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# Unions, Norms, and the Rise in U.S. Wage Inequality

Bruce Western<sup>a</sup> and Jake Rosenfeld<sup>b</sup>

## Abstract

From 1973 to 2007, private sector union membership in the United States declined from 34 to 8 percent for men and from 16 to 6 percent for women. During this period, inequality in hourly wages increased by over 40 percent. We report a decomposition, relating rising inequality to the union wage distribution's shrinking weight. We argue that unions helped institutionalize norms of equity, reducing the dispersion of nonunion wages in highly unionized regions and industries. Accounting for unions' effect on union and nonunion wages suggests that the decline of organized labor explains a fifth to a third of the growth in inequality—an effect comparable to the growing stratification of wages by education.

## Keywords

wages, inequality, unions, labor markets, norms

The decline of organized labor in the United States coincided with a large increase in wage inequality. From 1973 to 2007, union membership in the private sector declined from 34 to 8 percent for men and from 16 to 6 percent for women. During this time, wage inequality in the private sector increased by over 40 percent. Union decline forms part of an institutional account of rising inequality that is often contrasted with a market explanation. In the market explanation, technological change, immigration, and foreign trade increased demand for highly skilled workers, raising the premium paid to college graduates (for reviews, see Autor, Katz, and Kearney 2008; Gottschalk and Danziger 2005; Lemieux 2008).

Compared to market forces, union decline is often seen as a modest source of rising inequality (Autor et al. 2008). Scholars view unions' effects as indirect, mediating the influence of technological change (Acemoglu 2002); secondary to other institutions like the minimum wage (Card and DiNardo 2002;

DiNardo, Fortin, and Lemieux 1996); and limited, accounting for only a small fraction of rising inequality and only among men (Card, Lemieux, and Riddell 2004).

We revisit the effects of union decline on inequality and offer two extensions to earlier research. First, we study the effects of union decline while controlling for education and other factors. Analyzing education alongside unions allows a comparison of market and institutional effects on rising inequality. Second, we examine union effects on nonunion wages, considering whether wage inequality is lower among nonunion workers in highly unionized regions and industries.

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Union effects on nonunion workers can work in several ways. Nonunion employers may raise wages to avert the threat of union organization (Leicht 1989). We argue that unions also contribute to a moral economy that institutionalizes norms for fair pay, even for nonunion workers. In the early 1970s, when 1 in 3 male workers were organized, unions were often prominent voices for equity, not just for their members, but for all workers. Union decline marks an erosion of the moral economy and its underlying distributional norms. Wage inequality in the non-union sector increased as a result.

Our analysis estimates union effects on wage inequality by decomposing the growth in hourly wage inequality for full-time workers in the private sector. Analyses of the Current Population Survey (CPS) show that union decline explains a fifth of the increase in inequality among men and none of the increase among women if only union wages are considered. The effect of union decline grows when we account for the link between unionization and nonunion wages. In this case, deunionization explains a fifth of the inequality increase for women and a third for men. The decline of organized labor among men contributes as much to rising wage inequality as does the growing stratification of pay by education.

## TRENDS IN WAGE INEQUALITY AND UNIONIZATION

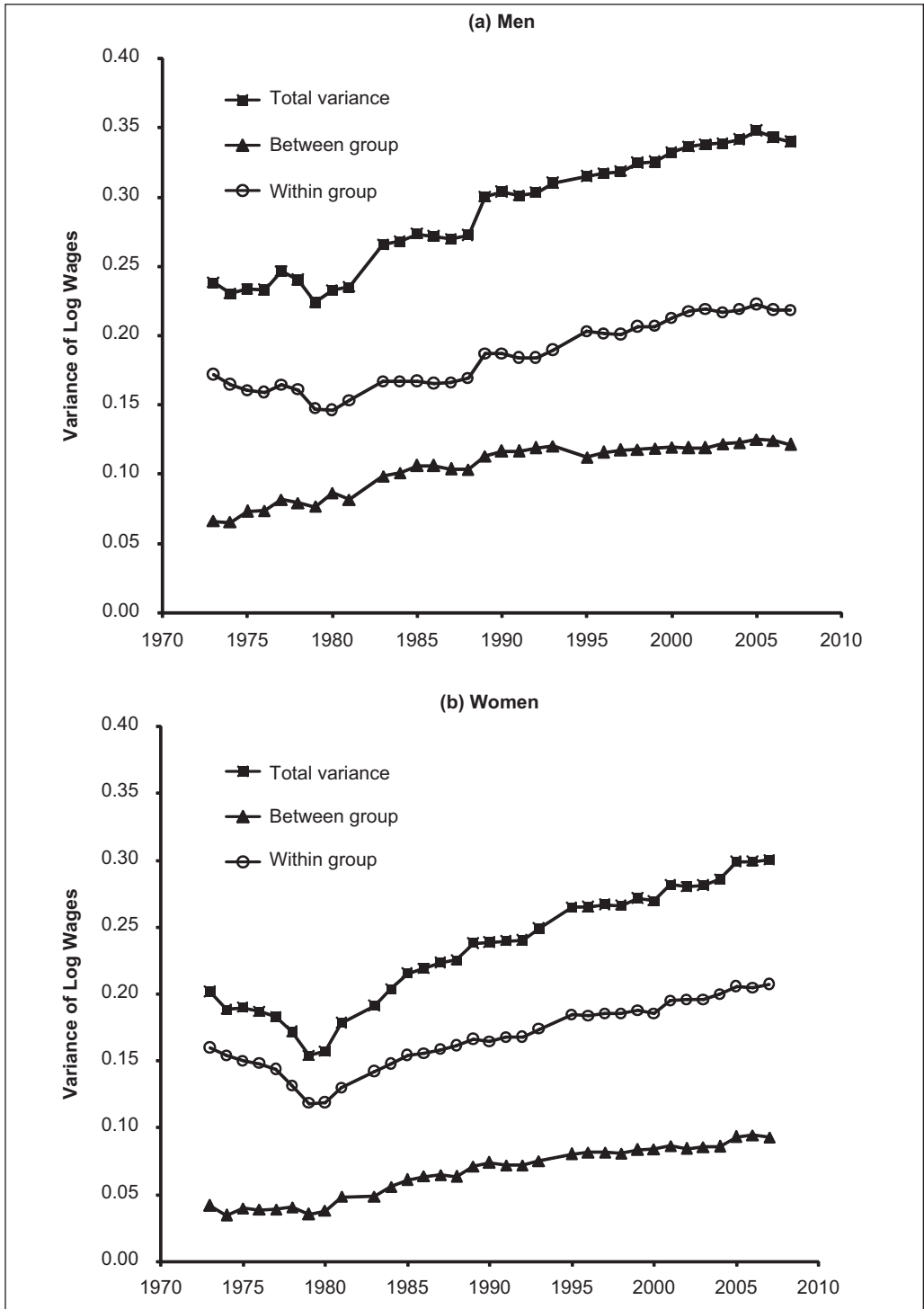
We analyze trends in the private sector—about 85 percent of nonfarm employment (U.S. Bureau of the Census 2007)—where growth in inequality and decline in union density was largest. Using data from the May and Merged Outgoing Rotation Group files of the CPS, we measure inequality by the variance in log hourly wages for men and women working full-time in private sector jobs. From 1973 to 2007, men's wage inequality increased by 40 percent, from .25 to .35, with most of the rise unfolding from 1978 to 2000 (see Figure 1). Women's wage inequality increased

even more, rising from .20 in 1973 to .30 in 2007. Overall trends were driven by movements at the top and the bottom of the wage distribution. Increasing inequality in the late 1970s and 1980s reflected falling wages at the bottom and rising wages at the top of the distribution. Since the late 1980s, the growth in wage inequality has been propelled by wage increases for the highest-paid workers (Lemieux 2008).

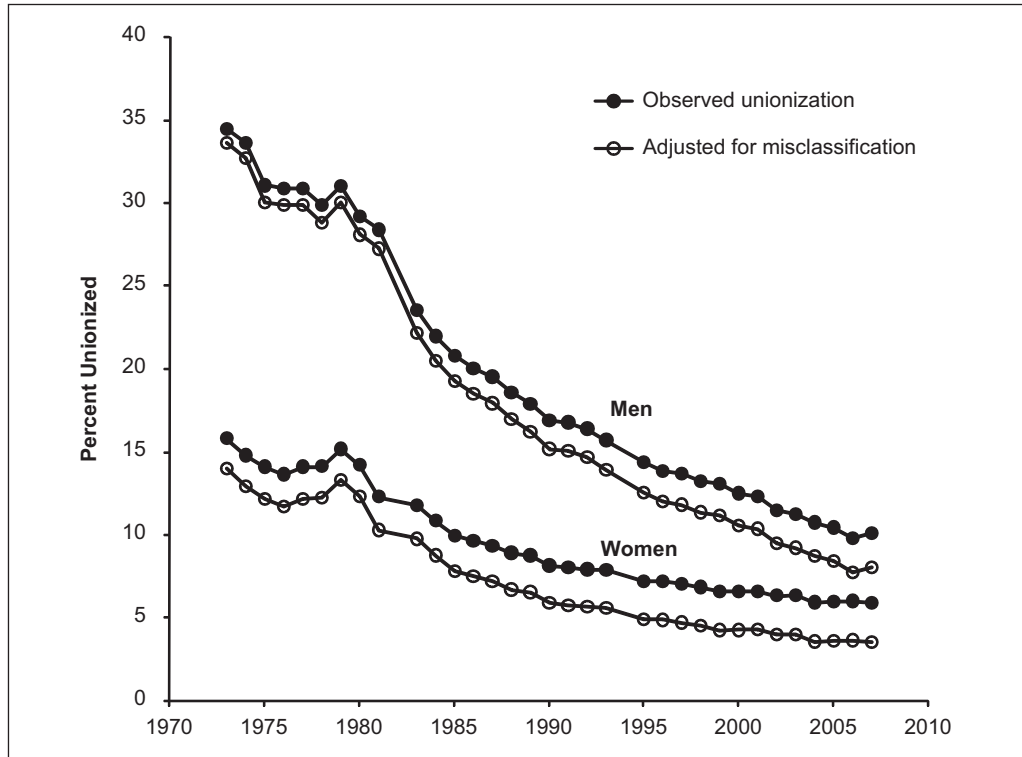
Figure 1 divides the total variance in log wages into between- and within-group components. We obtained these components from a regression of log wages with age, race, ethnicity, education, region, union membership, and industry-region unionization rates as predictors. Between-group inequality, measured by the variance of predicted wages, describes the dispersion of average wages across the groups defined by the predictors. Within-group inequality, measured by the residual variance, describes the spread of wages among workers in each of these groups. Rising inequality between and within groups increased total wage inequality in the 1980s. Since the 1990s, rising inequality is mostly due to increased within-group inequality.

