that the wage penalty associated with obesity varies significantly across occupations. As a result, the subsequent statistical analysis includes 6 occupational control variables and 6 industry control variables. For brevity, Table 1 omits description of the industry control variables (information for the occupational controls is provided). Minority status is included to differentiate whites from non-whites, as prior evidence suggests significant variation in the weight-related wage penalty across ethnic groups (Cawley, 2004; Averett and Korenman, 1996). Within the sample, the rate of obesity is nearly identical in union and non-union jobs at approximately 42%. Approximately 9% per cent of the observations indicated their compensation was covered by collective bargaining.

Table 1. Variable Description and Summary Statistics

		Overall		Non-Obese		Obese	
Variable	Variable Description	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
HRPAY	Hourly rate of pay in cents	1132.476	1150.017	1184.935	1198.502	1059.371	1074.624
EDUC	Years of education	13.216	2.330	13.396	2.375	12.965	2.242
EXP	Experience (Age-Education Years)	20.723	4.691	20.127	4.692	21.560	4.559
TENY	Tenure at job (years)	4.392	4.536	4.190	4.304	4.673	4.828
MAR	0/1 Indicator variable for currently married	0.568	0.495	0.594	0.491	0.531	0.499
MINO	0/1 Indicator variable for non-whites	0.470	0.499	0.392	0.488	0.578	0.494
MANG	0/1 Indicator variable for managerial and professional occupations	0.276	0.447	0.299	0.458	0.245	0.430
TECH	0/1 Indicator variable for technical occupations	0.043	0.203	0.044	0.206	0.041	0.198
ADMIN	0/1 Indicator variable for administrative support/clerical occupations	0.257	0.437	0.256	0.436	0.258	0.438
SALES	0/1 Indicator variable for sales occupations	0.094	0.292	0.102	0.302	0.084	0.277
SERVE	0/1 Indicator Variable for service occupations	0.198	0.399	0.181	0.385	0.223	0.416
OTH	0/1 Indicator variable for other occupations except professional	0.131	0.338	0.118	0.323	0.150	0.357
OBESE	0/1 Indicator variable for if BMI >=30	0.418	0.493	0.000	0.000	1.000	0.000
UNION	0/1 Indicator variable for if wages are set by collective bargaining	0.093	0.291	0.095	0.293	0.091	0.288
EAST	0/1 Indicator variable for North Eastern region	0.158	0.365	0.165	0.372	0.148	0.355
NCENT	0/1 Indicator variable for North Central region	0.231	0.422	0.241	0.428	0.218	0.413
SOUTH	0/1 Indicator variable for Southern region	0.418	0.493	0.395	0.489	0.451	0.498
WEST	0/1 Indicator variable for North Western region	0.192	0.394	0.199	0.399	0.183	0.387
SMSA	0/1 Indicator variable for metropolitan statistical area of residence	0.835	0.371	0.837	0.370	0.833	0.373
	# of observations	20,959					

Table 2 provides results for t-tests of significance between obese and non-obese individuals. The means for hourly pay, years of education, and marriage are significantly higher for non – obese individuals, while average years of experience and tenure are significantly higher for obese individuals. Specifically, we reject the null hypotheses of no difference between the mean of obese and non-obese individuals for these covariates.

Table 2 also indicates that there is no significant difference in the probability of a minority or union member being obese vis-à-vis non-obese subjects. The finding for minorities is surprising, as Kumanyika (1993) suggests obesity is skewed towards minority groups.

Given the results described in Table 2, it is possible that additional unmeasured differences between obese and none-obese women explain part or all of the pay differential between the two groups. For instance, Hammermesh and Biddle (1994) find that less attractive women have a tendency to self-select out of the labor market due to poorer job opportunities. Similar behavior could occur with obese women. However, they find that controlling for this type of selection does not change the measured wage penalty associated with beauty. Furthermore, Kromann (2015) summarizes a number of Scandinavian studies that control for self-selection, and concludes that omitted variables are not driving the correlations between BMI and weight.

