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**DECOMPOSING CHANGES IN
RETAIL FOOD WAGE DISTRIBUTIONS,
1983-1998:
A SEMI-PARAMETRIC ANALYSIS**

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ABSTRACT

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What role has the growing practice of eating out rather than at home played in the evolution of wages in retail food? Between 1983 and 1998, real wages fell for nearly all types of grocery store employees, whether they were relatively well paid, poorly paid, or somewhere in the middle. This resulted in an eight and a half percent decrease in the average real wage, but unlike many other industries, there was no increase in wage inequality. The "food away from home trend" is apparently connected to the deterioration in grocery store wages for all employees except those earning somewhere in the top ten percent of wages. Without this change in consumer behavior, average real grocery store wages would have risen by seven percent rather than falling by 12 percent.

While harmful to nearly all grocery store employees, this trend has benefitted many workers in the restaurant industry, where the average real wage rose by nearly twenty five percent. Because this growth was not evenly distributed, occurring primarily in the upper part of the wage distribution, wage inequality in this segment of retail food increased. Moreover, the increase in the fast food sector during this period is associated with decreasing real wage levels, or slower wage growth, in both the grocery and restaurant industries. The labor market institutions of minimum wage laws and labor unionization are also found to be important determinants of wage trends in retail food. Part-time employment is associated with lower wage outcomes, but over the last 20 years, the frequency of part-time work in these two industries actually declines. Overall, however, labor market institutions and changing demographic characteristics still leave much of the observed changes in real wages in retail food unexplained.

The data source for this analysis is the Current Population Survey, supplemented with secondary data sources.

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Abstract

This paper analyzes changes in the structure of wage outcomes between 1983 and 1998 in retail food – the Grocery Stores industry and the Eating and Drinking Places industry. Over this time period, the average real wage in the Grocery Stores industry fell by 8.5 percent. In fact, real wages in this industry decreased for workers in all parts of the wage distribution, high, middle, and low. Consequently, wage inequality did not increase – unlike many other industries. In Eating and Drinking Places, the average real wage increased nearly 25 percent, but this reflects an upward trend in upper part of the wage distribution. Thus, wage inequality in this segment of retail food increased. At the same time, there have been significant changes in unionization, minimum wages, and consumer behavior.

Using Current Population Survey data supplemented with secondary data sources, we find that the consumer trend towards food away from home rather than food at home correlates with a deterioration in wage outcomes in the Grocery Stores industry in all but the 90th percentile. In fact, the results predict that the median real wage would have increased by 7 percent between 1983 and 1998, instead of declining by 12 percent, if the level of per capita Grocery Stores sales had remained at its higher 1983 level. Moreover, the increase in fast food is associated with decreasing real wage levels, or slower wage growth, in both Grocery Stores and Eating and Drinking Places.

The labor market institutions of minimum wage laws and labor unionization are also found to be important determinants of wage trends in retail food. Part-time employment is associated with lower wage outcomes, but over the last 20 years, the frequency of part-time work in these two industries actually declines. Overall, however, labor market institutions and changing demographic characteristics still leave much of the observed changes in real wages in retail food unexplained.

On an aggregate level, it has been well-documented that wage inequality in the United States has significantly increased since 1980 (Levy and Murnane, 1992; Gottschalk and Smeeding, 1997). Potential explanations for the observed increase in inequality include supply-side determinants such as human capital investment, immigration, cohort size, and female labor force participation; demand-side determinants such as skill-biased technological change, international trade, and a changing industrial structure; and institutional factors such as declining unionization and real minimum wage values.¹

More recent scholarship builds upon these results by analyzing specific industries and/or occupations and attempts to evaluate the various explanations for the increase in wage inequality (e.g., Brown and Campbell, 1999; Hunter, 1999; Olson et al., 1999). This paper adds to this industry-specific research by focusing on retail food – the Grocery Stores and Eating and Drinking Places industries. The analysis below indicates that in the U.S. Grocery Stores industry, real wages have declined over the last 20 years while wage inequality does not exhibit any clear trend. In the Eating and Drinking Places industry, wage inequality has increased.

To assess the relative importance of various factors changing the wage distributions with retail food, probabilities that different characteristics appear in different time periods are incorporated into kernel density estimation to construct counterfactuals wage distributions (see DiNardo, Fortin, and Lemieux, 1996). With these counterfactuals, one can analyze, for example, what the wage distribution would have

¹ See Autor, Katz, and Krueger (1998), Burtless (1995), DiNardo, Fortin, and Lemieux (1996), Gottschalk (1997), Johnson (1997), Juhn (1999), Lee (1998), and Topel (1997) and the references cited therein.

looked like in 1998 if union density or per capita fast food sales remained at the 1983 levels, and therefore assess the relative importance of various factors in explaining the observed changes in wage outcomes.

In a companion paper (Budd and McCall, 1999), we analyze the effect of changes in retailing and operating characteristics, especially grocery store size and hours and the use of scanning technology, on wage outcomes in the grocery industry. The present research complements Budd and McCall (1999) by examining a longer period of time and by analyzing different features of retail food, especially changes in the level and composition of retail food sales. In particular, the increase in fast food sales between 1983 and 1998 is associated with a deterioration in wages in both Grocery Stores and Eating and Drinking Places.

The Retail Food Industry, 1980-1998

When considering consumer expenditures on food, it is common to divide total expenditures into food at home and food away from home. In 1960, roughly 75 percent of food expenditures was for food at home; in the 1990s, the fraction is closer to 50 percent (Kinsey, 1994; Kinsey et al., 1996). Grocery stores account for a majority of food at home expenditures while restaurants, including fast food, account for a majority of away from home expenditures. Consistent with the consumer expenditure trends, Figure 1 illustrates that real sales in the grocery industry over the previous two decades has been relatively flat (an 11 percent increase between 1980 and 1998) whereas restaurant (excluding fast food) sales have increased by 46 percent and fast food sales by 60 percent.

Moreover, grocery stores in the last 20 years have become larger and are open longer (Budd and McCall, 1999; Mayo, 1993; Walsh, 1993). As a result, the modest increase in sales has not been accompanied by a similar increase in the number of establishments. In contrast, the growth in the number

of eating place establishments has kept pace with the growth of restaurant and fast food sales. As the number of eating place establishments increases and as grocery stores become larger and expand their prepared foods offerings, competition between the two sectors of retail food has intensified.²

In the aggregate, technological change has received a lot of attention. In the Grocery Stores industry, the most visible technological change is scanning technology. Scanners read Universal Product Code (UPC) symbols and automatically record the price of each item (as well as providing important information for ordering and promotions) so that the cashier does not have to manually enter the price into the cash register. According to *Progressive Grocer* (various issues), the fraction of stores using scanners tripled from under 30 percent in 1982 to over 90 percent in the mid-1990s.

In the Eating and Drinking Places industry, specialized technology in fast food continues to automate food production (Leidner, 1993). More generally, sales analysis and inventory control are increasingly being done using computer technologies (National Restaurant Association, 1999). However, it is probably safe to conclude that restaurants have not been affected by technological change to the same extent as other industries outside retail food.

To analyze wage trends in retail food against this backdrop of competition and technology, we selected individuals employed in SIC 601 (Grocery Stores) and SIC 641 (Eating and Drinking Places) from the Current Population Survey (CPS) Annual Earnings Files (the outgoing rotation groups). Note that the CPS does not distinguish between eating places and drinking places nor can we distinguish fast food from other types of restaurants. Tables 1 and 2 present annual real wage trends for the two retail food

² For additional background on the two industries, see Mayo (1993) or Mariani (1991).

industries between 1979 and 1998. Column 1 contains the average hourly real wage which in Grocery Stores declines from \$11.17 in 1979 to around \$9.00 in the early and mid-1990s before rebounding to \$9.26 in 1998. In Eating and Drinking Places, the mean wage is always significantly lower than in Grocery Stores: \$7.45 in 1979 and \$8.33 in 1998. For comparison, the real value of the minimum wage is nearly identical to the Grocery Stores 10th percentile (column 4) up to 1987 and is about 10-20 cents less than the 10th percentile after 1987.³ For Grocery Stores, each of the percentiles follows the same trend as the mean real wage: a decline with a slight rebound in 1998. In other words, the entire real wage distribution in Grocery Stores has shifted downwards since 1979. In contrast, the Eating and Drinking Places experience is more varied: the 25th and 50th percentiles fall over this time period whereas the 75th and 90th percentiles increase. In short, wage inequality has increased in Eating and Drinking Places while there is no clear trend in Grocery Stores. These trends are also reflected in the values of two summary measures of wage inequality: the standard deviation (column 2) and the Gini coefficient (column 3).

The wage trends results are presented graphically in Figure 2. The solid lines are for Grocery Stores and the dashed lines are for Eating and Drinking Places and the lines for each industry from top to bottom are for the 75th percentile, the mean, and the 25th percentile of the real wage in each industry. Note that the general trend is downwards for all three measures in the Grocery Stores industry. In contrast, the 25th percentile in Eating and Drinking Places has declined while the higher parts of the distribution show a positive trend. Figure 2 also clearly shows that wages in Eating and Drinking Places are lower than in Grocery Stores.

³ It is not uncommon to find subminimum wage observations (Card and Krueger, 1995) due to a combination of noncompliance and imperfect coverage.

For comparison, Appendix Tables 1 and 2 present the same summary statistics for Manufacturing and the rest of Retail Trade. The level of wages in Manufacturing is significantly higher than in retail food and in Retail Trade more generally. However, the Manufacturing experience is closer to that of Eating and Drinking Places than Grocery Stores in that wage inequality shows a clear increase and the lower percentiles decline while the upper percentiles increase. Also note that the two retail food industries seem to represent opposite portions of the Retail Trade wage distribution with Eating and Drinking Places wage outcomes less than the rest of Retail Trade while Grocery Stores wage outcomes are greater than the rest.

Graphically, the retail food distributions for 1983 and 1998 are presented in Figure 3 while the distributions for Manufacturing and the rest of Retail Trade are presented in Appendix Figure 1.⁴ The two dashed vertical lines represent the 1983 and 1998 values of the log real minimum wage. For Grocery Stores, in both the lower and upper tails, the 1998 distribution is to the left of the 1983 distribution. For Eating and Drinking Places, the upper tail has shifted to the right in 1998. Except for the sub-minimum hump in 1983, the lower tail has shifted to the left in 1998.⁵ The Manufacturing and Retail Trade distributions indicate the same trend as in Eating and Drinking Places: an increase in wage inequality. Note also that the Manufacturing wage distribution is more symmetrical and not anchored by the minimum wage.

⁴ These densities are calculated using kernel density estimation (equation 1 described below) with a Gaussian kernel, a bandwidth of 0.05, and 200 evaluation points. These analysis below focuses on 1983 and 1998 because union density information is not available for earlier years.

⁵ The sub-minimum hump in the 1983 distribution stems from tipped employees and disappears when waiters and bartenders are dropped from the sample. Its disappearance by 1998 is likely due to changes in reporting behavior and in public policies regarding the use of tips in minimum wage payment calculations (see Wessels, 1993). These changes are beyond the scope of our analysis. However, omitting waiters and bartenders does not change the conclusions presented.

The central focus of this paper is to analyze the two retail food wage distributions as presented in Figure 3 and try to understand the forces underlying the observed changes. One aspect of retail employment that receives a lot of attention in the popular press is part-time work. Column 9 of Tables 1 and 2 show that part-time employment in retail trade has been relatively stable over the last 20 years and has perhaps even declined. Comparing these figures with Northrup and Storholm (1967, Figure 3-2) and Carnes and Brandt (1977) implies that the rise in part-time work in retail food in fact occurred before the mid-1970s (although Hughes (1999) provides a specific counterexample). It should be noted that while column 9 defines part-time to be less than 35 hours per week, the trends are similar for average weekly hours and the fraction working less than 30 or 25 hours. While part-time work in these two industries is much higher than in Manufacturing and the rest of Retail Trade (see Appendix Tables 1 and 2), there has not been an increase in part-time employment in the 1980s and 1990s.

Two other factors receiving significant attention in the aggregate are education and unionization (e.g., Juhn, 1999; DiNardo and Lemieux, 1997). While average years of education in Manufacturing, for example, increased by more than one year between 1979 and 1998, column 10 of Tables 1 and 2 illustrates that the increase in average educational attainment in retail food has been much more modest. The economic return to education, as measured by the OLS regression coefficient in a log wage regression, has remained fairly constant in the Grocery Stores industry at around 0.035 (column 11) and has increased from around 0.02 to 0.04 in Eating and Drinking Places. In contrast, in Manufacturing the OLS returns to education in 1979 is 0.056 and in 1998 is 0.094 (see Appendix Table 1). These casual comparisons suggest that changes in educational attainment are not as important in retail food as in other industries for understanding changing wage outcomes.

The trends in unionization (columns 12-13) suggest a different, albeit preliminary, conclusion. Union density in Grocery Stores declines substantially from 33 percent down to 24 percent between 1983 and 1998. At the same time, the union wage premium, as measured by the OLS regression coefficient in a log wage regression, also decreases quite significantly. Relative to 1983, there are relatively fewer unionized employees and their wage premium is much smaller. This suggests that unionization might be an important factor in understanding changing wage outcomes in Grocery Stores. Note that in Manufacturing, union density experiences a significant decline, but the union wage premium is relatively stable. In Eating and Drinking Places, while some sectors were heavily unionized in the early post-war period (Cobble, 1991), by 1983 the fraction represented by a union was only four percent and dropped to two percent by 1998.

Since the focus of the analysis will be a comparison of 1983 and 1998, Table 3 presents additional summary statistics for the CPS Grocery Stores and Eating and Drinking Places samples for these two years.⁶ The question of interest is to what extent can the demographic changes captured in Table 3, the declining real value of the minimum wage, and the change in competition described above explain the observed changes in the retail food wage distributions between 1983 and 1998 (as presented in Tables 1 and 2 and Figures 2 and 3).

Empirical Methodology

The foundation of the empirical methodology is nonparametric kernel density estimation. More specifically, the Rosenblatt-Parzen estimate of the density function at a point x is

⁶ The state-level measures presented in Table 3 are from *Restaurant Business* (various issues) and other publications published by Bill Communications. Effective Buying Income is personal disposable income.

$$\hat{f}(x) = \frac{1}{nh} \sum_{i=1}^n K\left(\frac{x - X_i}{h}\right) \quad (1)$$

where h is the bandwidth, X_1, \dots, X_n are observations, and $K(\bullet)$ is a kernel function (see Silverman, 1986). The kernel function is simply a weighting function so that, for example, observations closer to the point of interest x are weighted more heavily than observations farther away from x . For graphical display, the density function estimate is calculated for a number of equally-spaced evaluation points x . In the analysis below, the observations of interest are individuals' log real wages and we use a Gaussian kernel function with 200 evaluation points and a bandwidth of 0.05. Note that a significant advantage of this methodology is that we can examine the entire wage distribution in contrast to standard summary measures of wage inequality such as the Gini coefficient or standard deviation.

To analyze the importance of changes in unionization, minimum wages, and other factors in causing changes in retail food industry wage distributions, we utilize the semi-parametric methodology of DiNardo, Fortin, and Lemieux (1996). The centerpiece is the construction of a counterfactual density estimate

$$\hat{f}_c(x) = \frac{1}{h} \sum_{i=1}^n \psi(z_i) K\left(\frac{x - X_i}{h}\right) \quad (2)$$

where $\psi(\bullet)$ is a re-weighting function based on individual attributes z_i . For example, to construct the counterfactual density for 1998 if characteristics remained as they were in 1983, $\psi(\bullet)$ re-weights the individual 1998 wage observations to reflect the 1983 distribution of individual characteristics.

