

The Rise of Intra-Occupational Wage Inequality in the United States, 1983 to 2002

ChangHwan Kim
University of Minnesota

Arthur Sakamoto
University of Texas

Wage inequality has increased dramatically in the United States since the 1980s. This article investigates the relationship between this trend and occupational structure measured at the three-digit level. Using the Current Population Survey from 1983 to 2002, we find that the direct association between occupations and wage inequality declined over this period as within-occupational inequality grew faster than between-occupational inequality. We estimate multilevel growth models using detailed occupational categories as the unit of analysis to assess how the characteristics of occupations affect changes in mean wages and levels of wage inequality across this time period. The results indicate that changes in mean wages across occupations vary depending on the characteristics of individuals in those occupations and that intra-occupational inequality is difficult to predict using conventional labor force data. These findings seem largely inconsistent with the common sociological view of occupation as the most fundamental feature of the labor market. Correspondingly, a more comprehensive approach—one that incorporates the effects of organizational variables and market processes on rising wage inequality in the New Economy—is warranted.

For the first time in recent U.S. socioeconomic history, the succeeding generation of the non-college population can expect its standard of living to remain stagnant or to decline. Past research links this change to reduced economic mobility and the declining real value of wages for workers at the lower end of the distribution (Autor, Katz, and Kearney 2006; Bernhardt et al. 2001; Gottschalk 1997; Levy 1998; Morris and Western 1999). For the upper end of the distribution, however,

incomes have been increasing so that inequality in the overall distribution of wealth has grown substantially during the past few decades (Card and DiNardo 2002; Kalleberg and Mouw 2006; Lemieux 2006; Piketty and Saez 2003). The combined effects of these trends lend some credence to the old adage that “the poor get poorer and the rich get richer.”

Despite the significance of these trends, sociologists have not paid adequate attention to the study of aggregate wage inequality in the United States in recent years. As Morris and Western (1999:624) observe, “If you had been reading only the flagship journals in sociology, you probably would not know about these trends.” Some well-known sociological studies of aggregate inequality in the United States do exist (Bernhardt et al. 2001; Morris and Western 1999), but they focus primarily on basic descriptive patterns, leaving aside more detailed multivariate investigation about the underlying sources of these trends. Only very recently have sociologists begun providing more comprehensive analyses of growing aggregate wage

Direct correspondence to ChangHwan Kim, Minnesota Population Center, 50 Willey Hall, 225 19th Avenue South, University of Minnesota, Minneapolis, MN 55455 (chkim@pop.umn.edu). For helpful comments on this article, we are grateful to Jerry Jacobs, the current Editors, four anonymous *ASR* reviewers, Arne Kalleberg, and Ted Mouw. We also thank the Population Research Center at the University of Texas and the Minnesota Population Center at the University of Minnesota for excellent research support. All opinions expressed herein are the sole responsibility of the authors.



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inequalities (DiPrete 2005; Kalleberg and Mouw 2006; Weeden et al. 2007).

This neglect stems in part from the sort of topics that sociological research on stratification and inequality has emphasized, such as the study of occupations (DiPrete 2005; Grusky 2005; Kalleberg and Mouw 2006). Commonly viewed as the “backbone of the reward structure” (Parkin 1971:18), many sociologists focus on occupational attainment as a primary outcome of interest (e.g., Blau and Duncan 1967; Featherman and Hauser 1978; Hannum and Xie 1998; Wong 2002). Occupational variables even play an important role in the depiction of class structure in neo-Marxist studies, albeit in terms of a more specialized nomenclature (Wright 1997).

Individual differences in income attainment is another common concern in stratification research (e.g., Eliason 1995; Hollister 2004; Kalleberg, Wallace, and Althausen 1981), particularly differentials by gender and race/ethnicity (e.g., Bean, Gonzalez-Baker, and Capps 2001; Grodsky and Pager 2001; Marini 1989; McCall 2001). Although important, this research does not examine the sources of increased dispersion in the overall distribution of income.

Sociological studies of aggregate income inequality do exist, of course, but they are older and use cross-sectional data that largely predate the recent rise in the dispersion of wages (Nelson and Lorence 1988; Raffalovich 1993; Sakamoto 1988). Some recent studies of household income inequality have appeared, yet their focus is on international comparisons (Alderson and Nielsen 2002; Firebaugh and Goesling 2004; Gustafsson and Johansson 1999). None of these studies directly consider the sources of the dramatically increasing wage inequality in the United States in recent decades.

Economists have paid more attention to increasing wage inequality (Autor and Katz 1999; Autor et al. 2006; Bound and Johnson 1992; Card and DiNardo 2002; Lemieux 2006; Levy 1998; Levy and Murnane 1992). By any measure of inequality, their results confirm that the dispersion in wages and earnings has been increasing since 1980. The economics literature does not, however, sufficiently consider occupation because occupation does not play any significant conceptual role in microeconomic theory. One highly cited study (Juhn, Murphy, and Pierce 1993) does include one-digit occu-

pational groups as control variables in its regression analysis. The authors find that the increases in wage inequality among men from 1963 to 1989 occurred within these occupational categories.

Published research thus does not provide a detailed analysis of the effects of occupational structure on growing wage inequality in the United States. With this in mind, we explicate in this article the theoretical relationships between occupational structure and wage inequality. We then empirically test these relationships with recent data and three-digit occupational categories that enhance the potential explanatory power (particularly in a statistical sense) of occupational structure. This approach is an improvement on Raffalovich (1993) and Juhn and colleagues (1993) who measured occupation at a high level of aggregation, which may explain why they found little effect of occupations (Grusky and Sørensen 1998).