Falling unionization accompanied rising wage inequality. CPS tabulations indicate union decline was especially large among men, falling from 35 percent in 1973 to less than 10 percent by 2007. Employer surveys show that CPS survey respondents mistakenly report their union status 2 to 3 percent of the time (Card 1996). When unionization is very low, a relatively large number of non-union respondents incorrectly report being union members. Figure 2 reports the observed proportion of unionized workers and an adjusted series that corrects for error in reported union status in the CPS. Adjusting for reporting error, only 8 percent of private sector men and less than 4 percent of private sector women were union members by 2007.

Scholars often attribute union decline in the United States to changes in the economy and intensified political conflict in the workplace (Farber and Western 2001; Freeman and Medoff 1984; Goldfield 1987). In this account, union



**Figure 1.** Inequality in Hourly Wages among Full-Time, Private Sector Men and Women, 1973 to 2007  
*Note:* Figures are calculated from the May and Merged Outgoing Rotation Group files of the CPS.



**Figure 2.** Union Membership Rates among Full-Time, Private Sector Men and Women, 1973 to 2007

Note: Rates are unadjusted and adjusted for reporting error in union status in the CPS.

firms could not respond to 1970s stagflation, industry deregulation, and economic globalization. The biggest driver of decline in the percentage unionized was employment growth outside the traditional union strongholds of manufacturing, construction, and transportation, utilities, and communications. Faced with a newly competitive economic environment, employers in unionized industries intensified their opposition, and union employment and new organizing—at least through union elections—plunged through the 1980s (Hirsch 2008; Tope and Jacobs 2009).

Employer opposition unfolded in an increasingly adverse political context for labor. Hacker and Pierson (2010) report that an influx of corporate donations influenced policymakers to oppose pro-union reforms of labor law in the 1970s. Union reform efforts were defeated, and the National Labor Relations

Board's rightward shift under Republican administrations made organizing more difficult in the 1980s. Political defeats in the 1970s and 1980s yielded a set of "enervated" labor laws that enabled employers to block organizing campaigns and weaken existing unions (Cowie 2010:288).

## UNIONS AND INEQUALITY

Union decline and rising inequality has motivated research on the share and the shape of the union wage distribution. We extend this research by linking unionization to wage inequality among nonunion workers.

### *Wages in the Union Sector*

Research on unions and inequality has focused on two effects. First, unions raise

wages among less-educated and blue-collar workers. This between-group effect of unions reduces educational and occupational inequality. Second, collective bargaining standardizes wages within firms and industries. This within-group effect of unions on inequality reduces the spread of wages among union members with similar characteristics. Comparing these effects, Freeman (1980) found that unions reduce wage inequality more within than between educational and occupational groups. Because nonunion women are concentrated in occupations with low and relatively equal wages, unions' effect on within-group inequality is largest among men (MacPherson and Stewart 1987).

Unions' within- and between-group effects suggest union decline is associated with rising wage inequality. Scholars estimate that declining unionization explains 10 to 20 percent of the growth in men's wage inequality from the late 1970s through the late 1980s (Card 1992; Freeman 1993). DiNardo and colleagues (1996) studied the top and bottom tails of the wage distribution separately and found that deunionization is chiefly associated with top-tail inequality; union decline explains nearly a third of the growth in the gap between the median wage and the 90th percentile. In their analysis, deunionization accompanied the declining middle of the pay distribution.

### *Unions and Nonunion Wages*

Union wages have been the main focus of research on inequality, but organized labor also affects nonunion workers. Economists often contrast the effects of spillover and threat. When unions raise wages for their members, employers may cut union employment, forcing unemployed workers to find jobs in the nonunion sector. Spillover of workers into the nonunion labor market causes wages to fall. The threat effect results from nonunion employers raising wages to the union level to avert the threat of unionization. The two theories yield opposing predictions: unions reduce nonunion wages with

spillover but increase nonunion wages with threat. Empirical studies tend to support the threat effect, showing that nonunion wages are higher in highly unionized industries, localities, and firms (Farber 2005; Leicht 1989; Neumark and Wachter 1995).

The theory of union threat has distributional implications. If unions threaten to organize low-wage workers, employers may raise wages, thereby equalizing the wage distribution. Testing this theory, Kahn and Curme (1987) estimated the effect of industry unionization on the variance of nonunion wages for detailed industries and occupations in the 1979 CPS. Consistent with the equalizing effect of union threat, they found less inequality among nonunion workers in highly unionized industries (cf. Belman and Heywood 1990).

### *Unions and the Moral Economy*

The theory of union threat takes a rationalist view of employers and a minimalist view of labor market institutions. Employers minimize labor costs and only raise wages when threatened with even greater pay increases through unionization. Institutions are conceived minimally in the sense that unions are the key distortion in an otherwise competitive labor market.

We relax these assumptions, arguing that the labor market is embedded in a moral economy in which norms of equity reduce inequality in pay. The moral economy consists of norms prescribing fair distribution that are institutionalized in the market's formal rules and customs. In a robust moral economy, violation of distributional norms inspires condemnation and charges of injustice. We often think of the moral economy historically—determining, for example, fair prices for bread and flour under the British Corn Laws (Thompson 1971) or the relative rank and standing of English workers in the nineteenth century (Polanyi [1944] 1957).<sup>1</sup>

Unions are pillars of the moral economy in modern labor markets. Across countries and over time, unions widely promoted norms of

equity that claimed the fairness of a standard rate for low-pay workers and the injustice of unchecked earnings for managers and owners (Hyman and Brough 1976; Webb and Webb 1911). Comparative researchers emphasize the role of distributional norms governing European industrial relations (Elster 1989b; Swenson 1989). The U.S. labor movement never exerted the broad influence of the European unions, but U.S. unions often supported norms of equity that extended beyond their own membership. In our theory of the moral economy, unions help materialize labor market norms of equity (1) culturally, through public speech about economic inequality, (2) politically, by influencing social policy, and (3) institutionally, through rules governing the labor market.

Culturally, industrial unions often use a language of social solidarity in public discourse and within firms. Walter Reuther's postwar leadership of the United Auto Workers (UAW) provides a key example. Labor historian Nelson Lichtenstein (1995:300) writes that Reuther aimed to "reshape the consciousness of millions of industrial workers, making them disciplined trade unionists, militant social democrats, and racial egalitarians." The UAW sought to develop a network of union-based community organizations, published hundreds of newspapers, and pressed Presidents Kennedy and Johnson on civil rights legislation (Boyle 1995; Lichtenstein 1995). Within firms, unions have been voices for equity, protesting the pay of upper management. Consistent with the egalitarian effect of union advocacy, studies of data from the mid-1970s through the early 2000s find that managerial compensation is lower in unionized firms, and managerial employment is lower in highly unionized industries (DiNardo, Hallock, and Pischke 1997; Gomez and Tzioumis 2006).

Politically, U.S. unions have been frequent advocates for redistributive public policy. Highly unionized states have higher minimum wages, and their congressional representatives are more likely to support minimum wage increases (Cox and Oaxaca 1982; Kau

and Rubin 1978).<sup>2</sup> Union political pressure also reaches beyond wages to social legislation. For example, major unions regularly backed proposals for universal healthcare and supported the creation of Medicare in the mid-1960s (Derickson 1994). In the 1970s, unions joined with states in litigation opposing cuts to the federal food stamp program, and they threatened to sue again in 1980 to keep the program solvent.

Institutionally, U.S. industrial relations often extend union conditions to nonunion workers. When a third of the male labor force was organized, unions were national economic actors who shaped centralized wage policy. During World War Two, government boards with business and labor leaders helped set wage standards to control inflation and assist wartime production. Centralized wage policy continued during the Korean War. The tripartite Wage Standardization Board monitored wage increases among key firms and aimed to narrow inter-firm wage differentials and reduce wage inequality in the wider economy (Ross and Rothbaum 1954). In the 1960s, unions influenced national pay policy when the Kennedy and Johnson administrations set wage and price targets to stabilize prices and promote the "distributional equity" of wages (Ulman 1998:170). The Nixon administration also adopted a tripartite wage policy. Concluding that "no program works without labor cooperation," (Matusow 1998:160), Nixon's national pay board urged wage restraint in major contract negotiations but also examined executive pay levels, supported raises for low-wage workers, and monitored merit pay increases (Mitchell and Weber 1998). In the 1970s, President Carter pursued a national wage policy with union representation in a Pay Advisory Committee that set industry wage and price guidelines.

Unions also helped establish pay norms in local labor markets. In some industries, union influence was amplified by law. The federal Davis-Bacon Act and its state-level variants require public construction projects to pay at least the locally prevailing wages and fringe benefits. Studies from the 1970s show that

Davis-Bacon raised construction wages in nonunion firms and reduced the difference between union and nonunion wages (Goldfarb and Morrall 1981).