Estimates of various functions $\psi(z_i)$ can be constructed from logit models. To decompose changes in the wage distribution between two points in time, the re-weighting is done sequentially for different factors.

The first dimension considered is the minimum wage. It is assumed that there are no spillover effects of the minimum wage to those earning more than the actual and counterfactual minimum wage, the shape of the density of wages below the minimum wage depends only on the real value of the minimum wage, and there are no employment effects of minimum wage changes.⁷ With these assumptions, the counterfactual density for 1998 wage observations if the 1983 minimum wage rate prevailed can be constructed by replacing the portion of the 1998 wage distribution that is below the 1983 minimum wage level with the analogous portion from the actual 1983 distribution (re-scaled so that the sum of the total density is one).

More specifically, the counterfactual is constructed via equation (2) using the appropriate re-weighting function $\psi(\bullet)$:

$$\psi_m(z_i) = \frac{P(t_i=98 \mid z_i, w_i < m_{83})}{P(t_i=83 \mid z_i, w_i < m_{83})} \cdot \frac{P(t_i=83)}{P(t_i=98)} \quad (3)$$

where $P(\bullet)$ denotes probability, t_i is a dating variable for observation i , and $w_i < m_{83}$ indicates that individual i 's real wage is less than the real minimum wage in 1983. To construct $\psi_m(\bullet)$, the conditional probabilities in equation (3) are generated from a logit model for all of the observations

⁷ See DiNardo, Fortin, and Lemieux (1996) for a discussion of these assumptions and evidence that they are conservative.

below the 1983 minimum wage using year as the dependent variable and various demographic attributes z_i (see Table 3) as independent variables.⁸

Second, consider the effect of declining union density. To examine the extent to which this institutional change is related to changes in the distribution of wages, it is instructive to compare the actual 1983 distribution and the 1998 distribution that would have been observed if unionization remained unchanged. In other words, we want to construct a counterfactual wage density using the 1998 wage structure with 1983 unionization rates.

In terms of equation (2), the counterfactual density can be created by using the appropriate re-weighting function $\psi(\bullet)$: for union workers, $\psi_u(\bullet) = P(\text{union in 1983} \mid z_i) / P(\text{union in 1998} \mid z_i)$ and for nonunion workers, $\psi_u(\bullet) = P(\text{nonunion in 1983} \mid z_i) / P(\text{nonunion in 1998} \mid z_i)$. These conditional probabilities are estimated by a logit model for union status using various attributes as independent variables. Note that if union density, and therefore the probability of being unionized, does not change between 1983 and 1998, then $\psi_u(\bullet)=1$. In contrast, if union density declines between 1983 and 1998, then $\psi_u(\bullet)$ re-weights 1998 unionized individuals more heavily than in the observed 1998 distribution and re-weights 1998 nonunion individuals less to simulate the 1983 ratio of unionized to nonunion individuals.

The third factor we consider in sequence after minimum wages and unionization is part-time work. As demonstrated above, part-time work is quite common in retail food and is an important feature the labor market to analyze in the context of changing wage distributions. Methodologically, the technique is the same as for union status: estimate a logit model for part-time status, calculate

⁸ Note that nonparametric kernel estimation in equation (2) is therefore being combined with a parametric logit model to generate the appropriate counterfactual weights $\psi(\bullet)$. The overall estimation method is thus semi-parametric.

values for the part-time re-weighting function $\psi_p(\bullet)$ from predicted probabilities from a logit model, and create the counterfactual for 1998.

Finally, there are a host of other attributes that may change between 1983 and 1998 and which may influence the nature of the observed wage distributions in retail food. For example, education, age, ethnicity, the occupational structure, and industry-specific operating features are changing during the time period. But again, the thought experiment is the same: what would the 1998 wage distribution look like if these underlying characteristics were as they were in 1983? To create this counterfactual density, the observations in the kernel density estimator are re-weighted:

$$\psi_A(z_i) = \frac{P(t_i=83 \mid z_i)}{P(t_i=98 \mid z_i)} \cdot \frac{P(t_i=98)}{P(t_i=83)} \quad (4)$$

For these attributes, the re-weighting values are calculated from a logit model for year (1983 or 1998) using the group of attributes as the independent variables. Thus, in this fourth step, we consider the importance of various attributes jointly as a group in contrast to the previous three cases in which the minimum wage, union status, and part-time employment were considered as individual steps.

With each of the counterfactual densities, we can then calculate various points on the wage distribution, e.g., the mean, median, or 10th percentile, and compare the counterfactual values to the actual values. However, while quite informative, none of these measures can capture changes in the entire distribution. Thus, we follow DiNardo, Fortin, and Lemieux (1996) and use the Kullback and Leibler (1951) measure of the distance between two distributions f_1 and f_2 :

$$J = \int [f_1(w) - f_2(w)] \ln \frac{f_1(w)}{f_2(w)} dw \quad (5)$$

If a counterfactual 1998 density with the actual 1983 density yields a J statistic close to zero, then the counterfactual comes close to reproducing the 1983 density.

Finally, note carefully that the construction of the counterfactual densities is sequential and that the re-weighting functions are cumulative. Thus, to construct the counterfactual wage density for union status, the minimum wage and union status re-weighting functions are both used. For the final step analyzing other attributes, $\psi_m(\bullet)$, $\psi_u(\bullet)$, $\psi_p(\bullet)$, and $\psi_A(\bullet)$ are all used. Again, interested readers are referred to DiNardo, Fortin, and Lemieux (1996) for additional details and to DiNardo and Lemieux (1997) for another example using this methodology.

Retail Food Wage Distribution Changes, 1983-1998

To analyze the change in the Grocery Stores industry wage distribution between 1983 and 1998 as illustrated in Figure 3, we want to construct a counterfactual density based on the observed 1998 wage outcomes under the assumption that the minimum wage, union density, and other factors are at their 1983 values (equation 2). The real value of the federal minimum wage declined by over 6 percent between 1983 and 1998 and the first counterfactual density constructed simulates the 1998 wage distribution without this decline (holding unionization and other attributes at their 1998 values). The upper-left graph in Figure 4 presents the actual 1998 wage distribution for Grocery Stores and the counterfactual distribution using the 1983 minimum wage. By comparing this graph with Figure 3, it is evident that the counterfactual re-

weighting essentially replaces the actual 1998 distribution with the 1983 distribution below the 1983 minimum wage, but the 1998 distribution above the 1983 minimum wage is unaffected.

The significance of the minimum wage is also reflected in Table 4. In Table 4, the actual values for each measure of interest, such as the average or median log real wage, are presented in columns 1 and 2 for 1983 and 1998. Column 3 reports the counterfactual value which would have resulted, based on our estimates, if the minimum wage had remained at its 1983 level. The number in parenthesis is the difference between the counterfactual value and the actual 1983 value expressed as a percentage.

First, consider the first row which presents the mean log real wage. The actual mean in 1983 is 2.198 and in 1998 is 2.103. If the change in the minimum wage explains much of this decrease in the average wage, then the average of the counterfactual density should be close to the 1983 actual mean. However, the counterfactual mean log real wage is 2.105 (column 3) which implies that the average wage in 1998 would be quite similar to the 1998 observed mean if the real value of the minimum wage remained at its 1983 level. In other words, the minimum wage decline only explains 2.11 percent of the actual mean wage decline in the Grocery Stores industry.

The counterfactual estimates can also be interpreted similar to traditional Oaxaca decompositions. Traditional decompositions answer questions such as “what would the average wage have been in 1998 using the 1983 characteristics?” The counterfactual density generalizes this idea to the entire wage distribution. To wit, the actual mean decline between 1983 and 1998 is $2.198 - 2.103 = 0.095$. Using 1983 minimum wage characteristics (weights) and 1998 returns (wages), the decline is estimated to be $2.105 - 2.103 = 0.002$. So the minimum wage change only explains 2.11 percent of the actual change.

However, changing the minimum wage back to its 1983 value explains over 90 percent of the decrease in the 10th percentile. There is no explanatory power of the minimum wage change for other points of the wage distribution. As an indicator of the overall discrepancy between the actual 1983 density and the 1998 counterfactual, note that the Kullback and Leibler (1951) measure of the distance between two distributions falls from 0.208 for the 1983 and 1998 actual distributions to 0.147 when comparing the actual 1983 and counterfactual 1998 distributions. Thus, the minimum wage counterfactual accounts for 29 percent of the total difference between the 1983 and 1998 wage distributions. In sum, these results imply that the minimum wage is a significant factor in the change in the Grocery Stores wage distribution between 1983 and 1998 and while the explanatory power is confined to the lower part of the distribution, this is an important fraction of the entire structure.

Panel B of Table 4 indicates that this conclusion is similar for Eating and Drinking Places. For comparison, the analogous decompositions for Manufacturing and the rest of Retail Trade are reported in Appendix Table 4. The results for Retail Trade (excluding the two specific industries of interest) are similar to the retail food results, but the Manufacturing experience is quite different. More concretely, the minimum wage has minimal explanatory power for the changing wage structure in Manufacturing.

Next, consider the hypothetical situation in which the 1998 wage structure is combined with the 1983 minimum wage and the 1983 union density. The smoothed kernel density estimate of this counterfactual is presented in the upper-right graph of Figure 4 and the numerical measures are presented in column 4 of Table 4.⁹ The graphical differences are slight, however the numerical results are useful. For

⁹ In the figures, “before” indicates the counterfactual density before accounting for the relevant factor and “after” denotes the counterfactual density including the relevant factor.

example, correcting for the decline in union density increases the average wage to 2.122 and accounts for 18 percent of the decline in the average real wage. The change in unionization is also a very significant factor in explaining the change in the 25th percentile and the median real wage and explains a portion of the decrease in the 75th and 90th percentiles. According to the Kullback-Leibler statistic, the union density change explains almost 10 percent of the overall difference between the 1983 and 1998 wage distributions.

For Eating and Drinking Places, the results in column 4 imply that above the 10th percentile, if union density had remained at its 1983 level, the wage distribution values would have increased even more than they actually did. However, the magnitudes of these effects are quite small which is unsurprising given the very low level of union coverage in this industry reported in Table 2. In fact, it is best to consider these estimates statistically insignificant. Using a bootstrap procedure with 1,000 replications, the standard errors of these percentile estimates are about 0.018 and many of the column 5 point estimates are not more than two standard deviations different than the column 4 point estimates.

Since Grocery Stores is, by a large margin, the most heavily unionized industry in Retail Trade, it is also unsurprising that the unionization results for the remainder of Retail Trade (Appendix Table 4) are similar to those for Eating and Drinking Places. In Manufacturing, the decline in union density explains much of the decline in the median wage, but is less important in the tails of the distribution.

Recall from Tables 1-3 that the frequency of part-time employment in retail food declines between 1983 and 1998. Comparing columns 4 and 5 of Table 4, if part-time employment had remained at its higher 1983 level, wages in 1998 would be lower than they actually were. Again, note that this result is consistent with popular views equating part-time work with bad jobs, but that in retail food the trend in the 1980s and 1990s has been away from part-time work and this trend is associated with an increase in wage

outcomes. In general, however, the explanatory power is small, but the part-time addition does explain 8 percent of the Eating and Drinking Places median. Moreover, accounting for the change in the minimum wage, union density, and part-time employment yields a counterfactual log real wage of 1.774 for the Grocery Stores 25th percentile which is the actual value for 1983. Part-time is omitted from the graphical presentation in Figure 4 because no changes are visible.

Lastly, consider the final step of the re-weighting procedure which is to re-weight on the basis of observed demographic, occupational, and geographical attributes. More specifically, “other attributes” includes the variables in Table 3, except the state-level measures, plus age squared and region effects. The results are presented in column 6 of Table 4 and in Figure 4. For Grocery Stores, the addition of these attributes to the counterfactual causes the distribution to move in the “wrong direction” – i.e., the counterfactual distribution moves farther away from the actual 1983 distribution rather than closer to it. The Kullback-Leibler statistic increases slightly and each percentile is predicted to decrease further rather than increasing towards the higher, actual 1983 percentiles. These results imply that the increase in average education, age, frequency of supervisors, and the like between 1983 and 1998 prevented real wages, across the entire distribution, from declining even more than they are observed to have fallen.¹⁰

In Eating and Drinking Places, the changing demographics explain about 15 percent of the changed wage distribution. The Manufacturing results are similar to those for Grocery Stores. For example, the actual 25th percentile in 1983 is 2.179 and the other attributes counterfactual is 2.101 which is significantly

¹⁰ While this estimation strategy is order-specific, the results do not appear to be driven by the ordering of the steps. For example, omitting the minimum wage step and reversing the order of the union density and part-time counterfactuals do not change the results.

below the 1983 actual value. If demographics had stayed at their 1983 levels, these results imply that wages would have fallen across the board. For Retail Trade, the final counterfactuals are closer to the 1983 values than in the other three industries. In fact, accounting for all of the factors explains more than 75 percent of the 1983 to 1998 changes. In the other industries, however, other factors not captured in the Table 4 analyses are important.

Demographic Subgroups

To further dissect the changes in wage outcomes in Grocery Stores and Eating and Drinking Places in the 1980s and 1990s, we repeat the semi-parametric decompositions for men and women separately and for three educational attainment classes. Tables 5 and 6 present the results by gender. Figure 6 presents the graphical results; note that the intermediate steps are omitted in the graphical presentation to conserve space, but the steps of the analyses are identical to those in the previous section.

First, note that the various points of the wage distributions in both industries for both years for women are always below the analogous value for men. In other words, across the entire distribution, men have higher wages than women (compare Panel A with Panel B). Note that this does not account for any differences in characteristics and is unsurprising. However, as illustrated in Figure 6, the minimum wage anchors each of the distributions so the male-female wage gap is smaller in the lower portion of the distribution. Second, with the exception of the 90th percentile of the Grocery Stores wage distribution, the male-female gap is smaller in 1998 than in 1983.

Turning to the decompositions, there is not a pattern of systematic differences between men and women within each of the industries. As with the decompositions in Table 4, the single most important factor is the minimum wage. Unionization is more important in Grocery Stores than in Eating and Drinking

Places. And the factors listed in Table 3 do not totally explain the observed changes between 1983 and 1998 even after considering men and women separately.

Tables 7 and 8 present the results for three education groups: those with less than 12 years of completed education (dropouts), those with exactly 12 years (high school graduates), and those with more than 12 years of education (attended college). The graphs in Figure 7 just present the first and third categories since they have the sharpest contrast. As one would expect, the attended college wage distribution lies to the right of the high school graduates distribution which in turn lies to the right of the dropouts distribution. Moreover, the gap between dropouts and graduates is larger at most points than the gap between high school graduates and those that attended college. The wage differences between educational groups also widen in both industries, consistent with aggregate trends.

In the decompositions, the minimum wage's greatest explanatory power is for high school dropouts. Unionization, however, is more important for those who completed high school or attended college compared to high school dropouts. With the exception of high school dropouts in the Grocery Stores industry, the final models still leave a majority of the observed wage change unexplained.

Retail Food Competition

As described above and shown in Figure 1, consumer behavior in retail food has changed over the last twenty years with the two industries increasingly in competition with each other and with the relative increase in fast food sales. The preceding analysis documents the relationships between wage outcomes, labor market institutions, and demographics, but it also important to investigate the effect of these market changes.