OCCUPATIONAL STRUCTURE AND GROWING WAGE INEQUALITY

Although there are several notable studies on the significance of occupations for social stratification (e.g., Blau and Duncan 1967; Featherman and Hauser 1978; Hauser and Warren 1997; Parkin 1971; Sorokin 1959; Treiman 1977), our investigation refers to the recent work of Grusky and his colleagues (Grusky 2005; Grusky and Sørensen 1998; Weeden and Grusky 2005). We focus on their research for two reasons: first, it is largely consistent with several earlier sociological studies that stress the salient role of occupations in social stratification; second, their work is more theoretically elaborated than earlier studies.

DISAGGREGATE STRUCTURATION

Sociologically, an occupation refers to a category of “functionally similar jobs” (Grusky 2005:77) classified in terms of principal duties, tasks, job skills, and technical know-how (Hauser and Warren 1997). Occupations are far more specific than the highly generic representation of workers (popular among economists) in terms of their educational levels and years of labor force experience.

For most sociologists, however, occupations are not simply indicative of detailed measures

of human capital in a competitive labor market. The division of labor can be categorized in a variety of ways, but occupations are often thought to be “functional niches in the division of labor that typically become deeply institutionalized in the labor market” (Weeden and Grusky 2005:142). As discussed by Grusky (2005), detailed occupations frequently represent the subjective career aspirations of individuals, they are recognized widely in society (including by many governmental agencies), they promote their own subcultures and lifestyles, and “individual identities and self-definitions are strongly affected by occupational affiliations, almost to the point of bearing out a Durkheimian ‘essentialist’ view that such ties provide a master identity” (Grusky 2005:68). Detailed occupations constitute a “realist account” of the class structure of modern America because they represent actual social groups *für sich* that often have a *gemeinschaftlich* character and may pursue collective action for “pursuing purely local interests” (Grusky 2005:70).

Grusky and colleagues refer to their approach as disaggregate structuration (Grusky and Sørensen 1998). They assume that various processes of social closure erect barriers of entry in the labor market based on occupations (Grusky 2005; Weeden 2002). These barriers undergird the subcultures, social identities, and “proximate structuration” of detailed occupations (i.e., the “‘social clothing’ worn by functionally similar jobs” [Grusky 2005:77]). Other processes that reinforce entry barriers include the promotion of standards and procedures that underlie professional licensing practices, the self-selection of people on the basis of occupational subcultures (Grusky 2005:59), the training provided by senior workers that “introduces further homogeneity in the attitudes, behaviors and worldviews of prospective incumbents” (Grusky 2005:77), and the social interaction among occupational members that “reinforces occupation-specific attitudes, values, and lifestyles” (Grusky 2005:77–78).

Occupational groups represent institutionalized units of the class structure because they “have emerged as the elementary building blocks of modern and postmodern labor markets” (Grusky 2005:61). Relative to the “big classes” in neo-Marxist and other stratification theories, detailed occupations better “charac-

terize the contemporary structure of rent-extraction” because “the elementary units of skill-based exploitation are occupations themselves” (Grusky 2005:74–75). According to this view, “the working institutions of closure are organized largely at the occupational level and the potential for rent therefore emerges at that level” (Grusky 2005:74). This focus on detailed occupations is a theoretical improvement on prior research that has investigated “big classes” and broad occupational groups as the sources of income disparity in the United States.

WAGE INEQUALITY AND OCCUPATIONAL STRUCTURE

How does occupational structure relate to wage inequality? The theory of disaggregate structuration highlights how “the institutionalization of an occupational classification scheme” is so deeply entrenched in society that it “trains us to regard between-category disparities as appropriate and legitimate” (Grusky 2005:75). Indeed, occupational schemes are so widely accepted that we focus almost entirely on disparities within occupations, which are “closely scrutinized and are sometimes taken as evidence of discrimination (especially when correlated with race, gender, or ethnicity)” (Grusky 2005:77). In light of this theory, we will investigate the following hypotheses regarding wage inequality and occupational structure.

Hypothesis 1a: Most wage inequality is between occupations when measured at the three-digit level. Differences in mean wages across detailed occupations amount to more inequality than do differences in wages within detailed occupations.

Hypothesis 1a implies that the variability in mean wages across occupations should account for most of the total variance in wages across individuals in any given year. It can also be extended to investigate whether differences in mean wages across occupations explain the increase in wage inequality over time.

Hypothesis 1b: Most of the increase in wage inequality in recent years derives from differences in mean wages across detailed occupations. Increases in wage differentials within detailed occupations do not account for the majority of the increase in wage inequality in the last few decades.



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An additional process, consistent with Hypothesis 1b, is the increasing employment of the labor force into occupations where the differentials in mean wages are greater. This trend should lead to an increase in the between-occupational component that is the key prediction of this hypothesis.

MULTIVARIATE ANALYSIS OF WAGE INEQUALITY AND OCCUPATIONS

Hypotheses 1a and 1b reflect the strongest version of the theory of disaggregate structuration. Grusky recognizes, however, that “incomplete occupationalization” may sometimes occur because “occupational associations have simply failed to emerge, either because they have been overrun by competing forms (e.g., unions) or because social organization of all forms has proven unviable” (Grusky 2005:63). Factors that may mitigate the development of occupationalization include race, ethnicity, gender, unions, and industrial structure (Grusky 2005). Similarly, Weeden (2002:92) notes that “neither these analyses nor prior research support the claim that such [occupational] group-level processes are the only ones at work.” The theory of disaggregate structuration does not deny that variables other than occupation may play a significant role in affecting labor force outcomes such as wages.

Nonetheless, occupations constitute a fundamental aspect of class structure and thus frame the influences of these other variables (e.g., race, ethnicity, gender, union status, industrial composition, education, and region). Even if most wage inequality is not primarily between occupational categories, occupational structure may still be construed as the basic feature of the class structure if it successfully explains wage inequality due to other sociological variables measured at the occupational level. These other variables are secondary to occupational structure in that they only mediate the extent to which occupational incumbents benefit from the extracted rents that occupational-level closure generates (Weeden 2002:59). A multivariate statistical model should therefore explain most intra-occupational wage inequality when detailed occupations are used as the unit of analysis and the other variables are measured at that occupational level. If this is not so, then the extraction of rents and the consequent genera-

tion of inequality would not be primarily derived from occupational-level processes. In this case, the occupation would not be the fundamental unit of class structure.