Table 2. Test for Statistical Difference in Means (diff = mean (non-obese) – mean (obese) ->Ho: diff = 0)

	Ha: diff = 0	Ha: diff < 0	Ha: diff > 0
Variables	Pr(|T| > |t|)	Pr(T < t)	Pr(T > t)
HPAY	0.0628	0.9686	0.0314
EDUC	0.0000	1.0000	0.0000
EXP	0.0000	0.0000	1.0000
TENY	0.0000	0.0000	1.0000
MAR	0.0000	1.0000	0.0000
MINO	0.8339	0.4170	0.5830
UNION	0.4501	0.7750	0.2250

Table 3 present OLS and random effects (Random Effects 1) results for the following equation:

$$Lwage_{it} = Educ_{it} + Exp_{it} + Exp^2_{it} + Teny_{it} + Mar_{it} + Mino_{it} + Occu_{it} + Ind_{it} + Smsa_{it} + Reg_{it} + Obese_{it} + Union_{it} + \varepsilon_{it} \quad (1)$$

where $Lwage_{it}$ denotes the natural log of hourly wages of person i at time t, *Educ* denotes number of years of education, *Exp* is a proxy for job experience (*Age – Educ*), and *Teny* denotes years of tenure at current employer. *Mar* and *Mino* are 0/1 indicators for married and minority status, respectively. $Occu_{it}$ and Ind_{it} denote 0/1 indicator variables for the occupation and industry of respondent i at time t, respectively, and *Smsa* and *Reg* denote dummy variables for residency within a metropolitan statistical area and region of residence, respectively. *Obese* is a 0/1 indicator variable for a Body Mass Index (BMI) equal to or greater than 30, and *Union* is a 0/1 indicator variable for union status.

Table 3. OLS and General Random Effects Estimation

		Estimation Models					
Variable	Description	OLS		Random Effects 1		Random Effects 2	
EDUC	Years of education	0.092	***	0.111	***	0.111	***
		(0.003)		(0.003)		(0.003)	
EXP	Experience (Age-Education Years)	0.035	***	0.047	***	0.047	***
		(0.035)		(0.005)		(0.005)	
EXP^2	Experience Squared	-0.0003	**	-0.0003	***	-0.0003	**
		(0.0001)		(0.0001)		(0.0001)	
TENY	Tenure at job (years)	0.026	***	0.022	***	0.022	***
		(0.001)		(0.001)		(0.001)	
MAR	0/1 Indicator variable for currently married	0.013		0.000		0.000	
		(0.010)		(0.009)		(0.009)	
MINO	0/1 Indicator variable for non-whites	-0.042	***	-0.049	***	-0.050	***
		(0.012)		(0.012)		(0.012)	
TECH	0/1 Indicator variable for technical occupations	0.023		-0.003		-0.004	
		(0.024)		(0.019)		(0.019)	
ADMIN	0/1 Indicator variable for administrative support/clerical occupations	-0.180	***	-0.104	***	-0.104	***
		(0.014)		(0.011)		(0.011)	
SALES	0/1 Indicator variable for sales occupations	-0.218	***	-0.143	***	-0.143	***
		(0.021)		(0.018)		(0.018)	
SERVE	0/1 Indicator Variable for service occupations	-0.361	***	-0.231	***	-0.231	***
		(0.017)		(0.015)		(0.015)	
OTH	0/1 Indicator variable for other occupations except professional	-0.293	***	-0.146	***	-0.146	***
		(0.019)		(0.017)		(0.017)	
NCENT	0/1 Indicator variable for North Central region	-0.142	***	-0.148	***	-0.147	***
		(0.019)		(0.019)		(0.019)	
SOUTH	0/1 Indicator variable for Southern region	-0.152	***	-0.154	***	-0.154	***
		(0.018)		(0.017)		(0.017)	
WEST	0/1 Indicator variable for North Western region	-0.031		-0.040	*	-0.039	*
		(0.031)		(0.021)		(0.021)	
SMSA	0/1 Indicator variable for metropolitan statistical area of residence	0.157	***	0.095	***	0.095	***
		(0.013		(0.011)		(0.011)	
OBESE	0/1 Indicator variable for if BMI >=30	-0.060	***	-0.037	***	-0.040	***
		(0.010)		(0.009)		(0.009)	
UNION	0/1 Indicator variable for if wages are set by collective bargaining	0.036	***	0.064	***	0.051	***
		(0.036)		(0.013)		(0.017)	
*OBESE * UNION*	Interaction between union membership and obese					0.032	*
						(0.018)	
Intercept		0.456	***	-0.033	***	-0.031	
		(0.087)		(0.079)		(0.079)	
R-squared		38.67		37.06		37.07	
# of Observations		16007					