Various issues of *Restaurant Business* report annual per capita sales for Food Stores, Eating and Drinking Places, Restaurants, and Fast Food for each state. Restaurants and Fast Food sales are the major components of Eating and Drinking Places sales, but the latter also includes bars, caterers, concession stands, and other miscellaneous establishments. Note that for the factors previously analyzed, we could create counterfactual densities based on each individual's characteristics (for example, whether or not the individual worked part-time). For the *Restaurant Business* measures, each piece of information is for a specific state for a given year. These measures are merged to the CPS data by state and year so each individual is assigned the value for their state. The means for the specific measures utilized are presented in Table 3.

Table 9 reports the results of repeating the above semi-parametric analyses including each state-level measure in the other attributes category (which still includes the variables from Table 3).¹¹ Columns 1-3 repeat some of the results from Table 4 to facilitate interpretation and comparison. Columns 4-7 should each be compared with column 3 to gauge the effect of including each market indicator.

First, note the state effective buying income, or personal disposable income, does not significantly affect the distribution of wage outcomes in retail food. The relative prosperity of a state does not appear to influence retail food wage outcomes. Next, consider per capita food stores sales – a measure of spending in Grocery Stores. On a per capita basis, average food stores sales fell by approximately 18 percent between 1983 and 1998 (see Table 3). Comparing columns 3 and 5 of Table 9 indicates that if food stores sales had remained at their (higher) 1983 level, wage levels in Grocery Stores would have been

¹¹ The companion paper, Budd and McCall (1999), undertakes a similar strategy to investigate the importance of operational measures such as grocery store size and hours.

higher, albeit by only 2-7 percent. Moreover, if food store sales had remained at their 1983 levels, wages in the competitor industry, Eating and Drinking Places, would have fallen (by about the same magnitude).

On the other side of the table, Eating and Drinking Places sales, on a per capita basis and in real terms, increased by about 20 percent in this period. Comparing column 6 of Table 9 to column 3 reveals that if this industry's sales had remained at their lower 1983 level, real wage outcomes in both Grocery Stores and Eating and Drinking Places would have been higher. The pattern of results for fast food sales (column 7) echoes this same conclusion. On average across states, per capita fast food sales grew over 20 percent in real terms between 1983 and 1998. If this growth had not occurred, the Grocery Stores counterfactual implies that real wages in Grocery Stores would have been higher. The Eating and Drinking Places counterfactual also implies that wage outcomes in Eating and Drinking Places would have been higher.

In sum, the relative decline in Grocery Stores sales is associated with lower wages in Grocery Stores and higher wages in Eating and Drinking Places. However, the relative increase in Eating and Drinking Places and fast food sales, is associated with lower wages in both Grocery Stores and Eating and Drinking Places. The shift in consumer behavior away from Grocery Stores into Eating and Drinking Places has a clear negative effect on wages in Grocery Stores. However, this is not to say that the change in spending has been good for wages in Eating and Drinking Places.

The results here imply that the change within the Eating and Drinking Places sector has put downward pressure on wages in that industry. This may stem from a changing composition within the industry: note from Table 3 that fast food sales per capita increased much more than restaurant sales

between 1983 and 1998. While further research is warranted, the results suggest that the low wage conditions of the fast food industry are putting downward pressure on wage outcomes in retail food across the board. Actual real wage outcomes in Eating and Drinking Places have increased since 1983, but not because of the increase in Eating and Drinking Places sales.

Conclusions

While there has been much research on changing wage inequality on a broad, across-industry basis, this paper conducts a focused examination on the U.S. retail food industry between 1983 and 1998. Applying the semi-parametric methodology of DiNardo, Fortin, and Lemieux (1996) to retail food, we decompose changes in the wage distributions into four factors: the minimum wage, unionization, part-time work, and other attributes. This last factor includes demographic, occupational, and demand characteristics.

The results imply that labor market institutions are an important determinant of real wage trends in retail food. The changing real value of the minimum wage explains roughly one-third of the overall discrepancy between the 1983 and 1998 wage distributions in both the Grocery Stores and Eating and Drinking Places industries. The minimum wage also explains over 90 percent of the decline in the 10th percentile of the Grocery Stores wage distribution. The other labor market institution, labor union representation, is a significant explanatory factor of changes in the Grocery stores wage structure above the 10th percentile. The importance of unionization in Eating and Drinking Places is quite small.

Part-time work has been a frequent topic in the popular press and among some advocacy groups. Our analyses indicate that increases in part-time employment are associated with lower wage outcomes

in retail food. However, the trend in retail food over the last 20 years has been a slight *decrease* in the use of part-time employees and a corresponding (modest) increase in wage outcomes, *ceteris paribus*.

Two other trends in retail food over the last 20 years are increasing competition between the grocery and restaurant segments and a growth in fast food sales. The results above imply that the increasing competition, and in particular the greater increase in food away from home relative to food at home, correlates with a deterioration in wage outcomes in the Grocery Stores industry in all but the 90th percentile. However, the increase in fast food is associated with decreasing real wage levels in both sectors of retail food. Additional research needs to examine the changing composition of the Eating and Drinking Places industry and the implications for employment outcomes.

Much of the wage inequality literature has also focused on skill-biased technological change. By definition, skill-biased technological change increases the gap between the upper and lower portions of the wage distribution. However, the entire Grocery Stores wage distribution has shifted down. Moreover, there has not been a dramatic increase in the returns to education. In the Eating and Drinking Places industry, the most visible utilization of technology has been in fast food with the automation of food production and increases in fast food is associated with decreasing real wage outcomes. While the measures employed in our analyses still leave a fraction of the 1983 to 1998 changes in the retail food wage distributions unexplained, skill-biased technological change does not appear to be an important factor. Future research in this industry should look elsewhere for the missing explanations.

In sum, the results for 1983 to 1998 reinforce the value of employing a methodology in which the entire wage distribution is analyzed in the context of a specific industry. For example, the change in the real value of the minimum wage has significant power in explaining observed wage changes between 1983 and

1998, but only for portions of the wage distribution *below* the 25th percentile. The differences within retail food as well as between retail food and Manufacturing demonstrate that the changing wage outcomes cannot be explained by a unitary set of factors. The changing nature of competition and consumption within retail food helps in understanding retail food wage trends, but is not likely to be an important determinant of wage outcomes in other industries.

References

- Autor, David H., Lawrence F. Katz, and Alan B. Krueger (1998) "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics*, 113(4): 1169-1213.
- Bloom, Gordon F. (1972) *Productivity in the Food Industry: Problems and Potential*, Cambridge, MA: The MIT Press.
- Brown, Clair and Ben Campbell (1999) "The Evolution of Wage Structures in Semiconductor Companies," unpublished paper, University of California-Berkeley.
- Budd, John W. and Brian P. McCall (1999) "The Grocery Stores Wage Distribution: A Semi-Parametric Analysis of the Role of Retailing and Labor Market Institutions," The Retail Food Industry Center Working Paper, University of Minnesota.
- Burtless, Gary (1995) "International Trade and the Rise in Earnings Inequality," *Journal of Economic Literature*, 33(2): 800-816.
- Card, David and Alan B. Krueger (1995) *Myth and Measurement: The New Economics of the Minimum Wage*, Princeton, NJ: Princeton University Press.
- Carnes, Richard and Horst Brandt (1977) "Productivity and New Technology in Eating and Drinking Places," *Monthly Labor Review*, 100(9): 9-15.
- Cobble, Dorothy Sue (1991) *Dishing It Out: Waitresses and Their Unions in the Twentieth Century*, Urbana, IL: University of Illinois Press.
- DiNardo, John, Nicole Fortin, and Thomas Lemieux (1996) "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semi-Parametric Approach," *Econometrica*, 64(5): 1001-1044.
- DiNardo, John and Thomas Lemieux (1997) "Diverging Male Wage Inequality in the United States and Canada, 1981-1988: Do Institutions Explain the Difference?" *Industrial and Labor Relations Review*, 50(4): 629-651.
- Food Marketing Institute (various issues) *The Food Marketing Industry Speaks*, Washington, DC.
- Gottschalk, Peter (1997) "Inequality, Income Growth, and Mobility: The Basic Facts," *Journal of Economic Perspectives*, 11(2): 21-40.
- Gottschalk, Peter and Timothy Smeeding (1997) "Cross-National Comparisons of Earnings and Income Inequality," *Journal of Economic Literature*, 35(2): 633-687.

- Hughes, Katherine L. (1999) "Supermarket Employment: Good Jobs at Good Wages?" Institute on Education and the Economy Working Paper No. 11, Columbia University.
- Hunter, Larry W. (1999) "Organizational Choices and Earnings Trends in Front-Line Retail Banking Jobs," unpublished paper, University of Pennsylvania.
- Johnson, George E. (1997) "Changes in Earnings Inequality: The Role of Demand Shifts," *Journal of Economic Perspectives*, 11(2): 41-54.
- Juhn, Chinhui (1999) "Wage Inequality and Demand for Skill: Evidence from Five Decades," *Industrial and Labor Relations Review*, 52(3): 424-443.
- Kinsey, Jean (1994) "Changes in Food Consumption from Mass Market to Niche Markets," in Lyle P. Schertz and Lynn M. Daft, eds., *Food and Agricultural Markets: The Quiet Revolution*, Washington, DC: National Planning Association, pp. 19-43.
- Kinsey, Jean, Ben Senauer, Robert P. King, and Paul F. Phumpiu (1996) "Changes in Retail Food Delivery: Signals for Producers, Processors, and Distributors," The Retail Food Industry Center Working Paper 96-03, University of Minnesota.
- Kullback, S. and R. Leibler (1952) "On Information and Sufficiency," *Annals of Mathematical Statistics*, 22(1): 79-86.
- Lee, David S. (1998) "Wage Inequality in the U.S. During the 1980s: Rising Dispersion or Falling Minimum Wage?" Industrial Relations Section Working Paper 399, Princeton University.
- Leidner, Robin (1993) *Fast Food, Fast Talk: Service Work and the Routinization of Everyday Life*, Berkeley: University of California Press.
- Levy, Frank and Richard J. Murnane (1992) "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations," *Journal of Economic Literature*, 30(3): 1333-1381.
- Mariani, John (1991) *America Eats Out*, New York: William Morrow.
- Mayo, James M. (1993) *The American Grocery Store: The Business Evolution of an Architectural Space*, Westport, Conn.: Greenwood Press.
- National Restaurant Association (1999) *Restaurant Industry Forecast*, Washington, DC.
- Northrup, Herbert R. and Gordon R. Storholm (1967) *Restrictive Labor Practices in the Supermarket Industry*, Philadelphia: University of Pennsylvania Press.

- Olson, Craig A., Anne S. Miner, Susan J. Moeser, David F. Robinson, and Andreas Schwab (1999) "Technology and Wages in the Printing and Publishing Industries," unpublished paper, University of Wisconsin-Madison.
- Progressive Grocer (various issues) *Progressive Grocer Annual Report*, New York
- Restaurant Business* (various issues), New York: Bill Communications.
- Silverman, B.W. (1986) *Density Estimation for Statistics and Data Analysis*, London: Chapman and Hall.
- Topel, Robert H. (1997) "Factor Proportions and Relative Wages: The Supply-Side Determinants of Wage Inequality," *Journal of Economic Perspectives*, 11(2): 55-74.
- Walsh, John P. (1993) *Supermarkets Transformed: Understanding Organizational and Technological Innovations*, New Brunswick, NJ: Rutgers University Press.
- Wessels, Walter John (1993) "The Minimum Wage and Tipped Employees," *Journal of Labor Research*, 14(3): 213-226.

Table 1
Annual Wage and Employment Trends in Grocery Stores, 1979-98

Year	Real Wages (1998 dollars)										Fraction						
	Standard			Percentiles						Part-		Education		Unionization		Sample	Employment
	Mean	Deviation	Gini	10th	25th	50th	75th	90th	Time	Years	Return	Rate	Return	Size			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)			
1979	11.17	5.53	0.26	6.51	6.74	8.98	14.60	18.72	0.40	11.82	0.035	n/a	n/a	3,547	2,114		
1980	10.62	5.32	0.26	6.13	6.43	8.42	14.04	17.80	0.42	11.80	0.031	n/a	n/a	4,332	2,210		
1981	10.07	5.00	0.26	5.98	6.28	8.07	13.31	17.44	0.44	11.87	0.029	n/a	n/a	4,161	2,235		
1982	10.17	5.09	0.27	5.66	6.08	8.19	13.51	17.57	0.42	11.96	0.035	n/a	n/a	3,944	2,314		
1983	10.12	5.27	0.27	5.48	5.89	8.18	13.58	17.96	0.43	12.02	0.032	0.33	0.311	4,018	2,376		
1984	9.69	5.14	0.28	5.26	5.66	7.60	12.64	17.44	0.45	12.03	0.036	0.30	0.331	3,906	2,472		
1985	9.44	5.11	0.28	5.08	5.53	7.58	11.99	16.84	0.43	11.96	0.029	0.29	0.310	3,916	2,459		
1986	9.46	5.09	0.28	5.00	5.58	7.44	12.39	17.10	0.42	12.03	0.031	0.27	0.318	4,137	2,621		
1987	9.25	5.52	0.29	4.83	5.38	7.17	11.66	17.22	0.44	12.00	0.033	0.27	0.281	4,243	2,663		
1988	9.12	5.87	0.29	4.76	5.51	6.89	11.25	16.54	0.42	11.98	0.032	0.27	0.254	4,078	2,708		
1989	9.04	5.17	0.28	4.65	5.44	7.17	11.27	15.78	0.42	12.00	0.036	0.25	0.244	4,268	2,861		
1990	8.82	4.96	0.27	4.80	5.37	6.99	10.83	15.60	0.41	11.98	0.041	0.25	0.264	4,487	2,891		
1991	8.82	4.82	0.26	5.09	5.49	7.18	10.77	15.56	0.44	12.02	0.037	0.27	0.224	4,425	2,877		
1992	8.93	4.75	0.27	4.99	5.52	6.97	11.04	15.83	0.43	12.34	0.027	0.27	0.228	4,495	2,947		
1993	9.04	5.07	0.27	4.89	5.64	7.05	11.28	15.83	0.43	12.38	0.035	0.25	0.248	4,468	3,034		
1994	8.95	5.52	0.29	4.70	5.50	6.87	11.00	15.84	0.40	12.33	0.037	0.26	0.256	3,959	3,071		
1995	9.04	5.68	0.29	4.65	5.35	6.98	10.94	16.05	0.38	12.28	0.030	0.26	0.217	3,880	3,018		
1996	9.00	5.82	0.29	4.68	5.37	7.12	10.39	15.74	0.38	12.36	0.042	0.24	0.188	3,446	3,074		
1997	8.78	4.80	0.27	5.08	5.59	7.11	10.43	15.23	0.37	12.29	0.034	0.24	0.165	3,497	3,153		
1998	9.26	5.76	0.28	5.15	5.85	7.25	10.80	15.75	0.37	12.25	0.035	0.24	0.138	3,537	3,133		

Source: Current Population Survey.

Notes: Columns 1-14 are from the CPS Outgoing Rotation Groups and column 15 is from Employment and Earnings (various issues).

Columns 11 and 13 are OLS coefficients from log wage regressions controlling for union, education, age and its square, female, married, nonwhite, part-time, occupation, and region.