Hypothesis 2a: Most intra-occupational wage inequality can be explained by the characteristics of detailed occupations—gender, race, ethnicity, union status, industrial composition, education, and region.

On the other hand, “the social conditions that characterize an occupation will benefit (or harm) all of its members, albeit to different degrees” (Weeden 2002:59). The theory of disaggregate structuration implies that most of the variation in between-occupational differences in mean wages *cannot* be explained by other variables. If occupations are the fundamental feature of class structure, other variables should not overshadow them. Because disaggregate structuration assumes that social and market closure are organized at the occupational level, differences in mean wages across occupations should be associated with the occupations themselves, rather than just the characteristics of occupational incumbents. If differences in mean wages between occupations are mainly determined by other variables, then occupation itself would cease to be either theoretically or empirically important in determining mean wage differentials in the labor market.

Hypothesis 2b: Most inequality due to between-occupational differences in mean wages cannot be explained by the characteristics of occupations in terms of gender, race, ethnicity, union status, industrial composition, education, and region.

FEMALE WORKERS

Some research has focused on the relationship between occupation and the gender wage gap. The comparative worth literature contends that the proportion of female workers in an occupation has a negative effect on individuals’ earnings attainment (England 1992; Kilbourne, England, and Farkas 1994). Occupations with more women are therefore likely to have below average wages. Increases in the proportion of female workers will further lower an occupation’s average wage, thus resulting in increased between-occupational inequality. Moreover,

microeconomic theory argues that the increase in labor supply (deriving from the increased labor force participation rates of women) drives down wages for some occupations because of increased competitiveness. Since women tend to earn lower wages than do men, we also predict that increases in the proportion of female workers in an occupation increases within-occupational inequality.

Hypothesis 3a: Increases in the proportion of female workers in an occupation increases wage inequality in that occupation, *ceteris paribus*.

Hypothesis 3b: Increases in the proportion of female workers reduces an occupation's mean wage and increases between-occupational wage inequality, *ceteris paribus* (because occupations with increasing proportions of female workers tend to have mean wages below the overall average).

The only caveat to Hypothesis 3a is that the proportion of females in an occupation has a nonlinear effect. In occupations where the clear majority of workers are already female, increases in the proportion of female workers would increase homogeneity and thereby reduce wage inequality. Hypothesis 3a assumes that occupations have more men than women, on average. Since this assumption is incorrect for some occupations, our empirical analysis of Hypothesis 3a also considers whether increases in the proportion of female workers reduces inequality in occupations where that proportion is already high.

DEINDUSTRIALIZATION

Industrial change is often mentioned as another source of increasing wage inequality. Various industries have net effects on wages even after controlling for the human capital characteristics of workers (Krueger and Summers 1988). Net of these variables, the industrial composition of the labor force also affects inequality in the distribution of wages (Alderson and Nielsen 2002; Nielsen and Alderson 1995).

Using cross-sectional data, previous studies typically found that increases in employment in the manufacturing sector decrease income inequality (for reviews, see Alderson and Nielsen 2002; Sakamoto 1988). Similarly, Harrison and Bluestone (1990) argue that wage

inequality is increasing due to declining employment in the manufacturing sector. Many of the "good jobs" for workers with only a high school education were traditionally concentrated in manufacturing, which also contained internal labor markets that provided for upward economic mobility (Bernhardt et al. 2001). Deindustrialization reduced employment in the manufacturing sector and is therefore an important source of increasing wage inequality, especially at the lower end of the wage distribution (Gustafsson and Johansson 1999; Harrison and Bluestone 1990).¹

Hypothesis 4a: Reductions in the proportion of workers in an occupation that are employed in the manufacturing sector increases wage inequality in that occupation, *ceteris paribus*.

Hypothesis 4b: Reductions in the proportion of workers employed in the manufacturing sector within an occupation reduces an occupation's mean wage and therefore increases between-occupational wage inequality, *ceteris paribus* (because the manufacturing sector traditionally supports the wages of semi-skilled and low-skilled workers who otherwise would have mean wages below the overall average).

UNIONS

Among private-sector workers, membership in unions declined from 24 percent in 1973 to 9.5 percent in 1998 (Cornfield and Fletcher 2001). This decline has probably contributed to increasing inequality. Freeman (1993) estimates that a 10-point decline in the percent of unionized workers explains about half of the observed growth in the variance in earnings among blue-collar workers from 1978 to 1988. Freeman and Medoff (1984) and Card and DiNardo (2002) argue that a higher proportion of unionized workers reduces within-group inequality

¹ We are not proposing that deindustrialization alone provides a satisfactory explanation of rising inequality, nor are we seeking to extend that theory *per se*. We are only considering industrial change as one of several factors that may affect the relationship between inequality and occupational structure across time.



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because the distribution of wages is more equal within the union sector than within the nonunion sector.

A “spillover effect,” the upward pull that the unionized sector exerts on the average wage of nonunion members, is also associated with unionization (Freeman and Medoff 1984). This pressure results from nonunion firms attempting to prevent the unionization of their workers, which often reduces inequality by raising the wages of workers that would otherwise fall below the overall mean (Freeman and Medoff 1984). The spillover effect may be especially equalizing when the proportion unionized is quite high. Unions would then have significant power over broad segments of the labor force or political institutions.

The equalizing force of the spillover effect is not, however, inevitable. If the spillover effect is small or negligible, then the monopoly effect of unions may dominate (Freeman and Medoff 1984). In this case, unions increase inequality because the average wages of union workers increase while the wages of nonunion workers do not. Indeed, the average wage in the nonunion sector may decline due to the excess labor supply generated by the high wages of union workers. This scenario portrays unions as monopolistic institutions that increase inequality between union and nonunion workers.