Beyond federal contractors, major union agreements also set the pattern for industry-wide wage increases. In the 1960s and 1970s, employers used industry wage surveys to reduce wage differences between union and nonunion firms (Dunlop 1977; Foulkes 1980; Jacoby 1997). Of course, adoption of union standards in nonunion firms was often intended to prevent unionization. Still, nonunion companies in the 1970s closely monitored union contracts even in lightly unionized industries where the threat of unionization was remote (Foulkes 1980). Predominantly nonunion firms with small union workforces abandoned merit pay, and norms of equal treatment governed distribution of fringe benefits. Summarizing his survey of pay practices in large nonunion firms, Foulkes (1980:153) writes:

In many environments, providing and demonstrating equity generally means that a company's pay rates favorably compare with those of unionized companies. It would be acceptable to say that the activities of many unions in the United States are benefiting many nonmembers; in other words, unions are doing much good for people who do not pay them any dues.

The slow postwar decline of unionization rates accompanied the erosion of the labor market's moral economy. The cultural, political, and institutional indicators of equitable pay norms declined with union membership. Many researchers see 1981 as a watershed year, when the Reagan administration defeated the air traffic controllers' strike by hiring permanent replacements. Voss and Sherman (2000:311) characterize the turning point as a change in norms when "corporate leaders stopped playing by the rules." Levy and Temin (2011) similarly divide the U.S. labor market's postwar history into the eras of the Treaty of Detroit until 1980 and the Washington

Consensus that followed. The era of the Treaty of Detroit was named for the landmark wage agreement of 1948 between General Motors and the UAW that provided an annual wage increase of 2 percent plus cost-of-living. Wages across manufacturing industries moved broadly according to this formula until 1980. The Treaty of Detroit was succeeded by the Washington Consensus, an era of deregulation and eroded pay norms in which earnings inequality increased as managers' and professionals' compensation rose.

Because union decline varies across regions and industries, we view the transformation of the moral economy not as a discrete turning point but as a gradual process unfolding unevenly across the labor market through the 1980s and 1990s. Our research design exploits this variation to study how deunionization is associated with rising wage inequality among nonunion workers in regional labor markets.

### *Limitations and Rival Explanations*

We can directly observe the union wage distribution's contribution to wage inequality, but union threat and norms of equity are unobserved mechanisms. In our approach, union threat and egalitarianism in the moral economy are indicated by industry-level unionization in a given region. This is an indirect measure compared to direct observation of the cultural, political, and institutional channels of union influence on nonunion wages. Still, the industry-region unionization rate captures in a single index organized labor's salience in the surrounding labor market. We can measure the index across the national labor market over decades, and it usefully captures the uneven decline of U.S. labor as a voice for equity in the economy as a whole.

Despite these virtues, industry-region unionization is likely correlated with economic and social conditions that are also associated with rising inequality. In particular, increased demand for highly skilled workers may raise inequality and reduce unionization. Scholars regularly interpret the rising demand for skilled



workers, indicated by the increasing college wage premium, as resulting from technological changes in which computerization replaces routine work tasks (Autor and Dorn 2009; Autor, Levy, and Murnane 2003). In some accounts, firms adapt to technological change by introducing performance pay and other workplace incentives, weakening internal labor markets and increasing inequality within firms (Bloom and Reenen 2010; Cappelli 2001). Although skill-biased technological change has been scholars' central focus, economists also argue that immigration and trade have shifted demand away from low-skill workers, further contributing to college graduates' wage premium (Card 2009; Cline 1997).

Union decline may have enabled or influenced technological and organizational change and economic globalization. Merit pay, for example, is less common in union firms (Lemieux, MacLeod, and Parent 2009). Evidence from a plant restructuring indicates that unions shape the introduction of new technologies to moderate pay inequality and limit layoffs (Fernandez 2001). Deunionization may thus have indirect or mediated effects on inequality beyond the effects of union threat or normative influence.

Alternatively, unions flourish in concentrated, protected, smokestack industries employing relatively homogeneous workforces. Technological change, human resource management, and economic globalization may undermine workplace solidarity, fueling deunionization and wage inequality. Declining unionization and rising inequality may share common roots in shifting market conditions. Effects we attribute to union decline may really be due to other changes in the economy.

We account for some rival explanations in a regression that controls for education, demographic characteristics, and region. The increasing education gradient accompanying skill-biased technological change, immigration, and trade is directly incorporated into the analysis. The regression also allows a comparison of effects of deunionization versus effects of education. Still, omitted variable bias

likely remains and this affects our interpretation of the results.

## DATA AND METHODS

We link union decline to rising inequality by decomposing the variance of log wages. The decomposition uses a variance function regression in which the mean and the variance of an outcome depend on independent variables, providing a model for between- and within-group inequality (Western and Bloome 2009).

The decomposition is based on a regression on the log hourly wage,  $y_i$ , for respondent  $i$  ( $i = 1, \dots, N$ ) for a given year of the CPS. Our key predictors are an indicator for union membership,  $u_i$ , and a continuous variable,  $\bar{u}_i$ , that records for each respondent the unionization rate for the industry and region in which they work. Covariates, including schooling, age, race, ethnicity, and region, are collected in the vector,  $\mathbf{x}_i$ . The model includes equations for the conditional mean of log wages,

$$\hat{y}_i = \mathbf{x}_i' \boldsymbol{\alpha}_1 + u_i \alpha_2 + \bar{u}_i \alpha_3$$

and the conditional variance,

$$\log \sigma_i^2 = \mathbf{x}_i' \boldsymbol{\beta}_1 + u_i \beta_2 + \bar{u}_i \beta_3.$$

We expect union membership and industry-region unionization to have positive effects on average wages, but negative effects on the variance of log wages. Economy-wide changes in average wages and within-group inequality, perhaps due to general shifts in norms or the macroeconomy, are captured through the regression intercepts.

We measure between-group wage inequality by the variance of the conditional means,

$$B = \sum_{i=1}^N w_i (\hat{y}_i - \bar{y})^2, \quad (1)$$

where  $w_i$  is the sample weight for respondent  $i$ , normed to sum to 1, and  $\bar{y}$  is the grand mean of log wages. We measure within-group inequality by the residual variance,

$$W = \sum_{i=1}^N w_i \sigma_i^2, \quad (2)$$

That each respondent has a variance,  $\sigma_i^2$ , may be counterintuitive, but it is simply estimated by the squared residual from the regression on  $y_i$ . Because unions are mostly associated with within-group inequality, we expect deunionization to be closely associated with an increase in within-group variance,  $W$ . Summing within- and between-group components yields the total variance, a measure of overall inequality:

$$V = B + W.$$

We decompose the rise in inequality with three adjusted variances that fix in a baseline year either the coefficients or the distribution of some predictors. First, focusing on individual union membership, we calculate the level of inequality assuming unionization had remained at its 1973 level. We estimate this compositional effect by reweighting the data to preserve the 1973 unionization rate across all years, from 1973 to 2007. We then use the adjusted weights in Equations 1 and 2 to calculate adjusted variances for all years. Second, we add the effects of union threat and equitable wage norms on nonunion workers by calculating wage inequality assuming industry-region unionization and its coefficients remain constant at the 1973 level. Fixing industry-region unionization coefficients, and reweighting to hold union density constant, yields adjusted values of  $\hat{y}_i$  and  $\sigma_i^2$  that are plugged into Equations 1 and 2 to obtain adjusted measures of between- and within-group inequality. Finally, we assess education's contribution to rising inequality by fixing education coefficients for the mean and variance equations at their 1973 values. Fixed education coefficients adjust the values of  $\hat{y}_i$  and  $\sigma_i^2$  and the resulting measures of between- and within-group inequality (see Appendix A for more details).

Adjusted variances quantify the growth in inequality statistically attributable to changes in unionization rates or changes in coefficients. Adjustments describe the association between rising inequality, on one side, and

union decline and educational inequality on the other. Adjusted variances might be interpreted as counterfactual measures of inequality, prevailing if unionization rates or regression coefficients remained fixed at 1973 levels. The counterfactual assumes, however, that regression coefficients accurately estimate causal effects, that all other predictors and their coefficients change as observed, and that there are no broader effects on employment of fixing unionization rates or other quantities.

Counterfactual interpretation is likely implausible because of omitted variable bias. Because we analyze the change in inequality rather than its level at a point in time, biases of constant magnitude will not affect our analysis of the trend. However, if union members are increasingly positively selected, upward bias in wage effects will grow because of union workers' rising productivity. In the context of rising inequality, shifts in technology, industry regulation, and the use of performance pay, for example, might be correlated with industry-region unionization and wages. Industry and region fixed effects might reduce omitted variable bias, although fixed effects account for nearly all the variation in industry-region unionization, leaving little variance for the effects of interest. We try to reduce bias with region fixed effects. Given a clear trade-off between population description and causal analysis, we prefer this simple model because our interest centers on the population trend in rising wage inequality. We aim to show how the wage distribution moves with shifts in unionization and other labor market conditions, rather than providing a causal analysis of wage determination.

Measurement error in union membership also adds bias. Using data from a 1977 employer survey, Card (1996) found that 2.5 percent of CPS respondents misreport their union status.<sup>3</sup> With this estimate of measurement error, at 50 percent unionization, the number of nonunion workers misclassified as union equals the number of union members misclassified as nonunion. With observed unionization at 10 percent, a large number of nonunion workers (2.5 percent of 90 percent) report they are union members.

Given a misclassification rate,  $\lambda$ , and observed unionization,  $\bar{u}$ , the true unionization rate is  $(\sigma_i^2 - \lambda)/(1 - 2\lambda)$ . With observed unionization at .10 (10 percent) and a misclassification rate of  $\lambda = .025$  (2.5 percent), the true unionization rate is .079, a measurement error of about 20 percent. Measurement error biases estimates of union effects and increases with declining unionization.

We account for measurement error in union status by augmenting the likelihood for the wage model with an extra term for the probability of misclassification (for other approaches, see Card 1996; Hirsch 2004). Because the misclassification rate may vary across surveys, we specify an average rate of 2.5 percent but allow it to vary from 2 to 3 percent with a Bayesian prior distribution. Correcting for misclassification significantly reduces bias in the estimated union effects (see Appendix B).