Table 2
Annual Wage and Employment Trends in Eating and Drinking Places, 1979-98

Year	Real Wages (1998 dollars)										Fraction					
	Standard			Gini Coeff.	Percentiles					Part-Time	Education		Unionization		Sample Size	Employment (000s)
	Mean	Deviation	10th		25th	50th	75th	90th	Years		Return	Rate	Return			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)		
1979	7.45	3.72	0.22	4.04	6.06	6.74	7.86	11.23	0.51	11.44	0.020	n/a	n/a	7,106	4,131	
1980	7.30	4.18	0.22	3.96	5.93	6.25	7.81	10.88	0.53	11.56	0.018	n/a	n/a	8,651	4,279	
1981	7.01	3.84	0.21	3.80	5.83	6.10	7.17	10.24	0.53	11.56	0.015	n/a	n/a	8,419	4,469	
1982	6.76	3.44	0.22	3.67	5.63	5.91	7.18	10.14	0.54	11.74	0.017	n/a	n/a	8,289	4,724	
1983	6.72	3.57	0.23	3.68	5.46	5.73	7.16	9.96	0.54	11.79	0.019	0.04	0.172	8,398	4,875	
1984	6.59	3.49	0.23	3.56	5.24	5.49	7.08	10.20	0.52	11.80	0.018	0.04	0.183	8,407	5,095	
1985	6.54	3.54	0.23	3.55	5.08	5.46	7.35	10.04	0.50	11.80	0.022	0.03	0.113	8,480	5,244	
1986	6.56	3.58	0.24	3.72	4.98	5.43	7.44	10.41	0.50	11.81	0.022	0.03	0.204	8,466	5,312	
1987	6.60	3.73	0.25	3.59	4.81	5.42	7.17	10.76	0.49	11.72	0.024	0.02	0.188	8,592	5,423	
1988	6.52	3.73	0.26	3.45	4.63	5.51	7.24	10.34	0.49	11.74	0.023	0.02	0.135	8,070	5,480	
1989	7.35	4.18	0.25	4.41	4.93	6.16	8.47	11.69	0.48	11.73	0.036	0.02	0.137	8,326	5,646	
1990	7.41	4.75	0.25	4.41	4.99	6.24	8.32	11.85	0.47	11.72	0.033	0.02	0.116	8,621	5,663	
1991	7.43	4.23	0.24	4.79	5.12	5.99	8.38	11.97	0.49	11.83	0.035	0.02	0.108	8,663	5,744	
1992	7.37	3.96	0.23	4.94	5.19	6.09	8.13	11.62	0.49	12.01	0.027	0.02	0.140	8,687	5,831	
1993	7.27	3.95	0.24	4.80	5.08	5.92	8.18	11.28	0.49	12.08	0.030	0.02	0.150	8,769	6,052	
1994	7.67	5.57	0.27	4.40	4.95	6.16	8.69	12.10	0.49	12.09	0.037	0.02	0.033	7,714	6,333	
1995	7.71	4.94	0.27	4.49	5.08	6.25	8.61	12.70	0.47	12.07	0.040	0.03	0.113	7,678	6,282	
1996	7.73	4.90	0.27	4.42	5.20	6.24	8.83	12.47	0.46	11.98	0.040	0.02	0.160	6,875	6,502	
1997	7.76	4.96	0.26	4.67	5.18	6.35	8.79	12.19	0.46	11.95	0.032	0.02	0.123	6,901	6,595	
1998	8.33	6.05	0.28	5.00	5.45	6.69	9.38	13.14	0.45	11.96	0.039	0.02	0.044	7,090	6,743	

Source: Current Population Survey.

Notes: Columns 1-14 are from the CPS Outgoing Rotation Groups and column 15 is from Employment and Earnings (various issues).

Columns 11 and 13 are OLS coefficients from log wage regressions controlling for union, education, age and its square, female, married, nonwhite, part-time, occupation, and region.

Table 3
Retail Food Industry Employees, 1983 and 1998:
Means and Standard Deviations

Variable	Grocery Stores		Eating and Drinking Places	
	1983	1998	1983	1998
Log Real Wage (1998 dollars)	2.198 (0.470)	2.103 (0.462)	1.815 (0.401)	1.991 (0.464)
Age	30.469 (13.038)	33.415 (13.369)	27.643 (12.056)	29.106 (11.986)
Completed Education (years)	12.024 (1.824)	12.254 (1.990)	11.786 (2.165)	11.963 (2.445)
Female	0.487	0.522	0.587	0.522
Non-White	0.098	0.152	0.131	0.185
Married	0.486	0.413	0.342	0.313
Part-Time (< 35 hours per week)	0.433	0.367	0.535	0.449
Covered by a Union Contract	0.326	0.235	0.041	0.017
<u>Major Occupations</u>				
Supervisor	0.143	0.176	0.036	0.050
Cashier	0.371	0.311	0.066	0.090
Butcher	0.061	0.037	---	---
Bagger	0.227	0.205	---	---
Waiter	---	---	0.263	0.185
Cook	---	---	0.199	0.240
Bartender	---	---	0.054	0.037
Food Counter	---	---	0.066	0.047
Kitchen Worker	---	---	0.019	0.016
Waiters' Assistant	---	---	0.054	0.064
Other Food Preparation	---	---	0.064	0.056

Table 3 (continued)

State-Level Measures				
Effective Buying Income Per Capita (1998 dollars)	16,194.27 (1,775.36)	16,742.80 (1,656.67)	16,227.06 (1,720.88)	16,769.82 (1,629.28)
Food Stores Sales Per Capita (1998 dollars)	1,938.82 (193.32)	1,586.82 (198.83)	1,935.02 (196.28)	1,572.90 (200.94)
Eating and Drinking Places Sales Per Capita (1998 dollars)	744.60 (144.67)	896.36 (156.02)	752.24 (148.40)	899.14 (160.13)
Restaurants Sales Per Capita (1998 dollars)	397.65 (117.85)	415.09 (93.426)	404.06 (118.37)	419.03 (93.94)
Fast Food Sales Per Capita (1998 dollars)	289.14 (52.29)	354.36 (87.85)	289.79 (51.68)	352.82 (87.02)
Sample Size	4,018	3,537	8,398	7,090

Source: Current Population Survey Outgoing Rotation Groups and Bill Communications.
Summary statistics are weighted using CPS earnings weights.

Table 4
Decomposing Changes in the log Real Wage Distribution, 1983-98

<i>log real wage</i>	Counterfactuals (1998 with 1983 weights)						Unexplained Change (7)
	Actual		Minimum Wage (3)	Union (4)	Part- Time (5)	Other Attributes (6)	
	1983 (1)	1998 (2)					
A. Grocery Stores							
Mean	2.198	2.103	2.105 (2.11)	2.122 (17.89)	2.123 (1.05)	2.091 (-33.68)	-0.107 (112.63)
Standard Deviation	0.470	0.462	0.462 (0.00)	0.466 (50.00)	0.466 (0.00)	0.458 (-100.00)	-0.012 (150.00)
Gini Coefficient	0.107	0.105	0.104 (-50.00)	0.105 (50.00)	0.105 (0.00)	0.104 (-50.00)	-0.003 (150.00)
10th Percentile	1.702	1.639	1.697 (92.06)	1.697 (0.00)	1.697 (0.00)	1.697 (0.00)	-0.005 (7.94)
25th Percentile	1.774	1.766	1.766 (0.00)	1.788 (275.00)	1.774 (-175.00)	1.728 (-575.00)	-0.046 (575.00)
50th Percentile	2.102	1.981	1.981 (0.00)	2.015 (28.10)	2.015 (0.00)	1.946 (-57.02)	-0.156 (128.93)
75th Percentile	2.609	2.380	2.380 (0.00)	2.403 (10.04)	2.407 (1.75)	2.398 (-3.93)	-0.211 (92.14)
90th Percentile	2.888	2.757	2.757 (0.00)	2.773 (12.21)	2.773 (0.00)	2.761 (-9.16)	-0.127 (96.95)
Kullback-Leibler	0.208		0.147 (29.33)	0.127 (9.62)	0.124 (1.44)	0.129 (-2.40)	0.129 (62.02)
B. Eating and Drinking Places							
Mean	1.815	1.991	1.992 (-0.57)	1.997 (-2.84)	1.993 (2.27)	1.966 (15.34)	0.151 (85.80)
Standard Deviation	0.401	0.464	0.462 (3.17)	0.461 (1.59)	0.463 (-3.17)	0.451 (19.05)	0.050 (79.37)
Gini Coefficient	0.093	0.107	0.107 (0.00)	0.107 (0.00)	0.107 (0.00)	0.106 (7.14)	0.013 (92.86)
10th Percentile	1.304	1.609	1.591 (5.90)	1.591 (0.00)	1.591 (0.00)	1.552 (12.79)	0.248 (81.31)
25th Percentile	1.697	1.696	1.700 (400.00)	1.700 (0.00)	1.700 (0.00)	1.699 (-100.00)	0.002 (-200.00)
50th Percentile	1.745	1.900	1.900 (0.00)	1.910 (-6.45)	1.897 (8.39)	1.872 (16.13)	0.127 (81.94)
75th Percentile	1.969	2.238	2.238 (0.00)	2.251 (-4.83)	2.238 (4.83)	2.197 (15.24)	0.228 (84.76)
90th Percentile	2.298	2.576	2.576 (0.00)	2.585 (-3.24)	2.575 (3.60)	2.526 (17.63)	0.228 (82.01)
Kullback-Leibler	0.331		0.218 (34.14)	0.226 (-2.42)	0.214 (3.63)	0.164 (15.11)	0.164 (49.55)

Notes: Other attributes include those listed in Table 3 (except the state-level measures) plus region effects.

Each entry in columns 3-6 is the counterfactual log real wage measure replacing the 1998 distribution with a counterfactual. The number in parenthesis is the difference between the 1983 value and the previous counterfactual that is explained by the added counterfactual and expressed as a percentage.

The unexplained difference is the difference between columns 1 and 6.

Table 5
Decomposing Changes in the log Real Wage Distribution: Grocery Stores, 1983-98

<i>log real wage</i>	Counterfactuals (1998 with 1983 weights)						Unexplained Change (7)
	Actual		Minimum Wage (3)	Union (4)	Part- Time (5)	Other Attributes (6)	
	1983 (1)	1998 (2)					
A. Men							
Mean	2.300	2.191	2.195 (3.67)	2.206 (10.09)	2.215 (8.26)	2.166 (-44.95)	-0.134 (122.94)
Standard Deviation	0.499	0.518	0.513 (26.32)	0.517 (-21.05)	0.514 (15.79)	0.494 (105.26)	-0.005 (-26.32)
Gini Coefficient	0.112	0.119	0.117 (28.57)	0.117 (0.00)	0.116 (14.29)	0.114 (28.57)	0.002 (28.57)
10th Percentile	1.705	1.639	1.697 (87.88)	1.697 (0.00)	1.697 (0.00)	1.697 (0.00)	-0.008 (12.12)
25th Percentile	1.814	1.792	1.792 (0.00)	1.792 (0.00)	1.792 (0.00)	1.749 (-195.45)	-0.065 (295.45)
50th Percentile	2.284	2.079	2.079 (0.00)	2.120 (20.00)	2.128 (3.90)	2.079 (-23.90)	-0.205 (100.00)
75th Percentile	2.751	2.534	2.534 (0.00)	2.565 (14.29)	2.584 (8.76)	2.523 (-28.11)	-0.228 (105.07)
90th Percentile	2.978	2.906	2.906 (0.00)	2.900 (-8.33)	2.915 (20.83)	2.874 (-56.94)	-0.104 (144.44)
Kullback-Leibler	0.234		0.172 (26.50)	0.150 (9.40)	0.130 (8.55)	0.162 (-13.68)	0.162 (69.23)
B. Women							
Mean	2.089	2.022	2.023 (1.49)	2.040 (25.37)	2.037 (-4.48)	1.994 (-64.18)	-0.095 (141.79)
Standard Deviation	0.412	0.387	0.389 (8.00)	0.401 (48.00)	0.406 (20.00)	0.399 (-28.00)	-0.013 (52.00)
Gini Coefficient	0.092	0.087	0.086 (-20.00)	0.089 (60.00)	0.090 (20.00)	0.084 (-120.00)	-0.008 (160.00)
10th Percentile	1.702	1.639	1.697 (92.06)	1.697 (0.00)	1.697 (0.00)	1.697 (0.00)	-0.005 (7.94)
25th Percentile	1.745	1.749	1.749 (0.00)	1.749 (0.00)	1.749 (0.00)	1.705 (1100.00)	-0.040 (-1000.00)
50th Percentile	1.943	1.946	1.946 (0.00)	1.946 (0.00)	1.946 (0.00)	1.872 (2466.67)	-0.071 (-2366.67)
75th Percentile	2.364	2.238	2.238 (0.00)	2.303 (51.59)	2.299 (-3.17)	2.197 (-80.95)	-0.167 (132.54)
90th Percentile	2.767	2.542	2.542 (0.00)	2.570 (12.44)	2.573 (1.33)	2.518 (-24.44)	-0.249 (110.67)
Kullback-Leibler	0.223		0.169 (24.22)	0.154 (6.73)	0.156 (-0.90)	0.158 (-0.90)	0.158 (70.85)

Notes: Other attributes include those listed in Table 3 (except the state-level measures) plus region effects.

Each entry in columns 3-6 is the counterfactual log real wage measure replacing the 1998 distribution with a counterfactual. The number in parenthesis is the difference between the 1983 value and the previous counterfactual that is explained by the added counterfactual and expressed as a percentage.

The unexplained difference is the difference between columns 1 and 6.

Table 6
Decomposing Changes in the log Real Wage Distribution: Eating and Drinking Places, 1983-98

<i>log real wage</i>	Counterfactuals (1998 with 1983 weights)						Unexplained Change (7)
	Actual		Minimum Wage (3)	Union (4)	Part- Time (5)	Other Attributes (6)	
	1983 (1)	1998 (2)					
A. Men							
Mean	1.945	2.045	2.049 (-4.00)	2.055 (-6.00)	2.054 (1.00)	2.027 (27.00)	0.082 (82.00)
Standard Deviation	0.412	0.477	0.475 (3.08)	0.472 (4.62)	0.472 (0.00)	0.463 (13.85)	0.051 (78.46)
Gini Coefficient	0.089	0.108	0.106 (10.53)	0.106 (0.00)	0.107 (-5.26)	0.104 (15.79)	0.015 (78.95)
10th Percentile	1.671	1.609	1.671 (100.00)	1.671 (0.00)	1.668 (-4.84)	1.656 (-19.35)	-0.015 (24.19)
25th Percentile	1.704	1.705	1.705 (0.00)	1.705 (0.00)	1.705 (0.00)	1.705 (0.00)	0.001 (100.00)
50th Percentile	1.814	1.946	1.946 (0.00)	1.964 (-13.64)	1.952 (9.09)	1.925 (20.45)	0.111 (84.09)
75th Percentile	2.102	2.303	2.303 (0.00)	2.303 (0.00)	2.303 (0.00)	2.286 (8.46)	0.184 (91.54)
90th Percentile	2.508	2.667	2.667 (0.00)	2.683 (-10.06)	2.697 (-8.81)	2.638 (37.11)	0.130 (81.76)
Kullback-Leibler	0.227		0.143 (37.00)	0.154 (-4.85)	0.152 (0.88)	0.099 (23.35)	0.099 (43.61)
B. Women							
Mean	1.723	1.941	1.944 (-1.38)	1.947 (-1.38)	1.942 (2.29)	1.922 (9.17)	0.199 (91.28)
Standard Deviation	0.367	0.446	0.438 (10.13)	0.434 (5.06)	0.435 (-1.27)	0.436 (-1.27)	0.069 (87.34)
Gini Coefficient	0.089	0.105	0.105 (0.00)	0.105 (0.00)	0.105 (0.00)	0.106 (-6.25)	0.017 (106.25)
10th Percentile	1.186	1.568	1.502 (17.28)	1.504 (-0.52)	1.502 (0.52)	1.409 (24.35)	0.223 (58.38)
25th Percentile	1.591	1.668	1.697 (-37.66)	1.697 (0.00)	1.697 (0.00)	1.697 (0.00)	0.106 (137.66)
50th Percentile	1.709	1.864	1.864 (0.00)	1.864 (0.00)	1.852 (7.74)	1.833 (12.26)	0.124 (80.00)
75th Percentile	1.879	2.169	2.169 (0.00)	2.169 (0.00)	2.169 (0.00)	2.142 (9.31)	0.263 (90.69)
90th Percentile	2.135	2.510	2.510 (0.00)	2.517 (-1.87)	2.508 (2.40)	2.491 (4.53)	0.356 (94.93)
Kullback-Leibler	0.493		0.347 (29.61)	0.354 (-1.42)	0.342 (2.43)	0.288 (10.95)	0.288 (58.42)

Notes: Other attributes include those listed in Table 3 (except the state-level measures) plus region effects.