Hypothesis 5a: Reductions in the proportion of unionized workers in an occupation increases wage inequality in that occupation, *ceteris paribus*.

Hypothesis 5b: Reductions in the proportion of unionized workers in an occupation increases between-occupational wage inequality, *ceteris paribus* (because unions traditionally raise the mean wages of nonunion workers).

INSECURE EMPLOYMENT RELATIONS

Cost reduction has become a critically important basis of competition since the 1970s (Berg and Kalleberg 2001). The “shareholder revolution,” which encourages companies to pay more attention to short-term gains than to long-term development, may exacerbate this trend in cost reduction. This may lead to increases in the employment of contingent workers and insecure employment relations. Hiring the cheapest

possible workers for a particular set of jobs helps firms reduce their short-term labor costs. This increases wage inequality, though, because contingent workers tend to have lower wages and firms are usually uninterested in promoting or training such workers for higher skilled and better paying positions (McCall 2000).

The growth of contingent workers likely increases between-occupational inequality because these workers tend to have lower wages and are often concentrated in “bad secondary jobs” (Tilly 1991). Contingent workers are not limited, though, to low-wage jobs. High-skilled independent contractors may actually earn more than their counterparts in traditionally secure employment relations (Hipple and Stewart 1996). Nevertheless, these workers comprise only a small proportion of those employed on a part-time basis.

Hypothesis 6a: Increases in the proportion of part-time workers in an occupation increases wage inequality in that occupation, *ceteris paribus*.

Hypothesis 6b: Increases in the proportion of part-time workers within an occupation reduces its mean wage and increases between-occupational wage inequality, *ceteris paribus*.

INCREASES IN THE RETURN TO SKILL

Recent technological developments may have increased the demand for high-skilled workers while decreasing the demand for low-skilled workers. This explanation, popular in economics, is known as the skill-biased technological change (SBTC) (Card and DiNardo 2002). According to this view, increased demand for (and hence returns to) skilled labor is the primary cause of the increase in wage inequality in recent years. Although high-skilled workers are now earning more than before, the wages of low-skilled workers are not increasing and may even be declining. Technological change, which requires the sophisticated work skills of more highly educated workers, underlies the increased demand for skilled labor.

The 1970s witnessed shrinking educational gaps (Featherman and Hauser 1978). The baby boomers’ entry into the labor force further exacerbated the increased supply of highly educated labor, and the wage differential between high

school and college graduates continued to narrow. In keeping with the basic economic principles of supply and demand, the increased supply of educated labor usually explains the decline in the college premium (Levy and Murnane 1992; Murphy and Welch 1993).

The narrowing wage differential began to reverse, however, in the 1980s when the college premium rose despite the increased number of workers with a college degree. At first glance, this result seems inconsistent with the basic operation of supply and demand—increased supply should drive down demand and thus the college premium (Thurow 1975). The SBTC view explains this seemingly contradictory result as an upward shift in the demand function for highly educated labor, which outweighed its increased supply (Juhn et al. 1993).

Hypothesis 7a: Increases in the variability of educational attainment in an occupation increases wage inequality in that occupation, ceteris paribus.

Hypothesis 7b: Increases in the proportion of college-educated workers in an occupation increases both an occupation's mean wage and between-occupational wage inequality, ceteris paribus (because occupations with increasing proportions of college-educated workers tend to have mean wages above the overall average).

DATA, RESEARCH DESIGN, AND METHODS

DATA

To test these hypotheses, we use data from the Merged Outgoing Rotation Groups of the Current Population Survey (CPS-MORG), 1983 to 2002. The target population is non-military employees ages 18 to 65. We deleted self-employed persons from our sample because they tend to represent a separate labor market sector that is not critical to our research hypotheses. To adjust for inflation in hourly wages, we use the Consumer Price Index (CPI-X) to convert all wages to 2002 constant dollars. We impute hourly wages for persons with top-coded values on earnings based on the assumption of a log-normal distribution.

To ensure sufficiently reliable estimates of occupational characteristics, we limit the analy-

sis to the three-digit occupational codes that have a sample size of at least 100 in each year from 1983 to 2002. We collapsed occupational categories with sample sizes under 100 until we obtained a sufficient sample size. This process yielded a total of 331 occupations consisting of either separate three-digit occupational codes or slightly aggregated categories of three-digit codes. Our total sample size is 5,958, derived from 331 three-digit occupational categories observed over 18 years.²

For each year, we compute the Gini and Theil indices of wage inequality for each occupation. The Gini varies between 0 and 1; the Theil also has a minimum value of 0 (for perfect equality), but it has an unbounded upper value (Allison 1978). The Gini cannot be uniquely decomposed into between-group and within-group components, but this type of decomposition is available for the Theil:

$$Theil = \sum_j s_j T_j + \sum_j s_j \ln \frac{\bar{y}_j}{\bar{y}} \quad (1)$$

where s_j refers to the income share of occupation j ($s_j = \bar{y}_j / \bar{y} \times (n_j / N)$ where n_j refers to the number of workers in occupation j and N denotes the total number of labor force). \bar{y}_j refers to mean wage of the j th occupation and T_j refers to the Theil index for the j th occupation (Allison 1978). The first component on the right-hand side of Equation 1 is the within-occupational inequality; the second component is the between-occupational inequality.

STATISTICAL MODEL

We estimate multilevel growth models to test Hypotheses 2 through 7. First, we investigate models to study within-occupational wage inequality. For this part of the analysis the dependent variable is the Gini index for each occupation in each year. The independent variables are the relevant descriptive statistics for

²The complete list of the 331 occupations is available from the authors. We did not include CPS data prior to 1983 because they use a three-digit occupational classification that is not readily comparable with the classification used in later years. Similarly, we do not use the CPS data after 2002 because of significant changes in the occupational classification.



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each occupation in each year (See Appendix Table A for descriptive statistics for occupations).