Note: The numbers in parenthesis denote robust clustered standard errors, *, **, *** denote p<0.10, P<0.05, & p <0.001 respectively. The omitted occupational category is managerial & professional workers. Six Industrial categories were included in all regressions but not shown for brevity. Obesity is defined using the conventional method of Body Mass Index greater than 30.

Table 3 also presents random effects estimation of equation (1) with the inclusion of an interactive term between *Obese* and *Union* (Random Effects 2). Consistent with prior research, all else constant, obesity decreases pay and union membership increases pay for all model specifications.

To determine if there is a statistical difference in pay for unionized obese women, we tested the hypothesis *Obese* + *Obese*Union* = 0. The test was significant at the 10% level (probability > chi2 = 0.074), supporting the proposition than unionized obese women do not experience a wage penalty.

Table 4 presents random effects estimates for each of the following groups: obese and non-union, obese and union, non-obese and non-union, and non-obese and union. In general, all of the control variables have a similar affect on wages in each group.

The four equations are used to determine the predicted wages for each group, and the corresponding wage differentials between obese and non-obese women are then calculated using the following formula:

$$\left(\frac{W_{no}-W_o}{W_o}\right) * 100 \qquad (2)$$

where W_{no} and W_o denote the predicted average wage for non-obese and obese females, respectively. Note that the calculation is conducted twice; once for union members and once for non-union members.

The predicted wages and corresponding wage differentials are provided in Table 5. For jobs not covered by collective bargaining, obese women earn approximately 6% less than otherwise similar non-obese women (women with a BMI less than 30). However, for women covered by collective bargaining, the pay of obese and non-obese female workers is nearly identical, supporting the results found in Table 3. Overall the results suggest that unions do shield obese women from the wage penalty experienced by obese women in non-union jobs. In fact, the benefits of union membership cancel out nearly all of the pay inequity typically experienced by obese females.

As noted earlier, the non-union wage differential associated with obesity could theoretically be explained by self-selection of obese women into lower paying jobs. If this is the case, our results suggest the same self-selection dynamic does not occur within union employment. Another type of self-selection could occur if obese women are aware of the possible wage protection offered by union employers and thus gravitate toward those jobs. However, as noted above, obesity is not relatively more prevalent in jobs covered by collective bargaining. In fact, within our sample, the rate of obesity in jobs covered by collective bargaining is almost identical to that found in the non-union sector. Additionally, all else constant, higher average wages in the union sector would presumably be a draw for all types of workers.