Each entry in columns 3-6 is the counterfactual log real wage measure replacing the 1998 distribution with a counterfactual. The number in parenthesis is the difference between the 1983 value and the previous counterfactual that is explained by the added counterfactual and expressed as a percentage.

The unexplained difference is the difference between columns 1 and 6.

Table 7
Decomposing Changes in the log Real Wage Distribution: Grocery Stores, 1983-98

<i>log real wage</i>	Counterfactuals (1998 with 1983 weights)						Unexplained Change (7)
	Actual		Minimum Wage (3)	Union (4)	Part- Time (5)	Other Attributes (6)	
	1983 (1)	1998 (2)					
A. Less Than High School Graduate							
Mean	1.995	1.855	1.863 (5.71)	1.874 (7.86)	1.882 (5.71)	2.166 (202.86)	0.171 (-122.14)
Standard Deviation	0.411	0.348	0.347 (-1.59)	0.376 (46.03)	0.370 (-9.52)	0.410 (63.49)	-0.001 (1.59)
Gini Coefficient	0.083	0.068	0.063 (-33.33)	0.072 (60.00)	0.071 (-6.67)	0.088 (113.33)	0.005 (-33.33)
10th Percentile	1.697	1.609	1.645 (40.91)	1.635 (-11.36)	1.668 (37.50)	1.676 (9.09)	-0.021 (23.86)
25th Percentile	1.707	1.658	1.697 (79.59)	1.697 (0.00)	1.697 (0.00)	1.697 (0.00)	-0.010 (20.41)
50th Percentile	1.814	1.783	1.783 (0.00)	1.792 (29.03)	1.792 (0.00)	1.792 (0.00)	-0.022 (70.97)
75th Percentile	2.127	1.946	1.946 (0.00)	1.995 (27.07)	1.995 (0.00)	2.148 (84.53)	0.021 (-11.60)
90th Percentile	2.757	2.303	2.303 (0.00)	2.398 (20.93)	2.416 (3.96)	2.526 (24.23)	-0.231 (50.88)
Kullback-Leibler	0.332		0.191 (42.47)	0.170 (6.33)	0.163 (2.11)	0.103 (18.07)	0.103 (31.02)
B. High School Graduate							
Mean	2.226	2.144	2.148 (4.88)	2.170 (26.83)	2.165 (-6.10)	1.994 (-208.54)	-0.232 (282.93)
Standard Deviation	0.459	0.429	0.422 (-23.33)	0.422 (0.00)	0.430 (26.67)	0.427 (-10.00)	-0.032 (106.67)
Gini Coefficient	0.104	0.097	0.095 (-28.57)	0.096 (14.29)	0.098 (28.57)	0.099 (14.29)	-0.005 (71.43)
10th Percentile	1.705	1.677	1.699 (78.57)	1.700 (3.57)	1.699 (-3.57)	1.697 (-7.14)	-0.008 (28.57)
25th Percentile	1.814	1.792	1.792 (0.00)	1.802 (45.45)	1.792 (-45.45)	1.792 (0.00)	-0.022 (100.00)
50th Percentile	2.102	2.079	2.079 (0.00)	2.098 (82.61)	2.079 (-82.61)	2.015 (-278.26)	-0.087 (378.26)
75th Percentile	2.633	2.408	2.408 (0.00)	2.450 (18.67)	2.457 (3.11)	2.403 (-24.00)	-0.230 (102.22)
90th Percentile	2.872	2.730	2.730 (0.00)	2.741 (7.75)	2.745 (2.82)	2.730 (-10.56)	-0.142 (100.00)
Kullback-Leibler	0.205		0.168 (18.05)	0.148 (9.76)	0.145 (1.46)	0.152 (-3.41)	0.152 (74.15)

Table 7 (continued)

C. At Least Some College							
Mean	2.343	2.248	2.216 (-33.68)	2.223 (7.37)	2.218 (-5.26)	2.027 (-201.05)	-0.316 (332.63)
Standard Deviation	0.484	0.504	0.553 (-245.00)	0.556 (-15.00)	0.560 (-20.00)	0.511 (245.00)	0.027 (135.00)
Gini Coefficient	0.106	0.111	0.121 (-200.00)	0.121 (0.00)	0.123 (-40.00)	0.115 (160.00)	0.009 (180.00)
10th Percentile	1.745	1.705	1.699 (-15.00)	1.699 (0.00)	1.697 (-5.00)	1.697 (0.00)	-0.048 (120.00)
25th Percentile	1.879	1.872	1.856 (-228.57)	1.848 (-114.29)	1.833 (-214.29)	1.792 (-585.71)	-0.087 (1242.86)
50th Percentile	2.284	2.140	2.123 (-11.81)	2.146 (15.97)	2.140 (-4.17)	1.981 (-110.42)	-0.303 (210.42)
75th Percentile	2.754	2.565	2.563 (-1.06)	2.590 (14.29)	2.599 (4.76)	2.398 (-106.35)	-0.356 (188.36)
90th Percentile	2.978	2.957	2.957 (0.00)	2.957 (0.00)	2.957 (0.00)	2.879 (-371.43)	-0.099 (471.43)
Kullback-Leibler	0.233		0.260 (-11.59)	0.242 (7.73)	0.238 (1.72)	0.357 (-51.07)	0.357 (153.22)

Notes: Other attributes include those listed in Table 3 (except the state-level measures) plus region effects.

Each entry in columns 3-6 is the counterfactual log real wage measure replacing the 1998 distribution with a counterfactual. The number in parenthesis is the difference between the 1983 value and the previous counterfactual that is explained by the added counterfactual and expressed as a percentage.

The unexplained difference is the difference between columns 1 and 6.

Table 8
Decomposing Changes in the log Real Wage Distribution: Eating and Drinking Places, 1983-98

<i>log real wage</i>	Counterfactuals (1998 with 1983 weights)						Unexplained Change (7)
	Actual		Minimum Wage (3)	Union (4)	Part- Time (5)	Other Attributes (6)	
	1983 (1)	1998 (2)					
A. Less Than High School Graduate							
Mean	1.746	1.798	1.808 (-19.23)	1.812 (-7.69)	1.804 (15.38)	1.833 (-55.77)	0.087 (167.31)
Standard Deviation	0.310	0.349	0.335 (35.90)	0.331 (10.26)	0.336 (-12.82)	0.370 (-87.18)	0.060 (153.85)
Gini Coefficient	0.056	0.071	0.068 (20.00)	0.068 (0.00)	0.071 (-20.00)	0.086 (-100.00)	0.030 (200.00)
10th Percentile	1.409	1.558	1.534 (16.11)	1.542 (-5.37)	1.522 (13.42)	1.358 (110.07)	-0.051 (-34.23)
25th Percentile	1.697	1.639	1.697 (100.00)	1.682 (-25.86)	1.676 (-10.34)	1.668 (-13.79)	-0.029 (50.00)
50th Percentile	1.709	1.749	1.749 (0.00)	1.749 (0.00)	1.749 (0.00)	1.749 (0.00)	0.040 (100.00)
75th Percentile	1.822	1.946	1.946 (0.00)	1.946 (0.00)	1.946 (0.00)	1.946 (0.00)	0.124 (100.00)
90th Percentile	2.102	2.197	2.197 (0.00)	2.185 (12.63)	2.169 (16.84)	2.197 (-29.47)	0.095 (100.00)
Kullback-Leibler	0.217		0.109 (49.77)	0.123 (-6.45)	0.121 (0.92)	0.152 (-14.29)	0.152 (70.05)
B. High School Graduate							
Mean	1.816	2.015	2.010 (2.51)	2.021 (-5.53)	2.011 (5.03)	0.000 (1010.55)	-1.816 (-912.56)
Standard Deviation	0.394	0.426	0.436 (-31.25)	0.438 (-6.25)	0.438 (0.00)	0.422 (50.00)	0.028 (87.50)
Gini Coefficient	0.095	0.101	0.103 (-33.33)	0.105 (-33.33)	0.105 (0.00)	0.101 (66.67)	0.006 (100.00)
10th Percentile	1.244	1.609	1.591 (4.93)	1.591 (0.00)	1.591 (0.00)	1.591 (0.00)	0.347 (95.07)
25th Percentile	1.699	1.738	1.738 (0.00)	1.738 (0.00)	1.712 (66.67)	1.705 (17.95)	0.006 (15.38)
50th Percentile	1.751	1.946	1.946 (0.00)	1.949 (-1.54)	1.946 (1.54)	1.910 (18.46)	0.159 (81.54)
75th Percentile	1.997	2.251	2.251 (0.00)	2.288 (-14.57)	2.269 (7.48)	2.219 (19.69)	0.222 (87.40)
90th Percentile	2.284	2.565	2.565 (0.00)	2.590 (-8.90)	2.570 (7.12)	2.526 (15.66)	0.242 (86.12)
Kullback-Leibler	0.422		0.291 (31.04)	0.312 (-4.98)	0.280 (7.58)	0.195 (20.14)	0.195 (46.21)

Table 8 (continued)

C. At Least Some College							
Mean	1.905	2.165	2.168 (-1.15)	2.168 (0.00)	2.163 (1.92)	0.000 (831.92)	-1.905 (-732.69)
Standard Deviation	0.491	0.525	0.517 (23.53)	0.519 (-5.88)	0.522 (-8.82)	0.505 (50.00)	0.014 (41.18)
Gini Coefficient	0.125	0.115	0.114 (-10.00)	0.115 (10.00)	0.117 (20.00)	0.113 (-40.00)	-0.012 (120.00)
10th Percentile	1.235	1.639	1.671 (-7.92)	1.668 (0.74)	1.629 (9.65)	1.640 (-2.72)	0.405 (100.25)
25th Percentile	1.699	1.816	1.816 (0.00)	1.792 (20.51)	1.792 (0.00)	1.792 (0.00)	0.093 (79.49)
50th Percentile	1.814	2.118	2.118 (0.00)	2.115 (0.99)	2.105 (3.29)	2.079 (8.55)	0.265 (87.17)
75th Percentile	2.151	2.446	2.446 (0.00)	2.446 (0.00)	2.446 (0.00)	2.395 (17.29)	0.244 (82.71)
90th Percentile	2.565	2.813	2.813 (0.00)	2.813 (0.00)	2.818 (-2.02)	2.733 (34.27)	0.168 (67.74)
Kullback-Leibler	0.475		0.370 (22.11)	0.374 (-0.84)	0.357 (3.58)	0.291 (13.89)	0.291 (61.26)

Notes: Other attributes include those listed in Table 3 (except the state-level measures) plus region effects.

Each entry in columns 3-6 is the counterfactual log real wage measure replacing the 1998 distribution with a counterfactual. The number in parenthesis is the difference between the 1983 value and the previous counterfactual that is explained by the added counterfactual and expressed as a percentage.

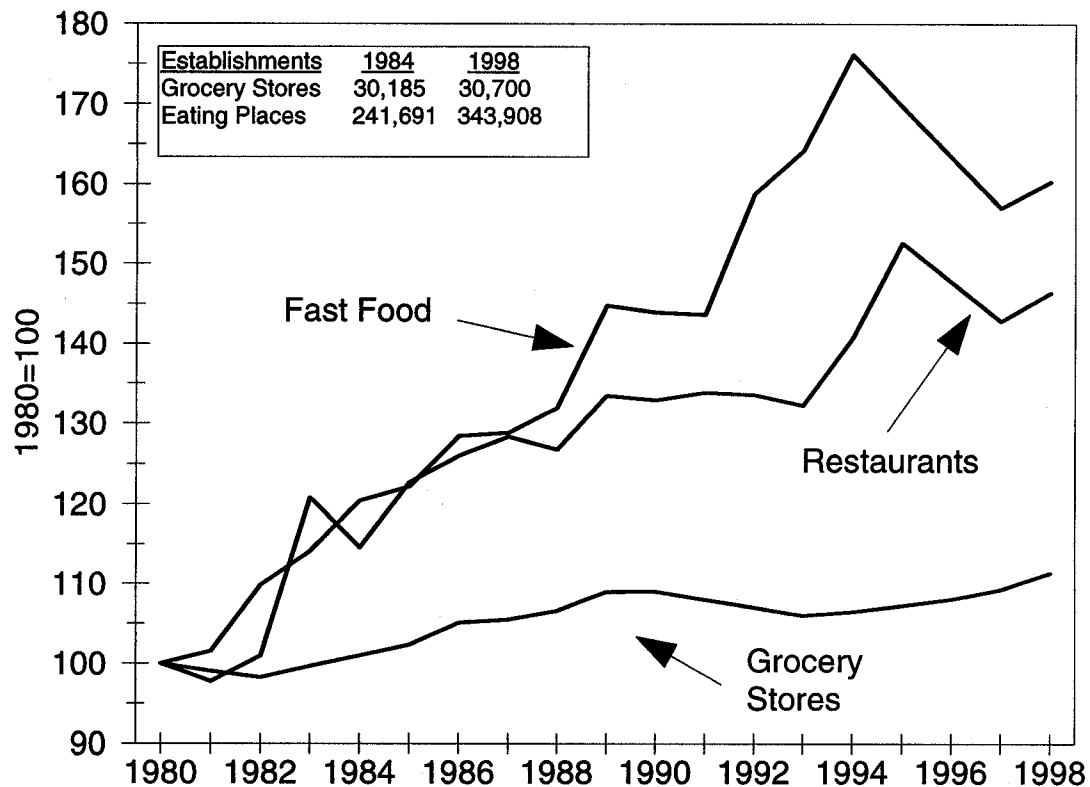
The unexplained difference is the difference between columns 1 and 6.