In subsequent analyses, we focus on understanding the sources of between-occupational wage inequality. For these multilevel growth models the dependent variable is the occupation-specific mean wage. Between-occupational inequality is assumed to be increasing to the extent that the mean wage is reduced in low-wage occupations or the extent to which it is increased in high-wage occupations.

WITHIN-OCCUPATIONAL WAGE INEQUALITY

As the Baseline Model, we estimate the unconditional growth model that contains no substantive predictors. Shown in Equation 2, this model includes the year as the only independent variable. The first line of Equation 2 shows the level 1 model in which $INEQ_{jt}$ refers to the Gini index of wage inequality in occupation j at time t . This model investigates within-occupational inequality specified as a function of the initial level of wage inequality for a particular occupation (α_j) and its yearly change (β_j). The initial level of inequality and the yearly change in inequality are thus random variables that vary across occupations.

$$\begin{aligned} INEQ_{jt} &= \alpha_j + \beta_j T_{jt} + \varepsilon_{jt} \\ \alpha_j &= \alpha + u_{1j} \\ \beta_j &= \beta + u_{2j} \end{aligned} \quad (2)$$

The second and third lines of Equation 2 define the level 2 portion of the growth model. The initial level of inequality consists of the grand mean for inequality across all occupations, α , and the deviation of occupation j from the grand mean, u_{1j} . Similarly, the yearly change consists of the grand mean of yearly change for all occupations, β , and the deviation of occupation j from the grand mean, u_{2j} .

To extend the Baseline Model, we add three sets of predictors to obtain Model 1 (shown in Equation 3). The first set includes the explanatory variables, X_{jt} , that refer to occupation-specific proportions for each of the following characteristics: female, African American, Hispanic, other nonwhite race/ethnicity, college graduate, resides in the South, employment in public sector, unionization, employment in man-

ufacturing, and the educational diversity index.³ X_{jt} is a $JT \times K$ matrix with k explanatory variables that are measured $t = 0, 1, \dots, T$ times for j occupations. The parameter estimates for the net effects of these variables (γ) indicate the extent to which each time varying explanatory variable affects the growth of wage inequality within an occupation.

$$\begin{aligned} INEQ_{jt} &= \alpha_j + \beta_j T_{jt} + \gamma X_{jt} + \\ &\delta(T_{jt} \times \bar{X}_j) + \zeta \bar{X}_j + \varepsilon_{jt} \end{aligned} \quad (3)$$

Model 1 contains other vectors to control for changes over time and for average compositional differences across occupations. Therefore, the coefficients in the γ vector refer to the net effects of changes in the independent variables on changes (i.e., growth) in wage inequality across this time period.

As shown in Equation 3, Model 1 includes interaction terms between the occupation-specific means of the explanatory variables and time ($T_{jt} \times \bar{X}_j$). By definition, these occupation-specific means are constant across all of the years. The coefficients for these interaction terms (δ) refer to the changes over time in the net effects of the explanatory variables without compositional change. The interaction coefficient for a particular independent variable thus indicates whether its net effect is increasing (or decreasing) from 1983 to 2002. Such changes may be interpreted as deriving from changes in the level of wage inequality over time within the group of workers defined by the independent variable.

The last set of variables in Model 1 is the vector for the unchanging occupational characteristics, which are simply the occupation-specific means (\bar{X}_j). Their net effects are the coefficients referred to as ζ in Equation 3. These coefficients predict variation in wage inequality across occupations in any cross-sectional year because the ζ coefficients are estimated net effects controlling for time and the time-varying explanatory variables, as well as the interactions between them.

³ To measure educational diversity we use Simpson's index. This index ranges from 0 to 1; larger values indicate greater variability in educational attainment in the particular occupation.

$$INEQ_{jt} = [\alpha + \beta T_{jt} + \gamma X_{jt} + \delta(T_{jt} \times \bar{X}_j) + \zeta \bar{X}_j] + [u_{1j} + u_{2j}T_{jt} + \varepsilon_{jt}] \quad (4)$$

where,

$$\varepsilon_{jt} \sim N(0, \Sigma) \text{ and } \begin{bmatrix} u_{1j} \\ u_{2j} \end{bmatrix} \sim N \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{21} & \sigma_2^2 \end{bmatrix} \right)$$

Equation 4 shows the composite model (i.e., another way to express Equation 3). We assume that the growth of wage inequality over time is normally distributed conditional on the sample data for the explanatory variables. The stochastic element for the intercept (u_{1j}) and the stochastic element for the growth rate (u_{2j}) are assumed to be jointly normally distributed. σ_1^2 represents the amount of variability in the intercepts across occupations and σ_2^2 refers to the amount of variability in the slopes over time. The reductions in σ_1^2 and σ_2^2 relative to the Baseline Model in Equation 2 indicate the variation that the independent variables explain.

BETWEEN-OCCUPATIONAL WAGE INEQUALITY

$$MEANWAGE_{jt} = [\alpha + \beta T_{jt} + \gamma X_{jt} + \delta(T_{jt} \times \bar{X}_j) + \zeta \bar{X}_j + \theta(X_{jt} \times D_j)] + [u_{1j} + u_{2j}T_{jt} + \varepsilon_{jt}] \quad (5)$$

Equation 5 is essentially the same as Equation 4 except the former uses a different dependent variable, the mean wage for the j th occupation. The parameter estimates of Equation 5 refer to the net effects of the explanatory variables on the occupation-specific mean wage. They thus indirectly indicate the sources of between-occupational inequality. To facilitate interpretation, Equation 5 includes interaction terms between the time-variant explanatory variables and two dichotomous variables that indicate high-income and low-income occupations ($X_{jt} \times D_j$). We define high-income occupations as those where the mean wage is greater than \$21.20 (i.e., more than 1 standard deviation above the grand mean of \$15.50). We define low-income occupations as those where the mean wage is less than \$9.82 (i.e., more than 1 standard deviation below the grand mean). For example, if the coefficient for the interaction between female and high-income occupations is negative, we can interpret female employment as reducing between-

occupational inequality because the mean wage of high-income occupations is reduced.