We compiled data from the annual May files of the CPS from 1973 to 1981 and the annual Merged Outgoing Rotation Group files of the CPS from 1983 to 2007 (Unicon Research Corporation various years; U.S. Bureau of the Census various years). We exclude 1982, when union questions were omitted from the survey, and 1994 and three-quarters of 1995, when allocation flags for wages were missing. The analysis includes men and women working full-time (i.e., 30 hours a week or more) in the private sector.

The dependent variable is log hourly wages adjusted for inflation to 2001 dollars. Several adjustments improve the quality and continuity of the wage data. Nonresponse to wage and income questions increases over time, and by 2007, about a third of CPS workers did not report wages. The CPS imputes wages to nonrespondents, but regression coefficients for nonmatched criteria are attenuated and the residual variance for wages is sensitive to the imputed data (Hirsch 2004; Mouw and Kalleberg 2010). We thus omit imputed wages from the analysis.<sup>4</sup> Earnings imputation flags change across surveys, and we follow Hirsch and Schumacher (2004) to create a consistent series of nonimputed earners. A few respondents with wages less than one dollar are excluded. Top-codes for wages

and the proportion top-coded varies over surveys, biasing estimates of inequality. For each year, we impute the top 2 percent of wages from a Pareto distribution. Other common methods for top-codes yield similar results to those reported here. Incomes greatly increased in the top percentile since the 1990s, a trend measured by administrative rather than survey data (Piketty and Saez 2003). Similar to other research on wage inequality (Autor et al. 2008; Mouw and Kalleberg 2010), we cannot analyze the top fractions of a percentile of the income distribution with these data (for coding details, see the online supplement [<http://asr.sagepub.com/supplemental>]).

Table 1 reports descriptive statistics for the CPS data. Wage stagnation is indicated by trends in average pay for union and nonunion men. Average pay increased for women, reflecting women's entry into professional and other skilled occupations. Inequality trends are similar for men and women, increasing everywhere and most rapidly among union workers. Rising wage inequality among union workers tends to reduce the effect of union decline on inequality, as the union wage distribution comes to resemble the nonunion distribution. Educational attainment also increased across the labor market, as the proportion of high school dropouts in the workforce dropped from around 1 in 4 workers in the 1970s to about 1 in 10 by the 2000s. Fewer than 20 percent of private sector workers were college graduates in the 1970s, but more than a quarter had college degrees three decades later. The college graduation gap between union and nonunion workers also narrowed from the 1970s to the 2000s.

Other covariates might be analyzed, but coding inconsistency and missing data prevent us from greatly augmenting the model. In additional analyses, we explored the effects of marital status, Hispanics, urban residence, and occupations. Results are largely unchanged for men. There is greater confounding for women, but their union effects are relatively small in any case.

To estimate the effect of unions on nonunion workers, earlier research measures unionization in industries and localities (e.g., Freeman and Medoff 1981; Neumark and Wachter 1995).

**Table 1.** Descriptive Statistics for Analysis of Unionization and Hourly Wage Inequality among Private Sector Men and Women, Working Full-Time, CPS, 1973 to 2007

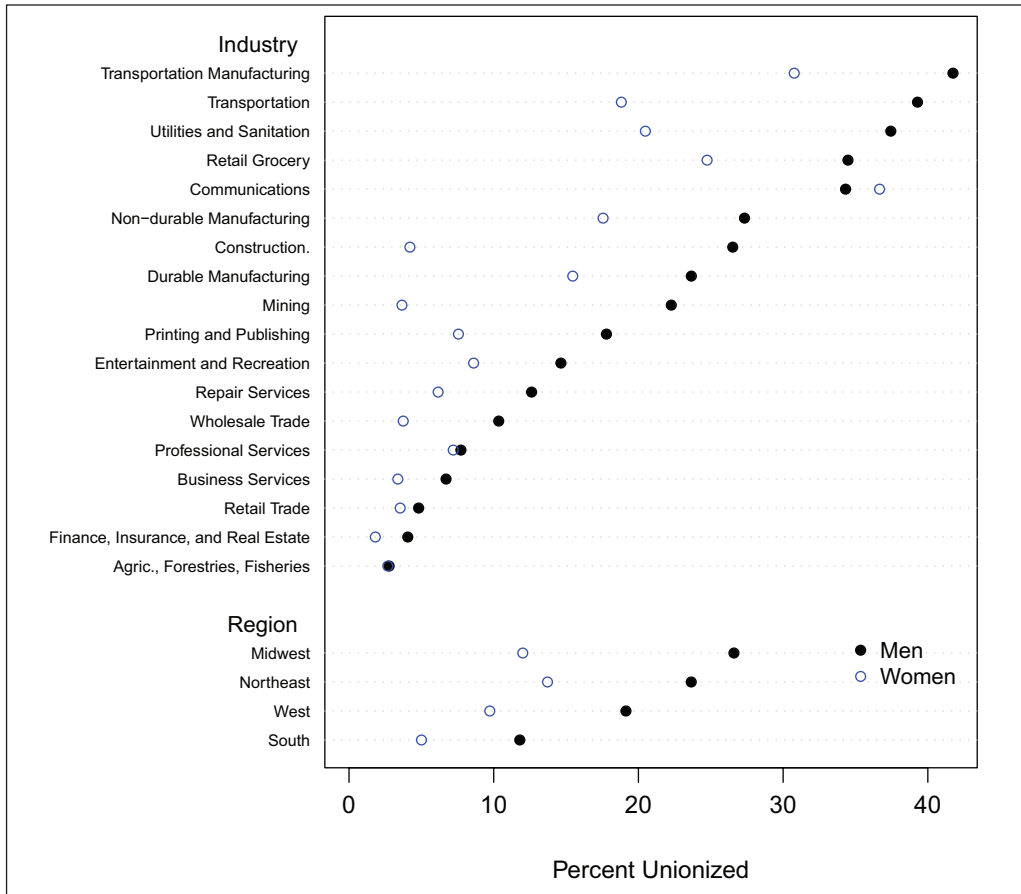
	1973 to 1984		1985 to 1995		1996 to 2007	
	N	U	N	U	N	U
<b>Male Workers</b>						
Log Hourly Wages						
Mean	2.84	3.05	2.81	3.04	2.87	3.07
Variance	.29	.12	.32	.14	.35	.19
Level of Schooling (proportion)						
Less than high school	.23	.31	.14	.17	.13	.10
High school graduate	.33	.47	.35	.51	.31	.46
Some college	.23	.17	.24	.24	.26	.33
BA or more	.21	.04	.27	.07	.29	.11
Demographic Characteristics (proportion)						
White	.86	.83	.83	.81	.76	.77
Black	.07	.09	.06	.09	.06	.08
Other	.08	.08	.11	.10	.18	.15
Age (years)	36.11	39.04	36.39	40.56	38.79	42.43
<b>Female Workers</b>						
Log Hourly Wages						
Mean	2.46	2.66	2.56	2.74	2.67	2.82
Variance	.19	.12	.24	.18	.29	.23
Level of Schooling (proportion)						
Less than high school	.20	.33	.10	.17	.08	.10
High school graduate	.47	.48	.40	.48	.32	.36
Some college	.22	.14	.29	.22	.33	.30
BA or more	.11	.05	.20	.13	.27	.23
Demographic Characteristics (proportion)						
White	.84	.74	.81	.68	.76	.64
Black	.09	.16	.09	.18	.09	.16
Other	.07	.10	.10	.14	.15	.20
Age (years)	35.59	38.83	36.41	40.05	39.20	42.50

Note: N = nonunion workers, U = union workers.

Indeed, regions and industries are two key dimensions along which workers and employers make wage comparisons (Foulkes 1980; Hyman and Brough 1976). To capture the influence of unions on the nonunion sector, we measure unionization in 18 industry categories combining broad (one-digit) sectors with several detailed (two-digit) industries. We recode the several revisions of CPS industry classifications to produce a relatively consistent series whose distribution changes smoothly across survey redesigns. We disaggregate further by measuring industry unionization in four census regions (i.e., the Northeast, the South, the Mid-

west, and the West). Regional disaggregation helps account for time-varying changes in regional pay scales and allows union strength to be spread unevenly across the country. Smaller spatial units, like states, might correspond better to local labor markets, although a full set of state identifiers are available only since 1977 and region codes are available for the whole series. In large capital-intensive industries where unions are concentrated, pay norms, like unionization, are also likely to stretch across state lines.

Dividing the national labor market into 18 industries by four regions yields 72 annual



**Figure 3.** Average Unionization Rates for Full-Time, Private Sector, Male and Female Workers, in 18 Industries and Four Regions, 1973 to 2007