Table 9
Final Counterfactuals for Alternative Specifications

	Final Counterfactuals (All Controls) (1998 with 1983 weights)						
	Actual		Baseline Demographics (Table 4)	Personal Disposable Income	Food Stores Sales	Eating and Drinking Places Sales	Fast Food Sales
	1983 (1)	1998 (2)	(3)	(4)	(5)	(6)	(7)
<i>log real wage</i>							
A. Grocery Stores							
Mean	2.198	2.103	2.091	2.094 (0.003)	2.111 (0.020)	2.245 (0.154)	2.151 (0.060)
Standard Deviation	0.470	0.462	0.458	0.456 (-0.002)	0.441 (-0.017)	0.459 (0.001)	0.472 (0.014)
Gini Coefficient	0.107	0.105	0.104	0.104 (0.000)	0.103 (-0.001)	0.102 (-0.002)	0.108 (0.004)
10th Percentile	1.702	1.639	1.697	1.697 (0.000)	1.697 (0.000)	1.732 (0.035)	1.697 (0.000)
25th Percentile	1.774	1.766	1.728	1.732 (0.004)	1.749 (0.021)	1.856 (0.128)	1.780 (0.052)
50th Percentile	2.102	1.981	1.946	1.960 (0.014)	2.015 (0.069)	2.197 (0.251)	2.041 (0.095)
75th Percentile	2.609	2.380	2.398	2.398 (0.000)	2.420 (0.022)	2.526 (0.128)	2.458 (0.060)
90th Percentile	2.888	2.757	2.761	2.764 (0.003)	2.708 (-0.053)	2.906 (0.145)	2.833 (0.072)
Kullback-Leibler	0.208		0.129	0.134 (0.005)	0.156 (0.027)	0.126 (-0.003)	0.080 (-0.049)
B. Eating and Drinking Places							
Mean	1.815	1.991	1.966	1.964 (-0.002)	1.893 (-0.073)	2.048 (0.082)	2.010 (0.044)
Standard Deviation	0.401	0.464	0.451	0.448 (-0.003)	0.445 (-0.006)	0.454 (0.003)	0.459 (0.008)
Gini Coefficient	0.093	0.107	0.106	0.106 (0.000)	0.111 (0.005)	0.101 (-0.005)	0.104 (-0.002)
10th Percentile	1.304	1.609	1.552	1.554 (0.002)	1.409 (-0.143)	1.684 (0.132)	1.591 (0.039)
25th Percentile	1.697	1.696	1.699	1.699 (0.000)	1.682 (-0.017)	1.749 (0.050)	1.705 (0.006)
50th Percentile	1.745	1.900	1.872	1.872 (0.000)	1.792 (-0.080)	1.946 (0.074)	1.930 (0.058)
75th Percentile	1.969	2.238	2.197	2.197 (0.000)	2.147 (-0.050)	2.301 (0.104)	2.251 (0.054)
90th Percentile	2.298	2.576	2.526	2.526 (0.000)	2.497 (-0.029)	2.639 (0.113)	2.605 (0.079)
Kullback-Leibler	0.331		0.164	0.160 (-0.004)	0.130 (-0.034)	0.363 (0.199)	0.248 (0.084)

Note: Each entry in columns 3-8 is the final counterfactual for different specifications. Column 3 is the baseline demographic specification from Table 4. Columns 4-7 add the variable listed to the baseline specification. The number in parenthesis is the difference between alternative specification and the baseline counterfactual.

Real Food Sales Trends: Grocery Stores and Restaurants, 1980-1998



Source: *Progressive Grocer* (various issues) and *Restaurant Business* (various issues).

Figure 1

Real Wage Trends in Retail Food, 1979-98

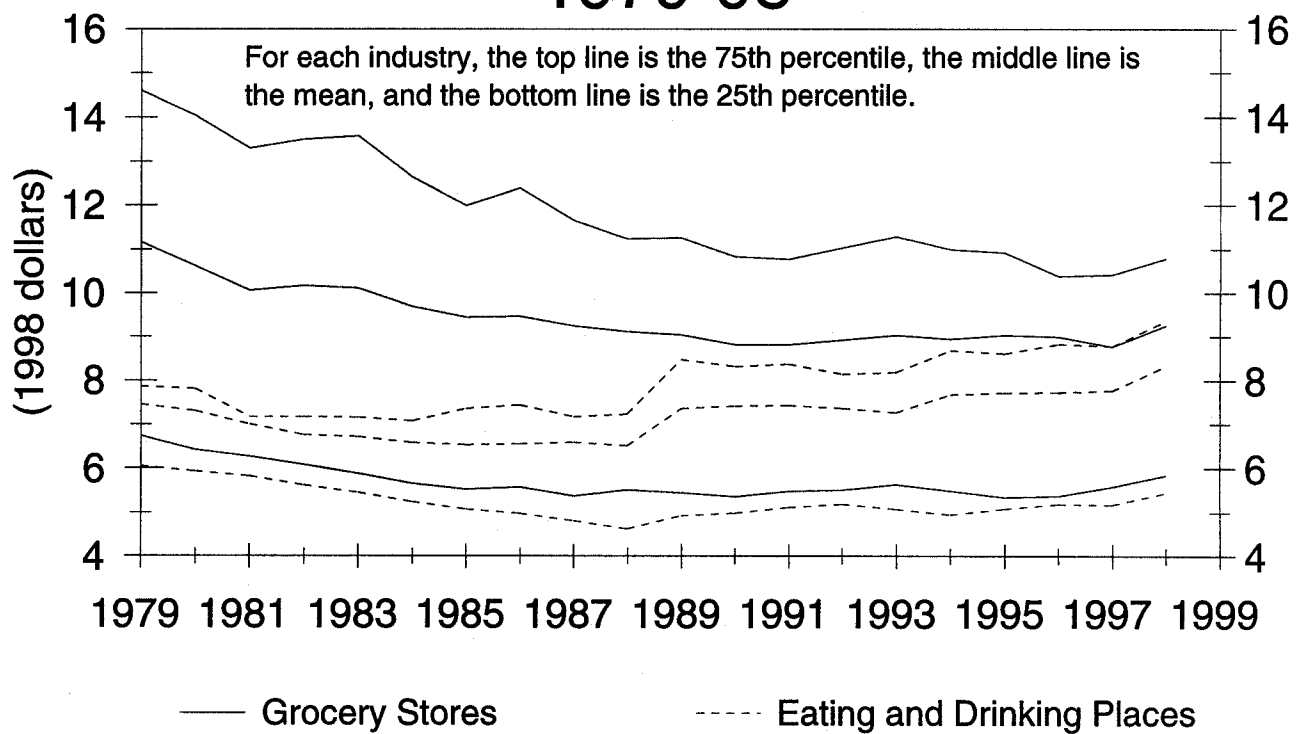
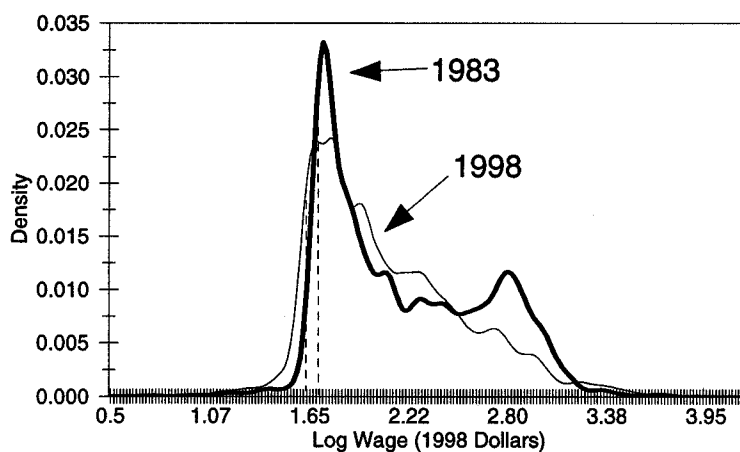


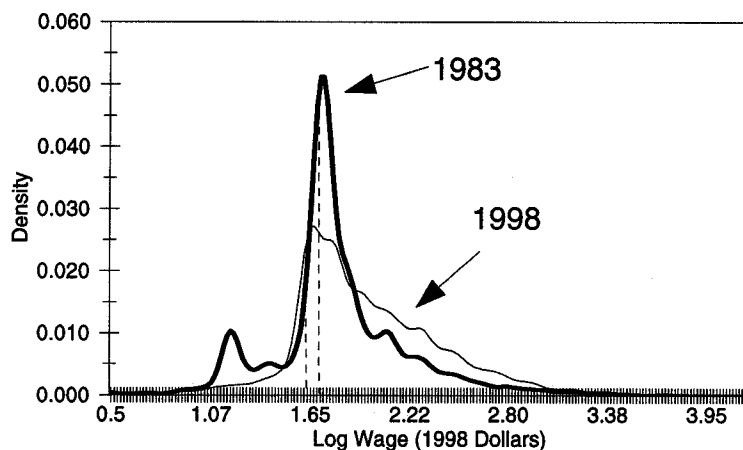
Figure 2

Industry Wage Distributions: log real wage, 1983-98

Grocery Stores



Eating and Drinking Places

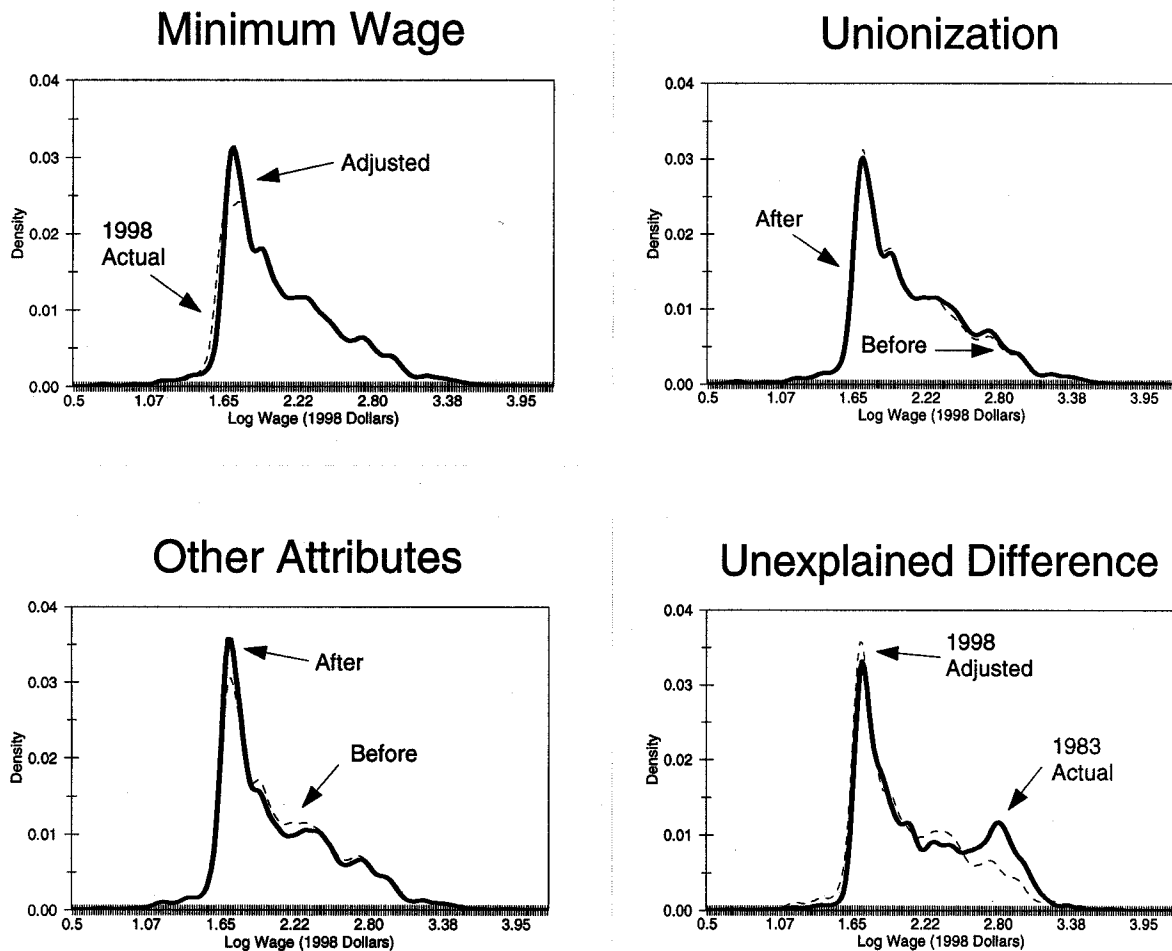


Note: Kernel density estimates using the Gaussian kernel with 200 evaluation points and bandwidth = 0.05. The samples are from the CPS Outgoing Rotation Groups. The dashed vertical lines indicate the real value of the minimum wage for each year.

Figure 3

Counterfactual Differences: Grocery Stores

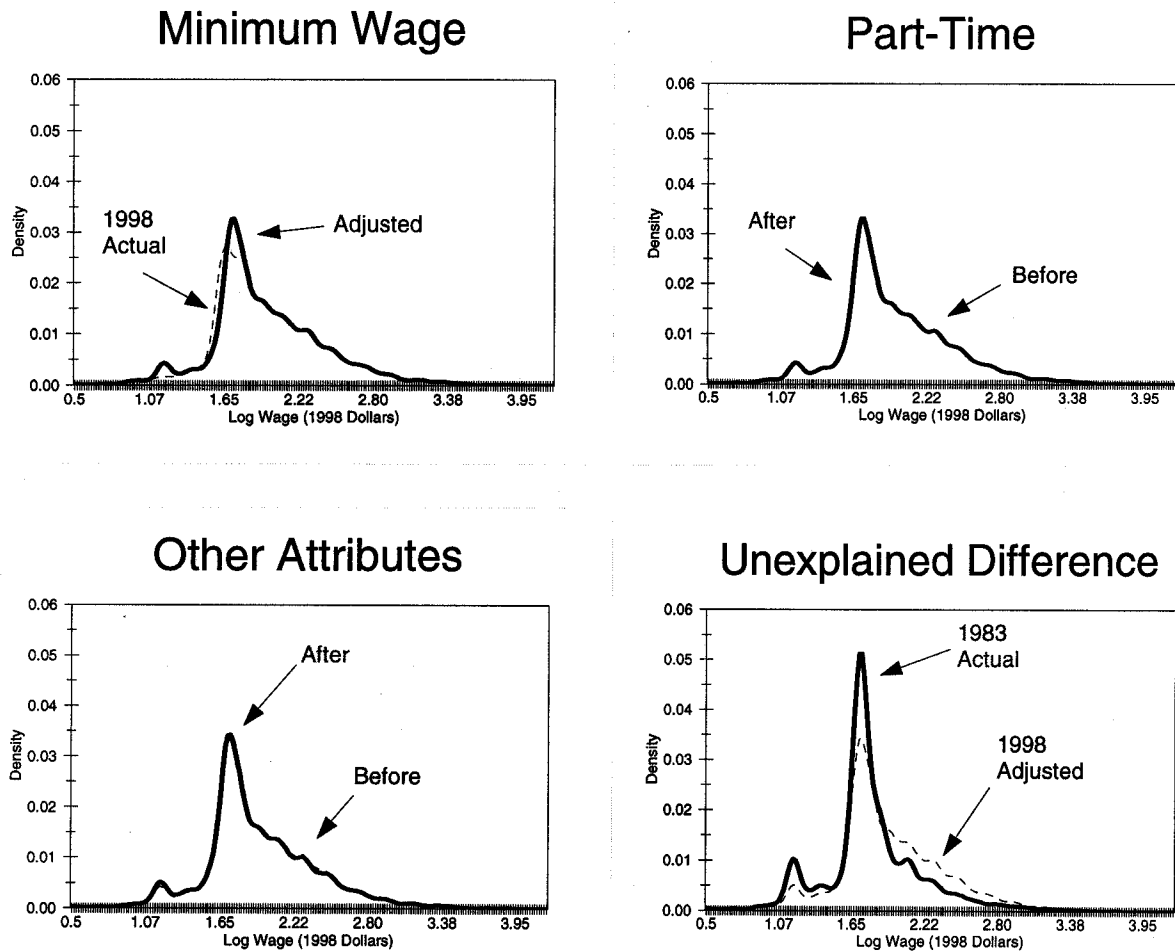
log real wage, 1983-98



Notes: Each graph presents the differences in the smoothed density for 1998 adjusted for the relevant factor and the 1983 density. The counterfactuals are cumulative and a part-time counterfactual is included in the estimation after unionization, but is not displayed in this figure because no differences are visible.