EMPIRICAL RESULTS

Figure 1 shows the Theil index from 1983 to 2002. It depicts a general trend of substantially increasing wage inequality across this period (although it does show a slight slowdown in the late 1980s). The Theil was .166 from 1983–1985 and .198 in 2000–2002, which represents an increase of 19.3 percent.

Figure 1 also shows the between and within components of the Theil across this period (based on 331 occupations using Equation 1). The within component is obviously much larger than the between component. Furthermore, the increase in the within component is substantial while the increase in the between component is smaller; the within component has grown faster than the between component. We calculate that 70.3 percent of the increase in the Theil across this period (from .166 in 1983–1985 to .198 in 2000–2002) occurred within occupations (i.e., it is due to the increase in the within component). These results in Figure 1 are inconsistent with Hypotheses 1a and 1b.

INCREASING WAGE INEQUALITY AND ITS DECOMPOSITION BY OCCUPATION

Table 1 shows the coefficients of determination (i.e., R-squared) for regression models of individual wage across all workers using dummy variables to indicate occupations and educational categories. For 1983 to 1985, occupation yields an R-squared of .286, using 330 dummy variables to indicate 331 three-digit occupations (located in the “3 digit” column of Table 1). For 2000 to 2002, the R-squared is .245.⁴ That is, the amount of between-occupational variance in wages declined over this period from .286 to .245, implying that the amount of within-occupational wage variance (i.e., the additive reciprocal) increased from .714 (in 1983 to 1985) to .755 (in 2000 to 2002). Thus, about three-quarters of the variance in wages is

⁴ To minimize variability due to sampling, we base the variables throughout the analysis on three-year moving averages.

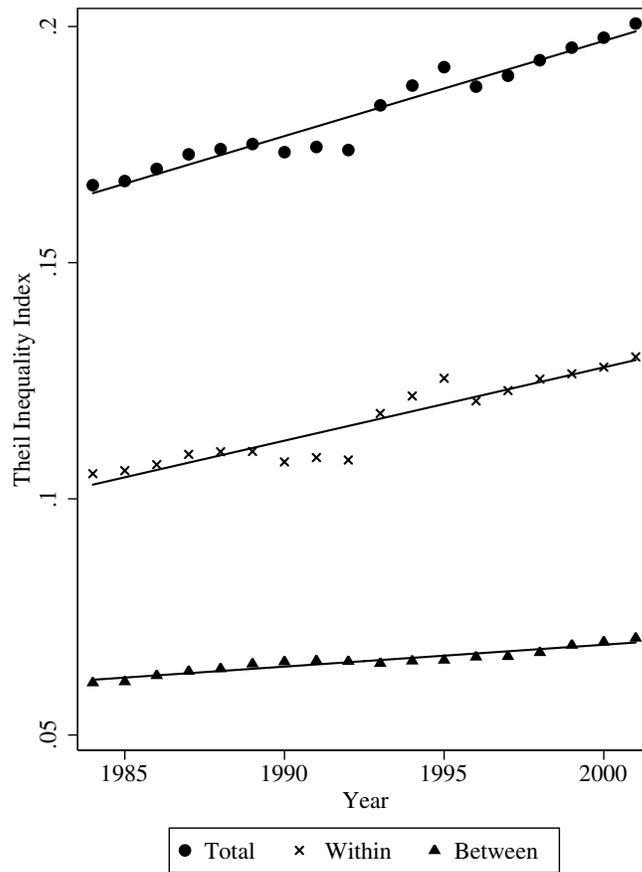


Figure 1. Thiel Index of Wage Inequality from 1983–1985 and 2000–2002

Table 1. Explanatory Power (R-squared) of OLS Regression Models of Hourly Wage across Individual Workers Using Occupation and Education as Independent Variables

	Occupation				Education ^e	Sample Size ^f
	3 digit ^a	1 digit ^d	BA+ ^{ab}	≤HSG ^{ac}		
1983–1985	.2856	.1559	.2019	.2555	.1230	510,127
2000–2002	.2454	.1546	.1396	.1885	.1807	492,537
Percent Change btw 1983–1985 and 2000–2002	-.141	-.008	-.309	-.263	.469	

^a Based on 331 three-digit occupation codes.

^b Among workers with at least a college degree.

^c Among workers with no more than a high school degree.

^d Based on five occupational categories including manager/professional, technician, service worker, precision worker, and laborer.

^e Based on five educational levels including less than high school, high school graduate, some college, college graduate, and graduate degree.

^f The sample sizes for the years between 1983–1985 and 2000–2002 range from a low of 438,780 to a high of 520,308 with a mean of about 500,000.

within three-digit occupational categories, and three-digit occupations became slightly less predictive of wages. These conclusions are generally consistent with the results for the Theil index discussed in regard to Figure 1; they are similarly inconsistent with Hypotheses 1a and 1b.

To compare the association between occupation and wage inequality with the association between education and wage inequality, we estimate two models of individual wage—one includes four dummy variables; the other four dummy variables for education. For 1983 to 1985, the R-squared for this one-digit occupation model is .156 (shown in Table 1 in the “1 digit” column). The R-squared for the education model is .123 for the same time period. For 2000 to 2002, the R-squared for the occupation model is .155, indicating a tiny decline from 1983 to 1985. In contrast, the R-squared for the education model for 2000 to 2002 increases to .181. That is, more of the variance in wages is now between broad educational categories than between broad occupational categories.

Table 1 focuses on the contrast between 1983 to 1985 and 2000 to 2002. To provide more information about the entire period, Figure 2 shows the R-squareds for each year in regression models of individual wage. The graph for all workers (shown on the left side of Figure 2) illustrates the basic pattern of the decline of occupations in predicting wages across this period in regression models using 330 dummy variables to indicate occupation. Figure 2 also shows this same basic downward trend to be evident among workers when we break them down by high-skilled (a college degree or more) and low-skilled (no more than a high school degree) workers.