Table 4. Random Effects Estimation by Union Membership and Obese Status

		Union				Non Union			
Variable	Description	Not Obese		Obese		Not Obese		Obese	
EDUC	Years of education	0.086	***	0.087	***	0.115	***	0.109	***
		(0.013)		(0.010)		(0.005)		(0.005)	
EXP	Experience (Age-Education Years)	0.040	*	0.046		0.051	***	0.039	***
		(0.020)		(0.029)		(0.007)		(0.009)	
EXP^2	Experience Squared	-0.0003		-0.0006		-0.0004	**	-0.0002	
		(0.0005)		(0.0007)		(0.0002)		(0.0002)	
TENY	Tenure at job (years)	0.022	***	0.022	***	0.024	***	0.021	***
		(0.005)		(0.004)		(0.001)		(0.002)	
MAR	0/1 Indicator variable for currently married	0.006		-0.042		-0.009		0.027	**
		(0.36		(0.033)		(0.012)		(0.013)	
MINO	0/1 Indicator variable for non-whites	-0.054		-0.092	**	-0.052	***	-0.044	**
		(0.034)		(0.038)		(0.016)		(0.018)	
TECH	0/1 Indicator variable for technical occupations	-0.037		0.004		-0.002		0.015	
		(0.058)		(0.078)		(0.026)		(0.032)	
ADMIN	0/1 Indicator variable for administrative support/clerical occupations	-0.219	***	-0.045		-0.116	***	-0.100	***
		(0.055)		(0.047)		(0.015)		(0.018)	
SALES	0/1 Indicator variable for sales occupations	-0.277	***	0.073		-0.168	***	-0.133	***
		(0.084)		(0.080)		(0.024)		(0.028)	
SERVE	0/1 Indicator Variable for service occupations	-0.280	***	-0.124	**	-0.257	***	-0.244	***
		(0.086)		(0.053)		(0.022)		(0.023)	
OTH	0/1 Indicator variable for other occupations except professional	-0.275	***	-0.004		-0.174	***	-0.145	***
		(0.072)		(0.080)		(0.023)		(0.029)	
NCENT	0/1 Indicator variable for North Central region	-0.128	**	-0.111	*	-0.143	***	-0.147	***
		(0.060)		(0.058)		(0.025)		(0.030)	
SOUTH	0/1 Indicator variable for Southern region	-0.194	***	-0.113	**	-0.145	***	-0.153	***
		(0.055)		(0.052)		(0.023)		(0.027)	
WEST	0/1 Indicator variable for North Western region	0.007		0.023		-0.038		-0.047	
		(0.056)		(0.060)		(0.027)		(0.033)	
SMSA	0/1 Indicator variable for metropolitan statistical area of residence	0.175	***	0.124	***	0.101	*	0.093	***
		(0.047)		(0.047)		(0.015)		(0.018)	
Intercept	Intercept	0.430		0.365		-0.122		0.052	
		(0.289)		(0.353)		(0.120)		(0.122)	
R-squared		36.480		43.510		38.090		36.200	
# of groups		629.000		429.000		2955.000		2187.000	

Note: The numbers in parenthesis denote robust clustered standard errors, *, **, *** denote p<0.10, P<0.05, & p <0.001 respectively. The omitted occupational category is managerial & professional workers. Six Industrial categories were included in all regressions but not shown for brevity. Obesity is defined using the conventional method of Body Mass Index greater than 30.

Table 5. Estimated Average Hourly Wages and Wage Gap

Status	Not Obese	Obese	Wage Gap
Union	$9.27	$9.24	0.31%
Non Union	$9.21	$8.68	6.03%

3. Discussion

The results suggest that union wage protection may extend beyond groups typically thought to benefit from collective bargaining. The exact mechanism(s) responsible for the weight-related wage penalty are not clear in the literature. One explanation is that discrimination, either from employers or customers, results in lower pay for obese females (possibly related to a correlation between obesity and attractiveness). However, an alternative explanation postulates that there may be unobserved productivity differences associated with obesity. Regardless of the explanation, unions would theoretically protect obese workers in either case, as they tend to equalize wages both across and within unionized firms (Card, 2001). Interestingly, we find the pay benefits associated with union membership mostly accrue to obese women. Additionally, the benefit of union membership overwhelms the penalty for obesity, resulting in virtually no remaining weight-related wage differential within the union sector.

Of further interest is the relationship between obesity, wages, and union affiliation in other countries. Brunello and D'Hombres (2007) document an obesity-related wage penalty throughout Europe, the severity of which varies across countries. Based on the analysis provided above, some of the differences across Europe may be due to differences in wage-setting behavior and union activity.

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