Figure 4

Counterfactual Differences: Eating and Drinking Places log real wage, 1983-98



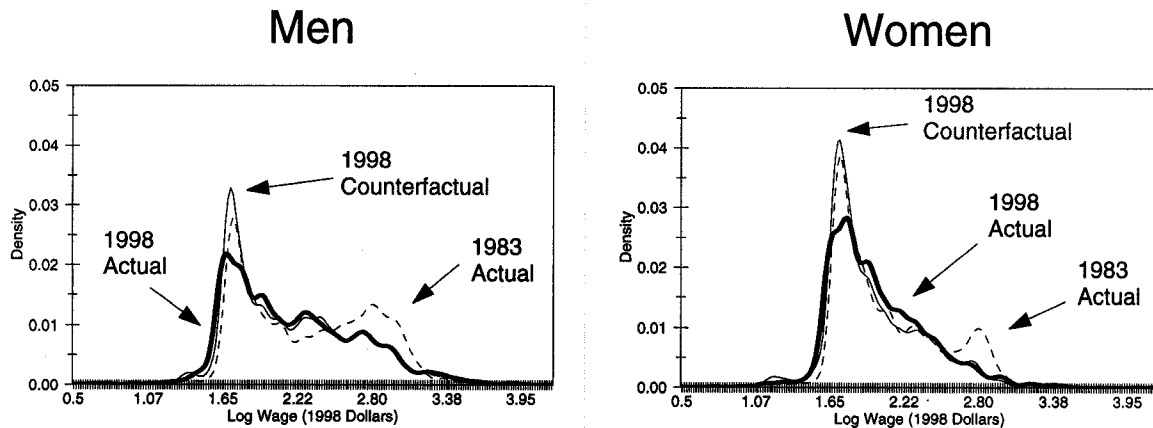
Notes: Each graph presents the differences in the smoothed density for 1998 adjusted for the relevant factor and the 1983 density. The counterfactuals are cumulative and a unionization counterfactual is included in the estimation before part-time, but is not displayed in this figure because no differences are visible.

Figure 5

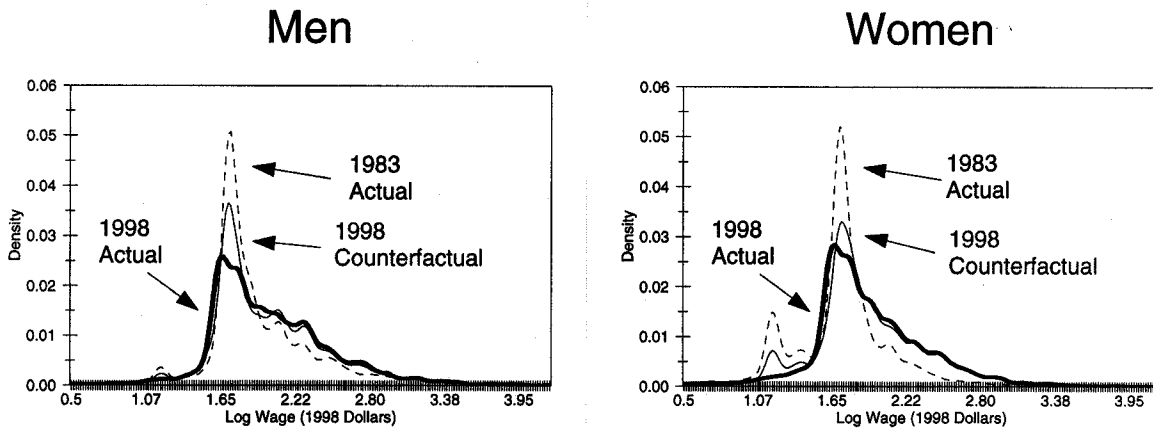
Actual and Counterfactual Distributions by Gender

log real wage, 1983-98

Grocery Stores



Eating and Drinking Places

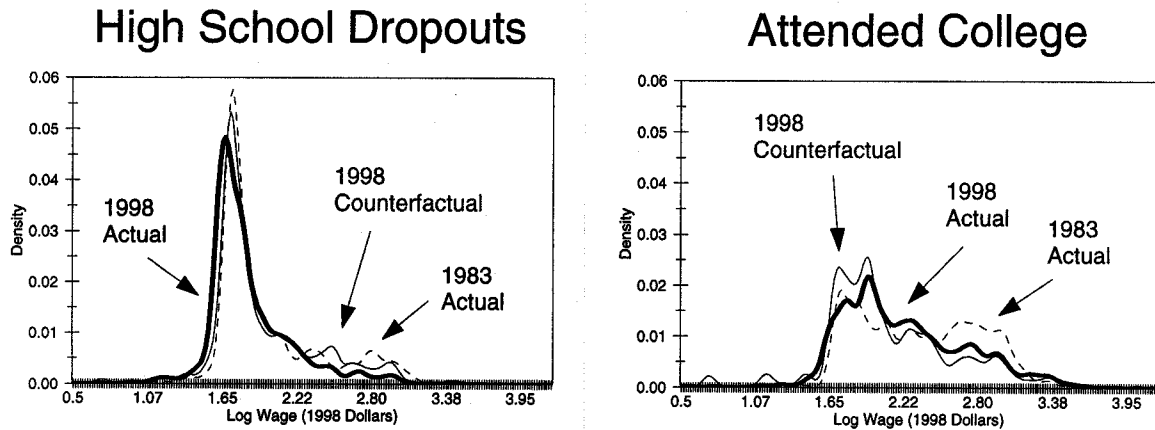


Note: Each graph presents the actual smoothed densities for 1983 and 1998 as well as the 1998 counterfactuals density adjusted for the characteristics in Table 4.

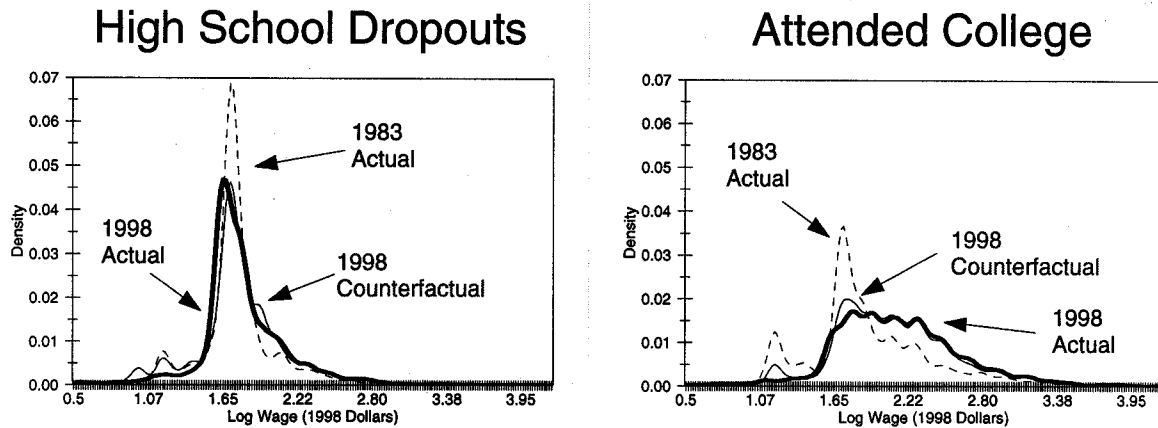
Figure 6

Actual and Counterfactual Distributions by Educational Attainment log real wage, 1983-98

Grocery Stores



Eating and Drinking Places



Note: Each graph presents the actual smoothed densities for 1983 and 1998 as well as the 1998 counterfactuals density adjusted for the characteristics in Table 4.

Figure 7

Appendix Table 1
Annual Wage and Employment Trends in Manufacturing, 1979-98

Year	Real Wages (1998 dollars)										Fraction				
	Standard			Percentiles			Part-		Education		Unionization		Sample Size	Employment (000s)	
	Mean	Deviation	Gini Coeff.	10th	25th	50th	75th	90th	Time	Years	Return	Rate			Return
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1979	13.47	6.71	0.26	6.64	8.48	12.25	16.34	21.24	0.04	11.81	0.056	n/a	n/a	38,093	22,137
1980	13.07	6.67	0.26	6.30	8.18	11.69	16.19	21.13	0.04	11.93	0.059	n/a	n/a	41,960	21,593
1981	12.92	6.49	0.26	6.20	8.15	11.41	16.30	20.38	0.04	11.95	0.062	n/a	n/a	39,185	21,460
1982	13.14	7.40	0.27	6.14	8.06	11.52	16.32	21.50	0.05	12.09	0.067	n/a	n/a	34,826	20,286
1983	13.20	7.15	0.27	5.95	8.04	11.91	16.45	22.32	0.05	12.19	0.070	0.30	0.079	33,493	19,946
1984	13.09	6.69	0.27	5.99	8.03	11.50	16.41	21.69	0.05	12.27	0.073	0.27	0.083	33,906	20,995
1985	13.28	7.76	0.28	6.03	8.27	11.85	16.84	22.39	0.05	12.32	0.077	0.26	0.092	33,855	20,879
1986	13.42	6.89	0.28	6.09	8.11	12.00	16.90	22.99	0.05	12.37	0.078	0.24	0.105	33,743	20,962
1987	13.23	6.76	0.28	5.97	8.04	11.74	16.93	22.83	0.04	12.37	0.079	0.24	0.082	33,584	20,935
1988	13.10	6.69	0.27	6.15	8.05	11.73	16.70	22.72	0.04	12.40	0.075	0.23	0.082	31,599	21,320
1989	13.46	7.68	0.29	5.98	8.17	11.96	16.74	22.98	0.04	12.43	0.080	0.22	0.065	32,082	21,652
1990	13.38	7.88	0.29	5.96	7.94	11.34	17.02	22.69	0.04	12.47	0.083	0.21	0.064	32,815	21,184
1991	13.34	8.41	0.29	5.99	8.03	11.26	16.33	22.98	0.05	12.56	0.085	0.21	0.062	31,034	20,434
1992	13.17	8.12	0.30	5.81	7.92	11.20	16.24	22.45	0.05	12.74	0.089	0.20	0.076	29,995	19,972
1993	13.15	7.82	0.30	5.89	7.70	11.16	16.42	22.80	0.05	12.80	0.091	0.20	0.089	28,795	19,557
1994	13.21	9.03	0.30	5.83	7.65	11.11	16.67	23.08	0.04	12.83	0.090	0.20	0.102	27,671	20,157
1995	13.20	7.90	0.30	5.84	7.78	11.21	16.54	23.37	0.04	12.88	0.092	0.19	0.087	27,151	20,493
1996	13.20	8.08	0.30	5.70	7.72	11.27	16.56	23.29	0.04	12.91	0.093	0.18	0.072	23,387	20,518
1997	13.31	9.56	0.30	5.77	7.78	11.16	16.85	23.16	0.04	12.91	0.093	0.17	0.083	23,663	20,835
1998	13.83	8.34	0.30	6.14	8.18	11.60	17.40	24.03	0.04	12.96	0.094	0.17	0.066	23,325	20,733

Source: Current Population Survey.

Notes: Columns 1-14 are from the CPS Outgoing Rotation Groups and column 15 is from Employment and Earnings (various issues).

Columns 11 and 13 are OLS coefficients from log wage regressions controlling for union, education, age and its square, female, married, nonwhite, part-time, and region.

Appendix Table 2
Annual Wage and Employment Trends in Retail Trade (excluding Grocery Stores and Eating and Drinking Places), 1979-98

Year	Real Wages (1998 dollars)										Fraction				
	Standard		Gini	Percentiles					Part- Time	Education		Unionization		Sample Size	Employment (000s)
	Mean	Deviation		Coeff.	10th	25th	50th	75th		90th	Years	Return	Rate		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1979	9.56	6.59	0.26	5.92	6.13	7.66	10.72	15.62	0.30	12.14	0.040	n/a	n/a	15,349	9,653
1980	9.04	5.46	0.26	5.58	5.85	7.20	10.34	14.99	0.31	12.17	0.039	n/a	n/a	17,160	9,411
1981	8.74	5.29	0.26	5.43	5.71	6.93	10.03	14.67	0.33	12.24	0.039	n/a	n/a	15,810	9,425
1982	8.66	5.25	0.26	5.15	5.45	6.91	9.98	14.78	0.33	12.32	0.037	n/a	n/a	15,089	9,600
1983	8.60	5.71	0.27	4.99	5.40	6.85	9.92	14.88	0.34	12.44	0.039	0.06	0.164	14,728	9,581
1984	8.72	6.09	0.28	4.78	5.34	7.13	10.06	15.00	0.33	12.48	0.047	0.05	0.149	14,970	10,200
1985	8.77	5.38	0.29	4.64	5.24	6.89	10.34	15.50	0.31	12.47	0.051	0.05	0.156	15,260	10,252
1986	8.85	5.45	0.29	4.60	5.41	6.76	10.29	15.73	0.32	12.51	0.055	0.05	0.132	15,346	10,464
1987	8.95	5.54	0.29	4.57	5.22	7.12	10.44	16.21	0.31	12.51	0.052	0.04	0.129	15,431	10,726
1988	8.96	7.29	0.30	4.39	5.22	7.02	10.59	15.67	0.32	12.55	0.050	0.04	0.129	14,854	10,897
1989	9.01	7.65	0.30	4.50	5.38	7.17	10.46	15.25	0.31	12.52	0.053	0.04	0.159	15,059	11,111
1990	9.05	6.48	0.29	4.54	5.67	7.12	10.64	15.60	0.30	12.57	0.059	0.04	0.140	15,747	11,064
1991	9.01	5.84	0.29	4.66	5.44	7.15	10.80	15.51	0.31	12.62	0.052	0.04	0.096	14,828	10,794
1992	8.98	5.64	0.29	4.75	5.28	7.27	10.56	15.85	0.31	12.93	0.055	0.04	0.106	14,668	10,811
1993	9.10	5.69	0.29	4.63	5.39	7.18	10.26	15.96	0.30	12.97	0.058	0.03	0.130	14,669	11,077
1994	9.30	6.43	0.31	4.53	5.38	7.27	11.00	16.18	0.28	12.99	0.056	0.04	0.093	13,775	11,582
1995	9.25	6.20	0.30	4.62	5.40	7.30	10.94	16.37	0.28	13.04	0.059	0.04	0.088	14,073	11,786
1996	9.26	5.89	0.30	4.73	5.67	7.40	10.89	16.35	0.27	13.00	0.058	0.04	0.047	12,530	11,965
1997	9.47	6.34	0.31	4.62	5.54	7.39	11.10	16.85	0.27	13.00	0.063	0.04	0.067	12,561	12,121
1998	9.69	6.88	0.30	4.91	5.68	7.60	11.35	16.82	0.28	12.95	0.064	0.03	0.065	12,853	12,237

Source: Current Population Survey.