Broken down by gender, slight variations in this overall pattern emerge. For men, as shown in the graph in the middle of Figure 2, the R-squareds actually increased until the early 1990s (especially for high-skilled male workers) and then began declining. For women (the graph on the right side of Figure 2), the general trend is downward but the annual fluctuations are much larger during the 1990s. In other words, until the 1990s, occupations were more predictive of wages for men than for women.

Figure 3 shows the incremental R-squareds of occupation and education in regression models of individual wage across this time period.

Again, 330 dummy variables represent occupation and four dummy variables represent education (based on the same educational levels used in Table 1). Not surprisingly, the incremental R-squareds are larger for occupation than for education given the far fewer degrees of freedom for the latter. Figure 3 depicts the incremental R-squareds for occupation declining systematically across this time period, while the incremental R-squareds for education are increasing slightly. This pattern is similar when the figure depicts male workers separately, female workers separately, or both genders combined. In sum, the increase in within-occupational wage inequality is especially apparent after controlling for education.

DECOMPOSING WITHIN-OCCUPATIONAL INEQUALITY

Because intra-occupational wage dispersion is an important issue, we calculate an additional decomposition to assess whether increased within-occupational inequality occurred even after allowing for changes in the distribution of occupations. As mentioned in the discussion of Hypothesis 1b, the occupational mix can affect the increase in the total level of within-occupational inequality. Because occupations differ in their internal levels of inequality, changes in the distribution of occupations can affect the overall amount of within-occupational inequality even if the levels of inequality specific to occupations remain constant. A rising level of total within-occupational wage inequality therefore does not necessarily imply that occupations are less significant in determining wage inequality. Instead, it may derive from a distributional shift toward those occupations where the level of internal inequality tends to be greater.

In the following decomposition, we also account for demographic changes in the incumbents of occupations since this can affect intra-occupational inequality. In doing so we can more confidently conclude whether there has been an intrinsic increase in within-occupational inequality per se. For example, even though an occupation may not have changed in the way it rewards college graduates, an increase in the proportion of college graduates in that occupation would raise its level of within-occupational inequality when wage dispersion is



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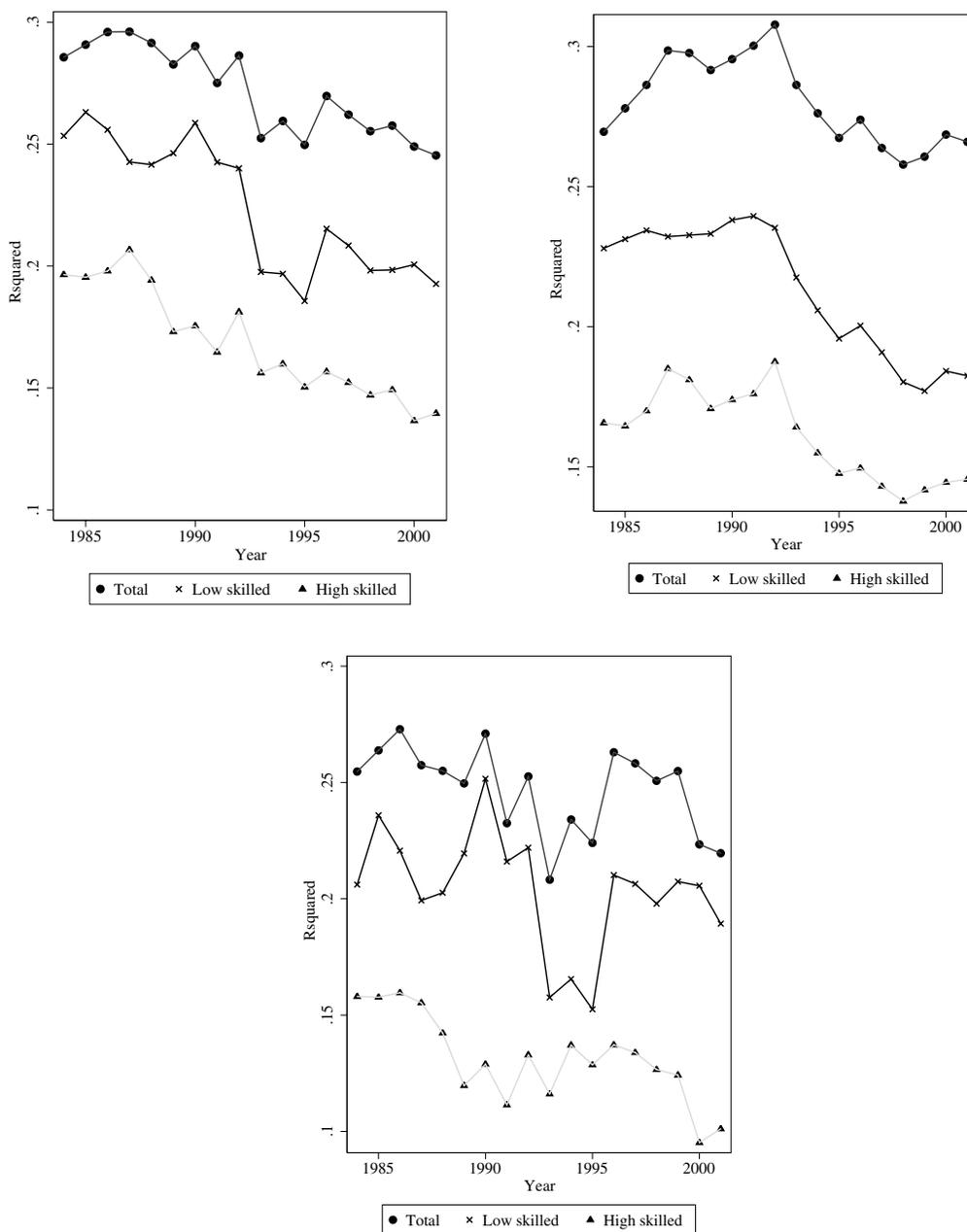


Figure 2. R-squared for Regressions of Individual Wage for Total Workers, Male Workers, and Female Workers

greater among college graduates.