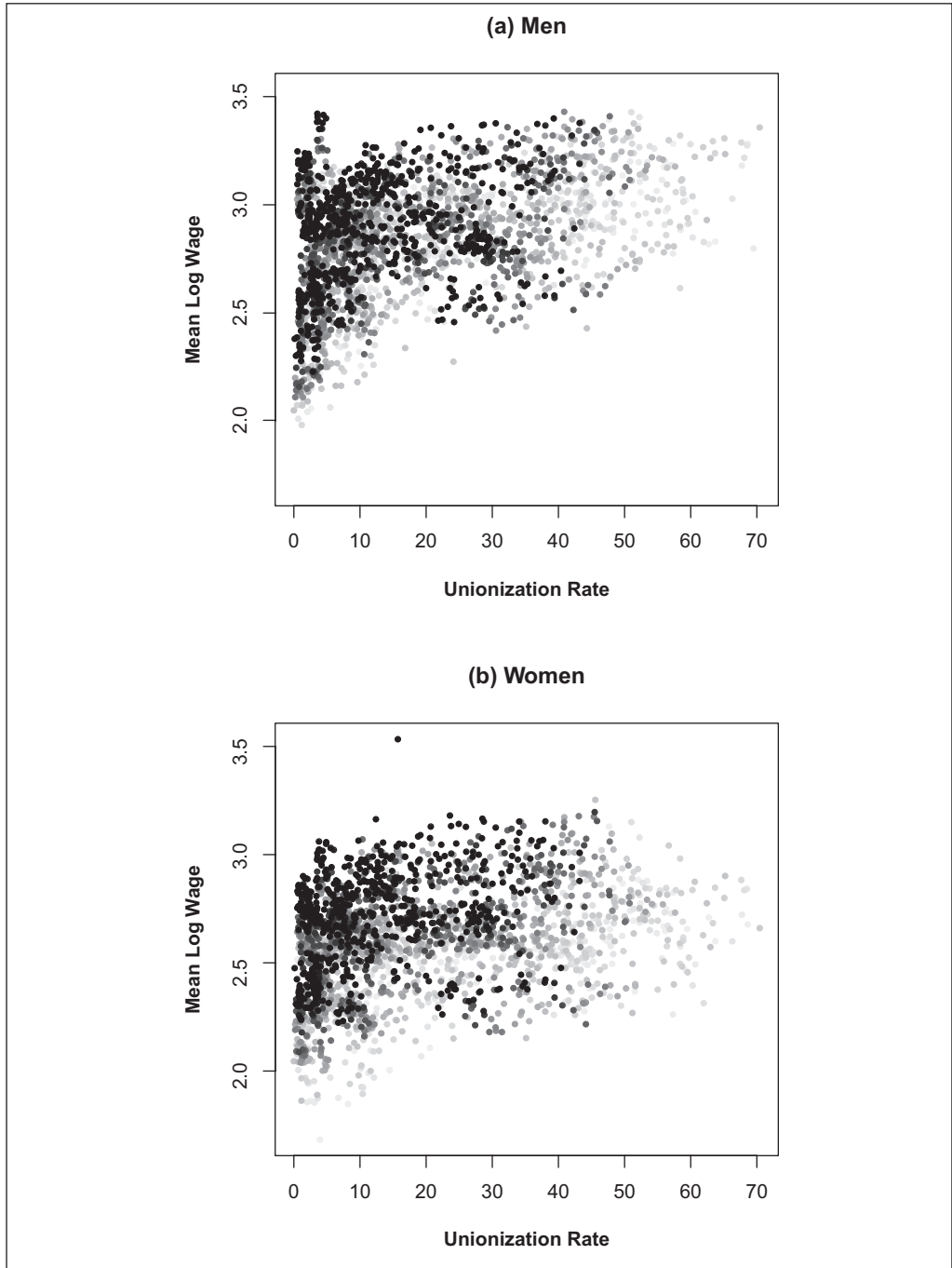
industry-region unionization rates. On average, unionization rates were highest in utilities, transportation, and communications, particularly in the Northeast and the Midwest (see Figure 3). Unionization was lowest in agriculture, finance, and retail trade, and throughout the South. Throughout the country, women’s unionization rates in the private sector were lower than men’s.

We find evidence for the relationship between industry-region unionization and wages by plotting unionization for the 72 industry-regions’ nonunion wages for each year from 1973 to 2007. Average nonunion wages are higher in regions and industries where unionization is higher (see Figure 4). Higher wages may reflect the effect of union

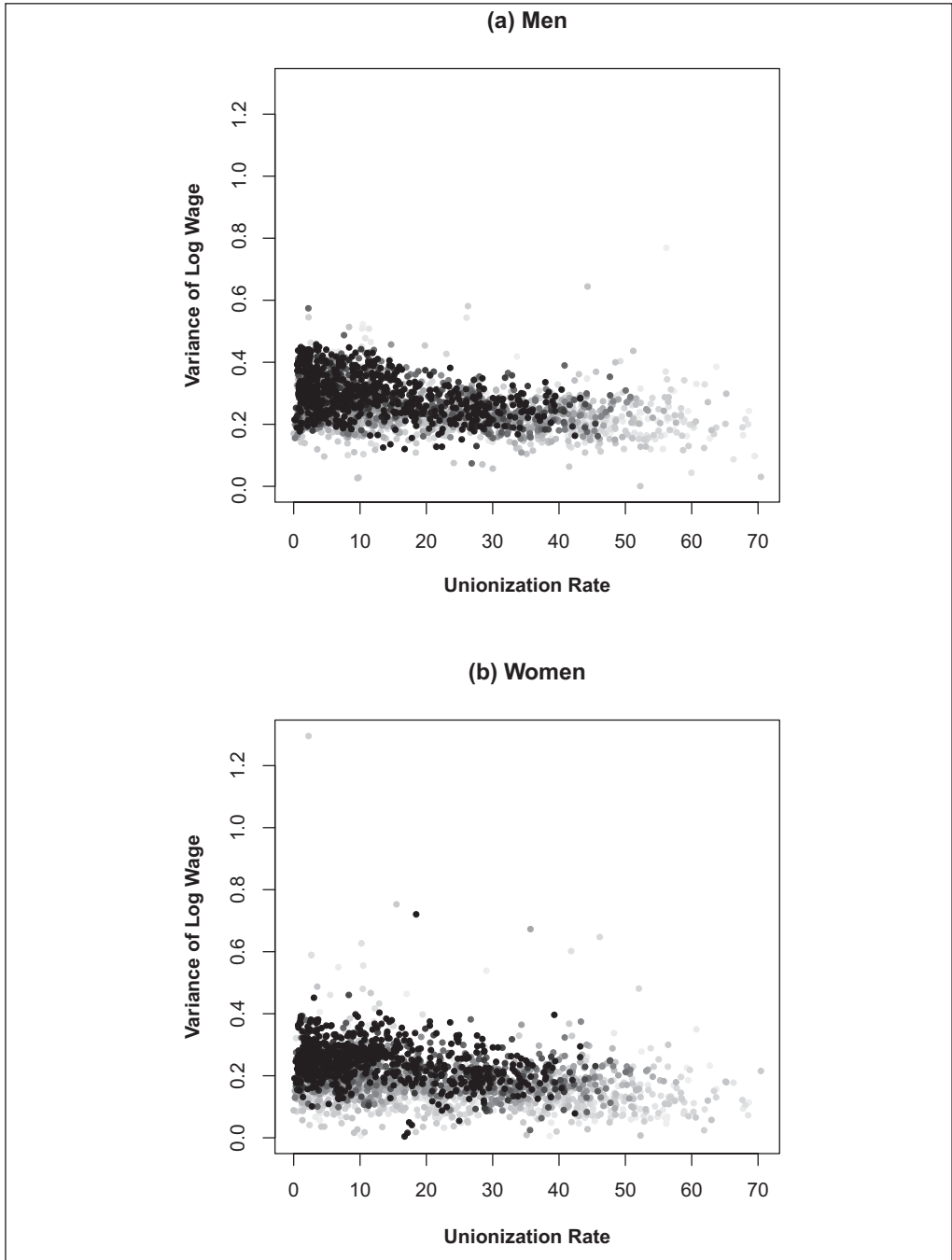
threat, workers’ skills in different industries, or industry rents. Figure 5 shows preliminary support for unions’ waning normative influence on nonunion wages. For men and women, nonunion wages are more compressed in local labor markets that are highly unionized, and highly unionized local labor markets become less common over time.

**RESULTS**

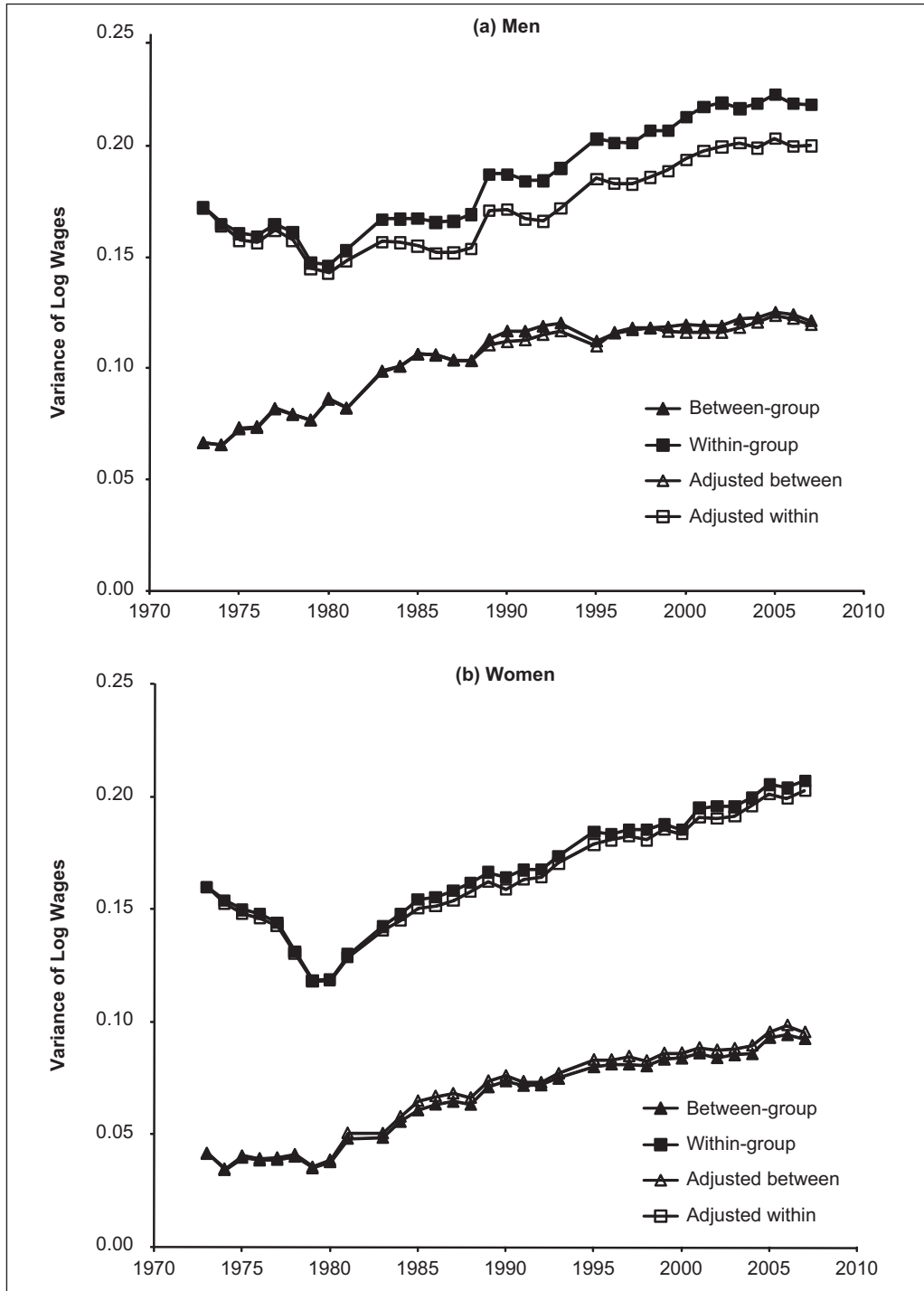
To study the effects of declining union membership on wage inequality, we fix the unionization rate at 1973 levels. Similar to earlier research, we find the largest effect of declining union membership on men’s within-group inequality (see Figure 6, panel a). The observed