Notes: Columns 1-14 are from the CPS Outgoing Rotation Groups and column 15 is from Employment and Earnings (various issues).

Columns 11 and 13 are OLS coefficients from log wage regressions controlling for union, education, age and its square, female, married, nonwhite, part-time, and region.

Appendix Table 3
Retail Trade and Manufacturing Employees, 1983 and 1998:
Means and Standard Deviations

Variable	Manufacturing		Retail Trade (except Grocery Stores and Eating and Drinking Places)	
	1983	1998	1983	1998
Log Real Wage (1998 dollars)	2.555 (0.491)	2.574 (0.538)	2.128 (0.451)	2.220 (0.506)
Age	38.054 (12.564)	39.547 (11.435)	33.658 (14.459)	35.172 (13.810)
Completed Education (years)	12.219 (2.669)	12.958 (2.627)	12.447 (2.072)	12.954 (2.041)
Female	0.330	0.319	0.520	0.499
Non-White	0.123	0.158	0.086	0.146
Married	0.709	0.638	0.539	0.471
Part-Time (< 35 hours per week)	0.052	0.041	0.339	0.277
Covered by a Union Contract	0.298	0.166	0.059	0.032
Sample Size	33,428	23,331	14,725	12,856

Source: Current Population Survey Outgoing Rotation Groups. Summary statistics are weighted using CPS earnings weights.

Appendix Table 4
Decomposing Changes in the log Real Wage Distribution, 1983-98

<i>log real wage</i>	Actual		Counterfactuals (1998 with 1983 weights)				Unexplained Change (7)
			Minimum	Union	Part- Time	Other	
	1983 (1)	1998 (2)	Wage (3)	(4)	(5)	Attributes (6)	
A. Manufacturing							
Mean	2.555	2.574	2.573 (5.26)	2.582 (-47.37)	2.581 (5.26)	2.487 (494.74)	-0.068 (-357.89)
Standard Deviation	0.491	0.538	0.539 (-2.13)	0.529 (21.28)	0.529 (0.00)	0.528 (2.13)	0.037 (78.72)
Gini Coefficient	0.099	0.107	0.107 (0.00)	0.104 (37.50)	0.105 (-12.50)	0.108 (-37.50)	0.009 (112.50)
10th Percentile	1.879	1.910	1.910 (0.00)	1.946 (-116.13)	1.946 (0.00)	1.816 (419.35)	-0.063 (-203.23)
25th Percentile	2.179	2.197	2.197 (0.00)	2.197 (0.00)	2.197 (0.00)	2.101 (533.33)	-0.078 (-433.33)
50th Percentile	2.572	2.546	2.546 (0.00)	2.565 (73.08)	2.565 (0.00)	2.485 (-307.69)	-0.087 (334.62)
75th Percentile	2.897	2.951	2.951 (0.00)	2.946 (9.26)	2.945 (1.85)	2.851 (174.07)	-0.046 (-85.19)
90th Percentile	3.201	3.274	3.274 (0.00)	3.256 (24.66)	3.256 (0.00)	3.157 (135.62)	-0.044 (-60.27)
Kullback-Leibler	0.076		0.073 (3.95)	0.065 (10.53)	0.065 (0.00)	0.072 (-9.21)	0.072 (94.74)
B. Retail Trade (except Grocery Stores and Eating and Drinking Places)							
Mean	2.128	2.220	2.222 (-2.17)	2.223 (-1.09)	2.219 (4.35)	2.146 (79.35)	0.018 (19.57)
Standard Deviation	0.451	0.506	0.503 (5.45)	0.503 (0.00)	0.504 (-1.82)	0.479 (45.45)	0.028 (50.91)
Gini Coefficient	0.100	0.113	0.112 (7.69)	0.112 (0.00)	0.113 (-7.69)	0.108 (38.46)	0.008 (61.54)
10th Percentile	1.702	1.684	1.700 (88.89)	1.699 (-5.56)	1.699 (0.00)	1.697 (-11.11)	-0.005 (27.78)
25th Percentile	1.780	1.833	1.833 (0.00)	1.833 (0.00)	1.833 (0.00)	1.792 (77.36)	0.012 (22.64)
50th Percentile	2.019	2.122	2.122 (0.00)	2.128 (-5.83)	2.120 (7.77)	2.037 (80.58)	0.018 (17.48)
75th Percentile	2.390	2.524	2.524 (0.00)	2.526 (-1.49)	2.519 (5.22)	2.420 (73.88)	0.030 (22.39)
90th Percentile	2.795	2.918	2.918 (0.00)	2.920 (-1.63)	2.918 (1.63)	2.813 (85.37)	0.018 (14.63)
Kullback-Leibler	0.099		0.067 (32.32)	0.070 (-3.03)	0.066 (4.04)	0.024 (42.42)	0.024 (24.24)

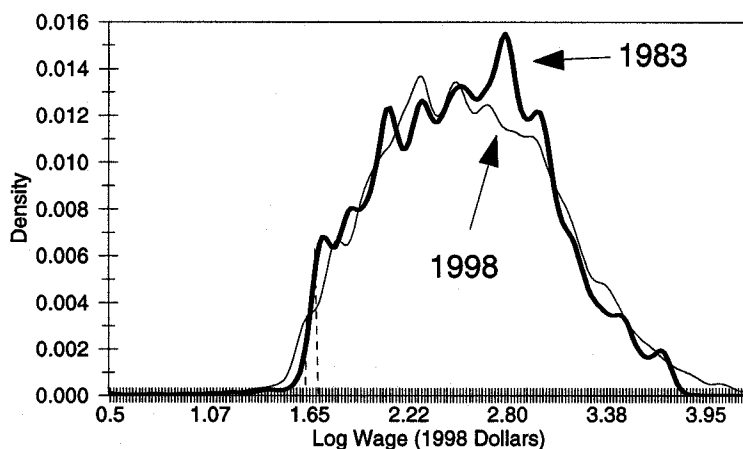
Notes: Other attributes include those listed in Appendix Table 3 plus region, industry, and occupation effects.

Each entry in columns 3-6 is the counterfactual log real wage measure replacing the 1998 distribution with a counterfactual. The number in parenthesis is the difference between the 1983 value and the previous counterfactual that is explained by the added counterfactual and expressed as a percentage.

The unexplained difference is the difference between columns 1 and 6.

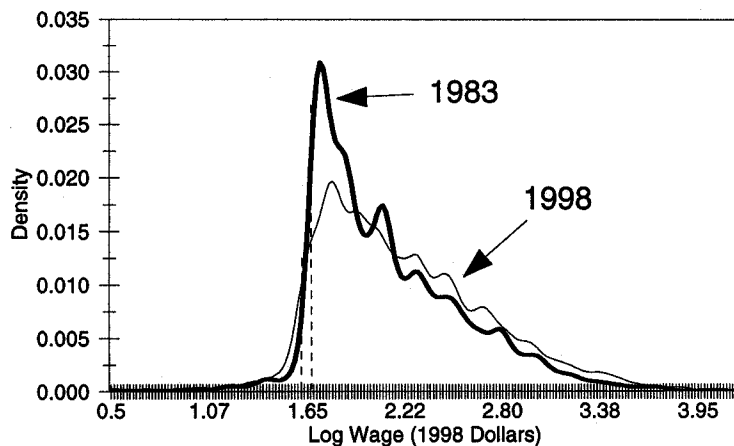
Industry Wage Distributions: log real wage, 1983-98

Manufacturing



Retail Trade

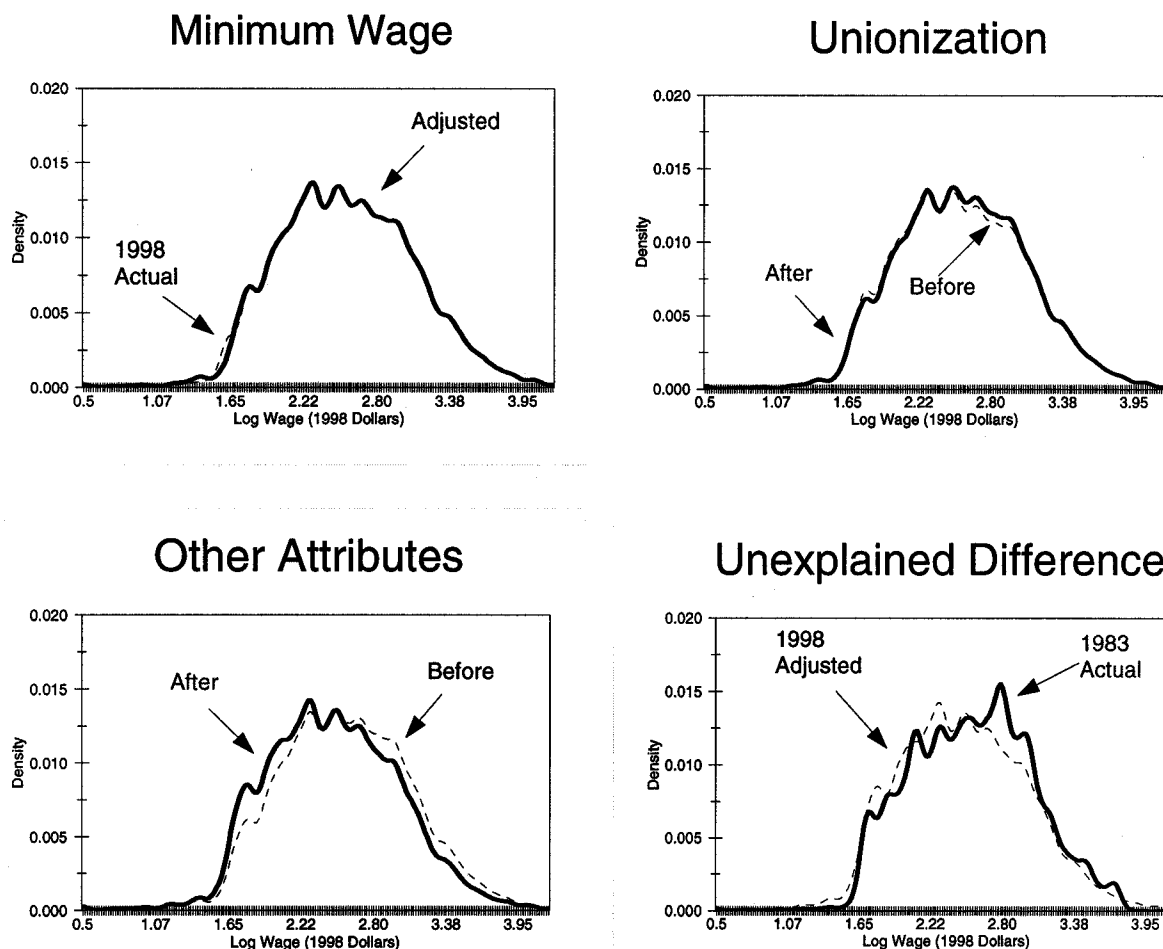
ex. Grocery and Eating/Drinking Places



Note: Kernel density estimates using the Gaussian kernel with 200 evaluation points and bandwidth = 0.05. The samples are from the CPS Outgoing Rotation Groups. The dashed vertical lines indicate the real value of the minimum wage for each year.

Appendix Figure 1

Counterfactual Differences: Manufacturing log real wage, 1983-98

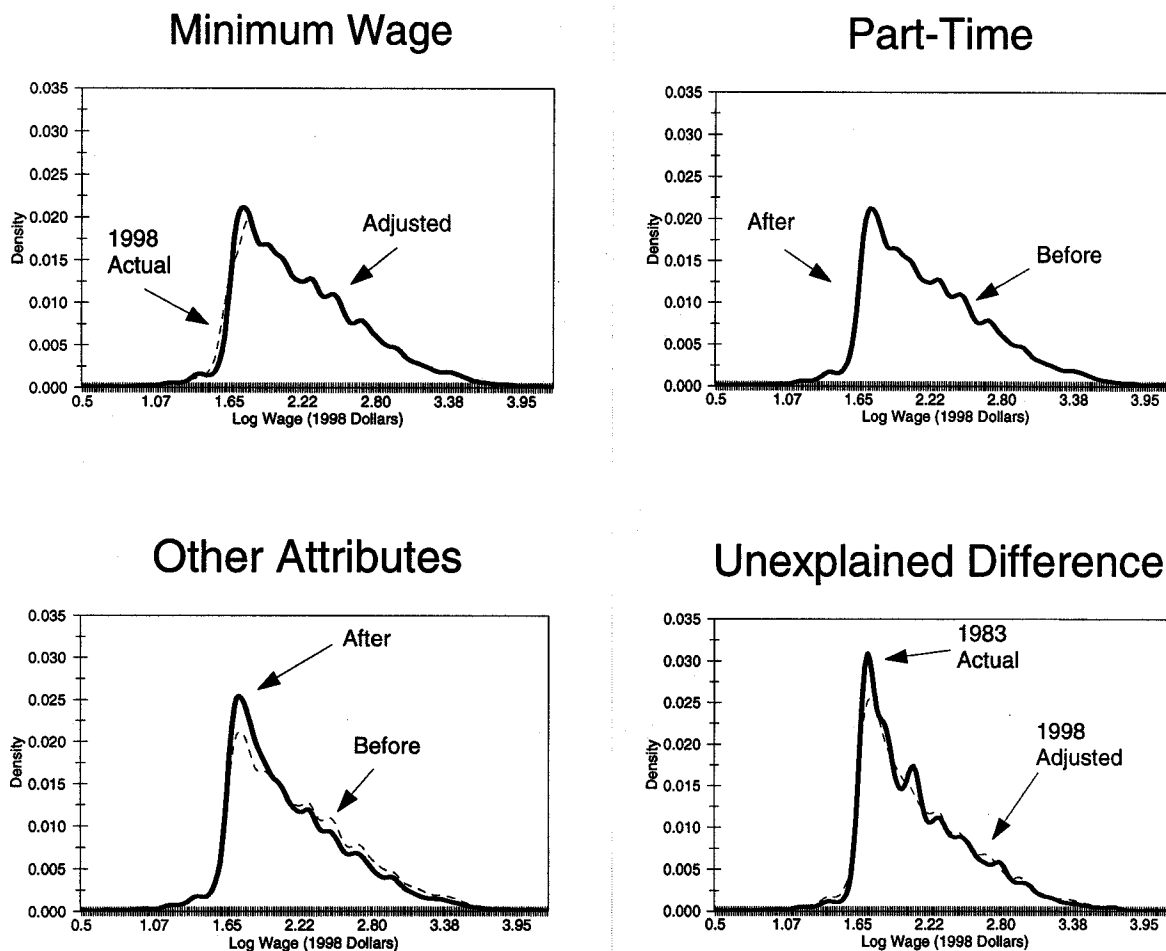


Notes: Each graph presents the differences in the smoothed density for 1998 adjusted for the relevant factor and the 1983 density. The counterfactuals are cumulative and a part-time counterfactual is included in the estimation after unionization, but is not displayed in this figure because no differences are visible.

Appendix Figure 2

Counterfactual Differences: Retail Trade

(except Grocery Stores and Eating and Drinking Places)
log real wage, 1983-98



Notes: Each graph presents the differences in the smoothed density for 1998 adjusted for the relevant factor and the 1983 density. The counterfactuals are cumulative and a unionization counterfactual is included in the estimation before part-time, but is not displayed in this figure because no differences are visible.

Appendix Figure 3