**Figure 4.** Unionization Rates and Mean Log Hourly Wages for Full-Time, Private Sector, Male and Female Nonunion Workers, by 72 Industry-Regions, 1973 to 2007  
*Note:* Points go from light gray to black, from 1973 to 2007.



**Figure 5.** Unionization Rates and the Variance of Log Hourly Wages for Full-Time, Private Sector, Male and Female Nonunion Workers, by 72 Industry-Regions, 1973 to 2007  
*Note:* Points go from light gray to black, from 1973 to 2007.



**Figure 6.** Observed and Adjusted Within- and Between-Group Variances of Log Hourly Wages, Full-Time, Private Sector Men and Women, 1973 to 2007; Adjusted Variances Fix Union Membership at the 1973 Level



within-group variance increases by .046 points, but the adjusted variance (with the 1973 unionization rate) increases by only .028 points. Over a third of the increase in within-group inequality is associated with declining union membership ( $[(.046 - .028)/.046 = .40]$ ). Between-group inequality increases by .055 variance points and the adjusted series increases by almost as much, by .053, indicating that union decline explains little of the rise in men's between-group inequality. Summing the between- and within-group effects, the decline in unionization from 34 to 8 percent explains about a fifth of the rise in inequality in hourly wages among full-time, private sector men.

Among women, the effect of declining union membership on wage inequality is smaller (see Figure 6, panel b). Inequality grew slightly more for women than for men, but increasing women's wage inequality is unrelated to union membership. Within-group inequality increased by about .047 points among women but the adjusted series, with 1973 unionization held constant, increases nearly as much, by .043 points. Similarly, between-group inequality increased by .051 points and the adjusted between-group variance, with union membership fixed, increased by .054 points. Consistent with other research, holding the unionization rate constant explains almost none of the rise in women's wage inequality.

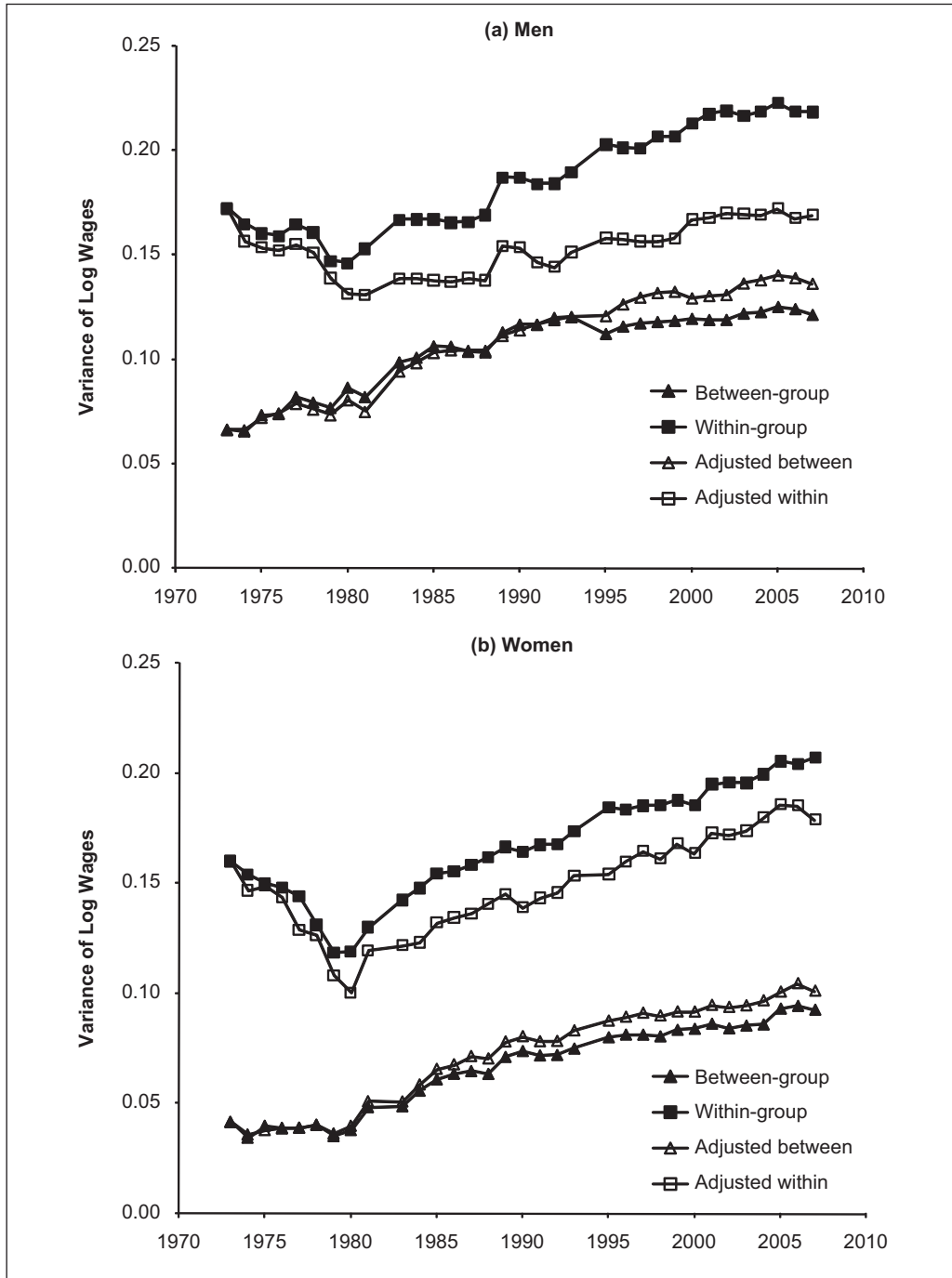
Union decline explains more of the rise in wage inequality once we account for the link between unions and nonunion wages. The link between organized labor and nonunion workers is captured by the effects of industry-region unionization on the mean and variance of wages. The total effect of deunionization can be measured by fixing the 1973 unionization rate as before, and also fixing industry-region unionization rates and their coefficients at 1973 values (see Figure 7). This adjustment indicates the strong relationship between union decline and rising within-group inequality. Among men, adjusted within-group inequality does not increase between 1973 and 2007, suggesting effects of union threat and eroding norms of equity on the wage distribution. Deunionization's effect on union and nonunion wages is associated with about

a third of the rise in wage inequality. This accounting, which includes unions' effects on nonunion wages, is 50 to 100 percent larger than the union effects on inequality reported in other decompositions (cf. Card 2001; DiNardo et al. 1996).

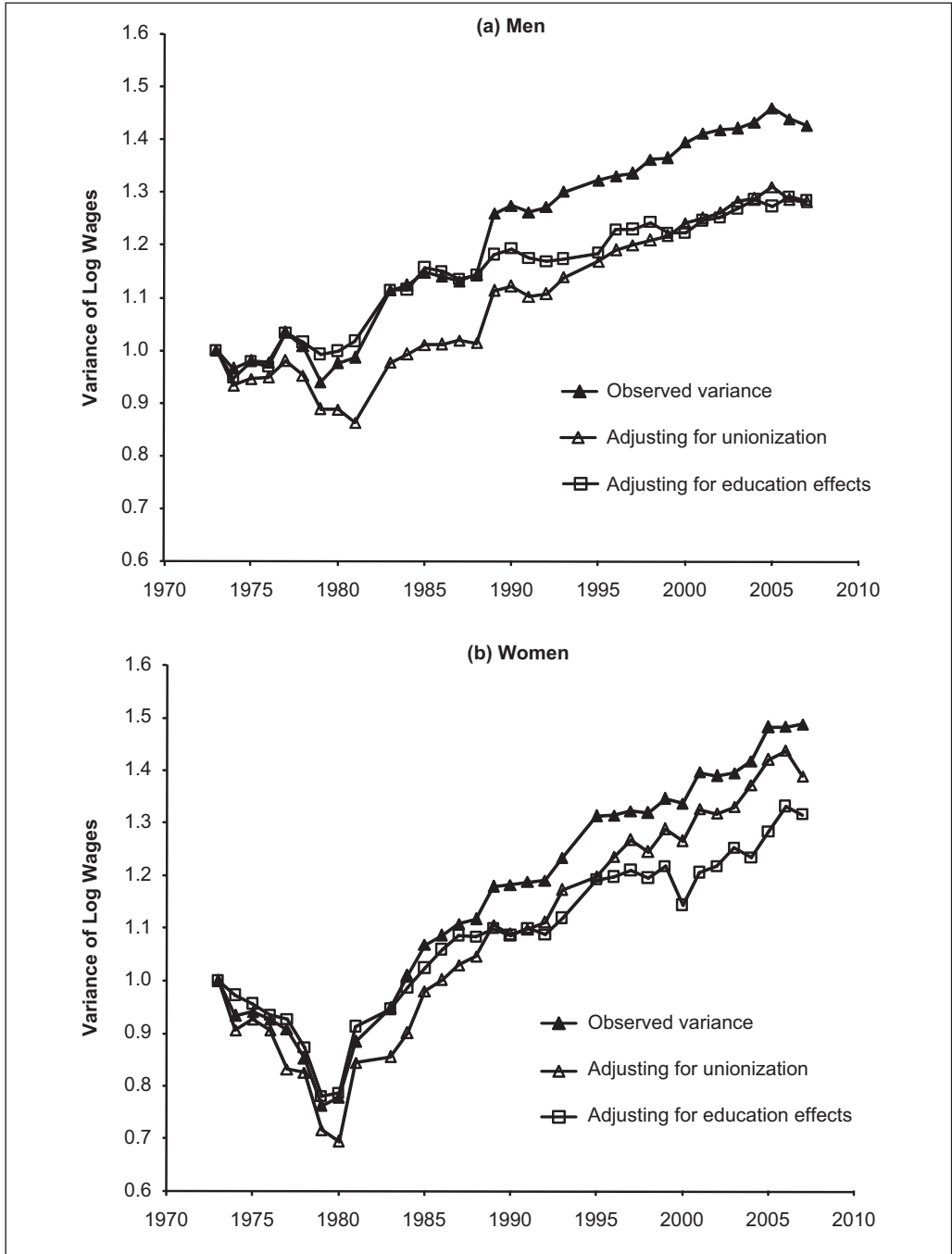
Among women, the association between union decline and wage inequality is smaller, but greater than zero, once nonunion wages are taken into account (see Figure 7, panel b). Declining industry-region unionization accounts for over half of the increase in women's within-group inequality. Adding between- and within-group effects together, union decline is associated with about a fifth of the rise in wage inequality among women.

How do the effects of union decline compare to the growing inequality of wages by education? Counting union and nonunion wage effects, deunionization explains about a third of the rise in men's earnings inequality (see Figure 8, panel a). Increasing returns to education and increasing wage inequality among highly educated workers explain a similar share of the rise in wage inequality. Among women, union decline explains about a fifth of the rise in wage inequality (see Figure 8, panel b); rising educational inequality in pay explains nearly twice as much. In short, deunionization's effects on inequality are only half as large as education's effects for women, but union and education effects are equally large for men.

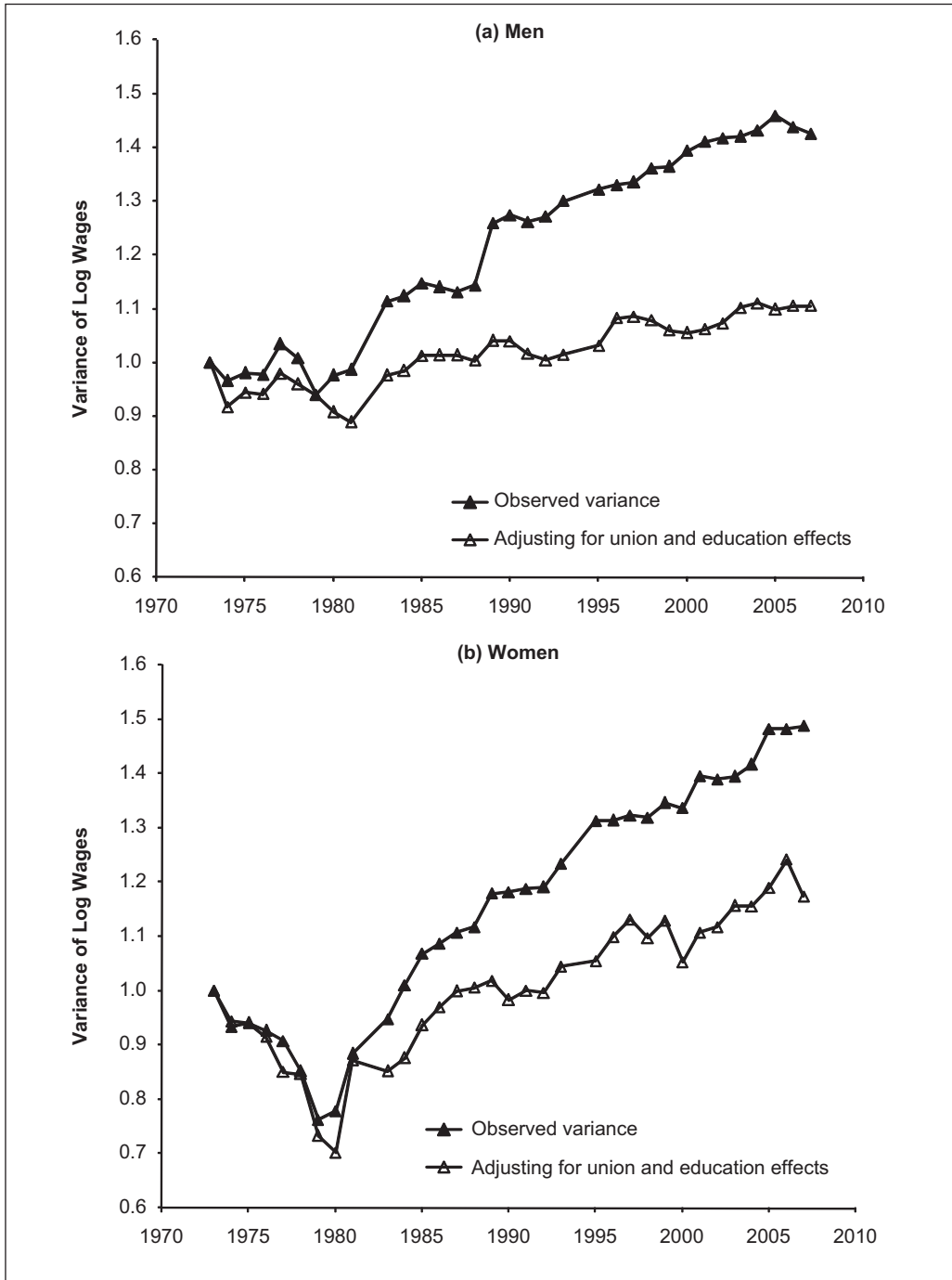
Finally, the combined effects of union decline and education on wage inequality can be calculated by holding constant the unionization rate, industry-region unionization and its coefficients, and education coefficients (see Figure 9). From 1973 to 2007, the adjusted variance for men's wage inequality increased only 10 percent, compared to a 40 percent increase in the observed variance. Three-quarters of the rise in men's hourly wage inequality is thus associated with union decline and increasing inequality by education. Women's wage inequality increased by nearly 50 percent, but adjusted inequality—accounting for inequality by education and unionization—increased 17 percent. Decomposition of women's wage inequality indicates that unions and returns to schooling



**Figure 7.** Observed and Adjusted Within- and Between-Group Variances of Log Hourly Wages, Full-Time, Private Sector Men and Women, 1973 to 2007; Adjusted Variances Fixed at the 1973 Level: Union Membership, Industry-Region Unionization Rates, and Industry-Region Unionization Effects



**Figure 8.** Total Variance of Log Hourly Wages, Full-Time, Private Sector Men and Women, 1973 to 2007; Variances Adjust for Unionization and Education; Variances Are Set to Equal One in 1973



**Figure 9.** Total Variance of Log Hourly Wages, Full-Time, Private Sector Men and Women, 1973 to 2007; Adjusted Variances Fixed at the 1973 Level: Unionization Rate, Industry-Region Unionization Rate and its Effects, and Education Effects; Variances Are Set to Equal One in 1973

**Table 2.** Summary of the Decomposition of the Change in Variance of Log Hourly Wages for Full-Time, Private Sector Men and Women, 1973 to 2007

	Between	Within	Total
<b>Male Workers</b>			
Observed change in variance of log wages	.055	.046	.102
Change in variance fixing:			
Union membership rate	.053	.028	.081
+ Industry-region unionization	.070	-.003	.067
+ Education effects	.030	-.005	.025
Percentage of change explained:			
Union membership rate	3.2	40.3	20.2
+ Industry-region unionization	-26.9	106.3	33.9
+ Education effects	45.8	110.1	75.2
<b>Female Workers</b>			
Observed change in variance of log wages	.051	.047	.098
Change in variance fixing:			
Union membership rate	.054	.043	.097
+ Industry-region unionization	.059	.019	.078
+ Education effects	.018	.017	.035
Percentage of change explained:			
Union membership rate	-5.2	9.2	1.7
+ Industry-region unionization	-16.1	59.8	20.4
+ Education effects	64.9	63.6	64.3

*Note:* Adjusted variances are obtained by successively adding the listed effects. For example, adjusted variances in line 2 are obtained by fixing union membership, adjusted variances in line 3 are obtained fixing union membership and regional unionization rates, and so on.

together account for nearly two-thirds of the rise in wage inequality.

Table 2 summarizes results of the variance decomposition. Two findings stand out. First, the effect of declining unionization on private sector wage inequality is much larger for men than for women. This result is consistent with the large fall in private sector unionization among men. Second, most of the rise in men's wage inequality can be explained by deunionization and increasing returns to schooling. Educational inequality in wages explains a large fraction of the increase in between-group inequality. Increasing inequality in highly unionized industries and regions explains a large fraction of rising within-group inequality.

## DISCUSSION

We revisited the effect of declining union membership on wage inequality, arguing that unions not only equalize union members' wages, they

also equalize the nonunion wage distribution by threatening union organization and buttressing norms for fair pay. We found strong evidence that unionization rates in detailed industries for geographic regions are positively associated with wage equality among nonunion workers. As unionization rates fell in the national labor market, industry-region unionization rates also declined, and within-group inequality increased among union and nonunion workers.

A variance decomposition analysis estimated the effect of union membership decline and the effect of declining industry-region unionization rates. When individual union membership is considered, union decline accounts for a fifth of the growth in men's earnings inequality. Adding normative and threat effects of unions on nonunion pay increases the effect of union decline on wage inequality from a fifth to a third. By this measure, the decline of the U.S. labor movement has added as much to men's wage

inequality as has the relative increase in pay for college graduates. Among women, union decline and inequality are only related through the link between industry-region unionization and nonunion wage dispersion. Union decline contributes just half as much as education to the overall rise in women's wage inequality. These results suggest unions are a normative presence that help sustain the labor market as a social institution, in which norms of equity shape the allocation of wages outside the union sector.

Of course, not all unions of the 1970s were in the vanguard of egalitarianism. In skilled trades and construction, unions often reinforced racial and ethnic inequalities. Compared with the American Federation of Labor's craft unions, industrial unions originating in the Congress of Industrial Organizations were more supportive of redistributive public policies, including civil rights and the welfare state (Draper 1989; Quadagno 1994). Nor were all nonunion workplaces of the 1970s dominated by norms of fairness and limited markets. Nonunion employers were often virulently anti-union (Jacoby 1997), and wage inequality was clearly higher in the nonunion sector.

Could the union-inequality connection we observed spuriously result from economic changes that helped eradicate organized labor, increase inequality, and perhaps transform labor market norms? Computerization, firm and industry deregulation, and economic globalization may have fostered a more dynamic and unequal U.S. capitalism to which unions were poorly adapted (Hirsch 2008). In this case, deunionization is not directly implicated in the process of growing inequality; it is just the visible byproduct of new kinds of employment relations in new, nonunion industries. At least some of the association between industry-region unionization and nonunion wages is likely related to technological, organizational, and institutional changes that eliminated rents and fueled deunionization. Still, changes in the economy are themselves unlikely to be purely exogenous; the process of economic change spread unevenly, with

unions likely slowing or cushioning the impact on wages.

Union decline, too, captures much of the growth in inequality, with just two explanatory variables: union membership and industry-region unionization rate. Given the parsimony and empirical power of union effects compared to a multiplex and hard-to-measure process of economic change, we view the empirical analysis as supporting unions' broad influence on U.S. labor market inequality. Having established the population-level association, more research is needed to better understand the mechanisms connecting deunionization to nonunion wages in key industries and labor markets.

More generally, the analysis contributes to a political account of rising economic inequality in the United States. The analysis suggests that unions helped shape the allocation of wages not just for their members, but across the labor market. The decline of U.S. labor and the associated increase in wage inequality signaled the deterioration of the labor market as a political institution. Workers became less connected to each other in their organizational lives and less connected in their economic fortunes. The de-politicization of the U.S. labor market appears self-reinforcing: as organized labor's political power dissipates, economic interests in the labor market are dispersed and policymakers have fewer incentives to strengthen unions or otherwise equalize economic rewards.

Although industry and regional variation play important roles, the key comparison implied by our analysis is fundamentally historical, from the early 1970s to the 2000s. In the earlier period, unions offered an alternative to an unbridled market logic, and this institutional alternative employed over a third of all male private sector workers. The social experience of organized labor bled into non-union sectors, contributing to greater equality overall. As unions declined, not only did the logic of the market encroach on what had been the union sector, but the logic of the market deepened in the nonunion sector, too, contributing to the rise in wage inequality.

APPENDIX

A. CALCULATING ADJUSTED VARIANCES

Between- and within-group variances in year  $t$  can be written in matrix form:

$$B_t = \mathbf{w}'_t (\hat{\mathbf{y}}_t - \bar{\mathbf{y}}_t)^2 \tag{A.1}$$

and,

$$W_t = \mathbf{w}'_t \sigma_t^2 \tag{A.2}$$

where  $\mathbf{w}_t$  is a vector of survey weights,  $\hat{\mathbf{y}}_t$  is a vector of conditional means of log wages,  $\bar{\mathbf{y}}_t$  is the grand mean, and  $\sigma_t^2$  is the vector of residual variances. The conditional means and variances are given by the variance function regressions, in matrix form,

$$\hat{\mathbf{y}}_t = \mathbf{X}_t \alpha_{1t} + \mathbf{u}_t \alpha_{2t} + \bar{\mathbf{u}}_t \alpha_{3t}$$

and,

$$\log \sigma_t^2 = \mathbf{X}_t \beta_{1t} + \mathbf{u}_t \beta_{2t} + \bar{\mathbf{u}}_t \beta_{3t}.$$

The first adjusted variance is based on the reweighted data:

$$w_{ti}^* = \begin{cases} w_{ti} \bar{u}_b / \bar{u}_i & \text{if } u_{ti} = 1 \\ w_{ti} (1 - \bar{u}_b) / (1 - \bar{u}_i) & \text{otherwise,} \end{cases}$$

where  $b$  is a baseline year set here to  $b = 1973$ . The adjusted weights,  $w_{ti}^*$ , are then plugged into the between- and within-group equations, A.1 and A.2.

The second adjusted variance adds to the union effect by fixing industry-region unionization terms at their 1973 values:

$$\hat{\mathbf{y}}_t^* = \mathbf{X}_t \alpha_{1t} + \mathbf{u}_t \alpha_{2t} + \bar{\mathbf{u}}_b \alpha_{3b}$$

and,

$$\log \sigma_t^{*2} = \mathbf{X}_t \beta_{1t} + \mathbf{u}_t \beta_{2t} + \bar{\mathbf{u}}_b \beta_{3b}.$$

The adjusted means and variances, with weights adjusted to 1973 unionization rates, are then plugged into the equations for between- and within-group variance,  $\mathbf{w}'_t (\hat{\mathbf{y}}_t^* - \bar{\mathbf{y}}_t)^2$  and  $\mathbf{w}'_t \sigma_t^{*2}$ .

The third adjusted variance fixes education effects in  $\alpha_{1t}$  and  $\beta_{1t}$  at their 1973 values. The modified coefficient vectors yield an adjusted set of conditional means, which are plugged into the between- and within-group equations.

B. CORRECTING FOR MISCLASSIFICATION OF UNION STATUS

Card (1996) analyzed validation data from an employer survey that indicated the misclassification rate of true union status in the 1977 May CPS is about 2.5 percent ( $\lambda = .025$ ). If 10 percent of respondents are union members, 2.5 percent of the 10 percent misreport that they are nonunion, and 2.5 percent of the 90 percent who are nonmembers misreport that they are union members. Formally, if an indicator for true union status,  $u^* = 1$ , then

$$p(u_i = 0 | u_i^* = 1) = p(u_i = 1 | u_i^* = 0) = \lambda.$$

Given the observed unionization rate,  $\bar{u}$ , and the true unionization rate,  $\bar{u}^*$ ,

$$\bar{u}(1 - \lambda) \bar{u}^* + \lambda(1 - \bar{u}^*).$$

Rearranging terms yields an adjustment to the observed rate, providing the true rate of unionization:

$$\bar{u}^* = \frac{\bar{u} - \lambda}{1 - 2\lambda}.$$

Evidence for misclassification of union status is based on just one year and measurement error in other years may be larger or smaller. To accommodate this uncertainty, we place a prior distribution on  $\lambda$ . True union status,  $u_i^*$ , is also unobserved, and uncertainty about union status should be incorporated in the final results. To describe this uncertainty, we can write a probability distribution for  $u_i^*$ , given the observed union status.

Rearranging terms we can find the probability distribution for true union status,  $u_i^*$ ,

$$p(u^* | u = 0, \lambda) = \pi_0^u (1 - \pi_0^u)^{u^* - 1},$$

where,

$$\pi_0 = \frac{\lambda \bar{u}^*}{1 - \bar{u}}$$

and

$$p(u^* | u=1, \lambda) = \pi_1^{u^*} (1 - \pi_1)^{u^*-1},$$

where,

$$\pi_1 = \frac{(1 - \lambda) \bar{u}^*}{\bar{u}}.$$

To incorporate uncertainty about the misclassification parameter, we write

$$p(u^* | u) = \int p(u^* | u, \lambda) p(\lambda) d\lambda,$$

where  $p(\lambda)$  is a prior distribution. In our analysis, we specify this distribution to be uniform on the interval, [.02, .03].

If log wages,  $y_i$ , are normal, the variance function model, conditional on true union status,  $u_i^*$ , can be written,

$$y_i \sim N(\hat{y}_i, \sigma_i^2),$$

where

$$\hat{y}_i = \mathbf{x}'_i \alpha_1 + u_i^* \alpha_2 + \bar{u}_i^* \alpha_3$$

and

$$\log \sigma_i^2 = \mathbf{x}'_i \beta_1 + u_i^* \beta_2 + \bar{u}_i^* \beta_3.$$

Because  $y_i$  and  $u_i^*$  are independent, conditional on  $u_i$ , we can write the likelihood,

$$p(y_i | \theta, u_i) = \sum_{u_i^*} p(y_i | u_i^*, \theta) \times p(u_i^* | u_i),$$

where all model parameters are collected in vector  $\theta$ . A full Bayesian model is completed by supplying proper priors to  $\theta$ . Posterior inference for  $\theta$  is obtained by Markov Chain Monte Carlo simulation.

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**Notes**

1. Thompson (1971) coined the term “moral economy.” Elster (1989a) argued that distributional norms are departures from strict rationality, eliciting strong emotions in response to violation.
2. Union self-interest may drive political support, however, where minimum wage increases reduce competition from nonunion workers.
3. Card (1996) studied a sample of 1,718 men with valid wage data and nonmissing employer and employee union membership responses.
4. Analysis of earnings nonresponse reveals modest positive selection, but bias in regression coefficients is small if imputed data are excluded (Bollinger and Hirsch 2009). If unobserved high earners are nonunion, union wage effects and the union decline effect on between-group inequality will be overestimated. But if high-pay unobserved nonunion workers are drawn from low-union industries and regions, inequality and the union effect on within-group inequality will be underestimated. In short, effects of nonresponse are likely modest and small biases in union effects are offsetting.

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