Evident in Equation 1, occupational mean wages also affect the calculation of the total level of within-occupational inequality. The occupation-specific mean wages serve as the

weights in the summation of the occupation-specific levels of inequality in Equation 1. To provide a methodologically generous calculation of the significance of occupation, we assume that demographic changes in the incumbents of

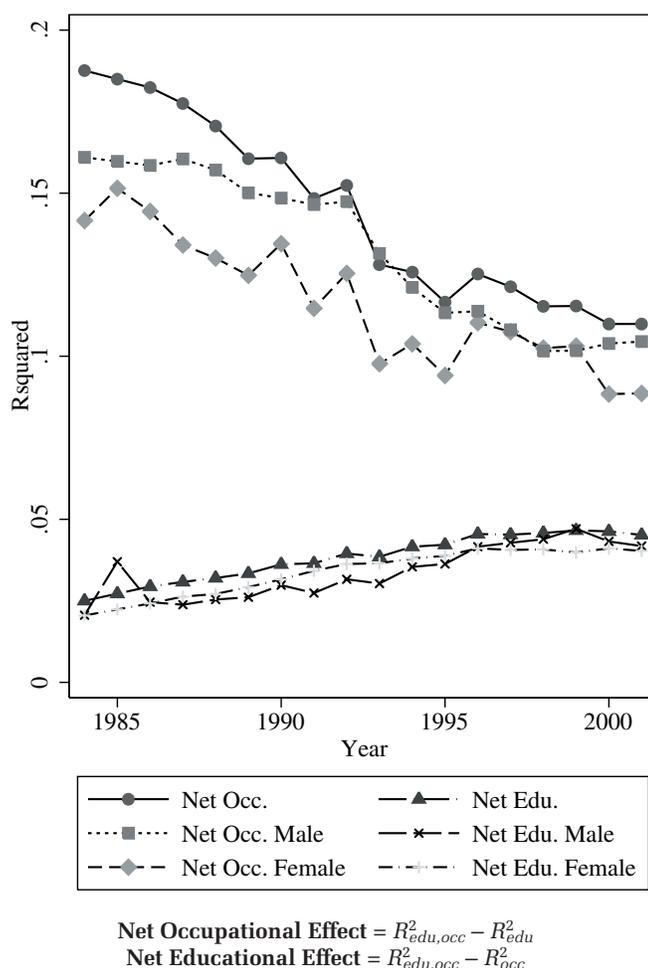


Figure 3. Incremental R-squared for Occupation and Education Regression Models of Individual Wage

occupations determine occupation-specific mean wages. If we cannot explain the rise in the level of total within-occupational inequality after accounting for demographic changes of occupational incumbents, the distribution of occupations, and occupational mean wages, we can then argue more forcefully that the rise in intra-occupational wage inequality is due to sources other than occupational structure per se.

First, the level of inequality in occupation j , which is T_j in Equation 1, can be further decomposed into:

$$T_j = \sum_k s_{jk} T_{jk} + \sum_k s_{jk} \ln \frac{\bar{y}_{jk}}{\bar{y}_j} \quad (6)$$

where s_{jk} refers to the share of income of demographic group k in occupation j (i.e., $s_{jk} = (\bar{y}_{jk}/\bar{y}_j) \times (n_{jk}/n_j)$ where n_{jk} is the number of workers for group k in occupation j). \bar{y}_{jk} refers to the mean wage of group k in occupation j , and T_{jk} denotes the Theil inequality index for group k in occupation j . We define eight groups within an occupation involving distinctions based on gender (male versus female), race (white versus nonwhite), and education (those with a college education or more versus those with less than a college education). By inserting Equation 6 into Equation 1, we obtain the following:

$$Theil = \sum_j \left[\underbrace{\left(s_j \sum_k s_k^j T_{jk} \right)}_{(A)} + \underbrace{\left(s_j \sum_k s_k^j \ln \frac{\bar{y}_{jk}}{\bar{y}_j} \right)}_{(B)} \right] + \sum_j s_j \ln \frac{\bar{y}_j}{\bar{y}} \quad (7)$$

Within-Group
Between-Group
Inequality
Inequality
Between-Occupational
Inequality

Within-Occupational
Inequality
Between-Occupational
Inequality

where (A) is the inequality within-demographic groups within occupations, and (B) is the inequality between-demographic groups within occupations. Together (A) and (B) equal the total level of within-occupational inequality. Using Equation 7, we calculate the expected change in the total level of within-occupational inequality when the demographic composition, the distribution of occupations, and the occupational mean wages are allowed to vary but the within-group inequalities (T_{jk}) remain constant. Table 2 shows the results of these computations.

The upper panel of Table 2 shows actual within-occupational inequality change over this time period. For 1983 to 1985, within-occupational inequality is .10612. For 2000 to 2002, it increased by .02249 points to .12861. The lower panel shows the expected changes according

to different scenarios. The first scenario shows only the occupational mix changing over time and everything else remaining fixed at the 1983 to 1985 levels (so that only s_j in Equation 7 is affected). The predicted within-occupational inequality for this scenario (shown as (1) in Table 2) is .11135, which accounts for 23 percent of the growth in within-occupational inequality across this time period. The second scenario shows changes in demographic composition (which alter only s_k^j in Equation 7). They explain only 4 percent of the growth in within-occupational inequality (shown as (2) in Table 2). The third scenario changes both the occupational mix and the demographic composition, keeping within-group inequality fixed at the 1983 to 1985 levels. Predicted inequality is then .11197, which explains 26 percent of the growth in within-occupational inequality.

Table 2. Decomposition of Within Occupational Inequality

	A	B	A+B	(E-C)/(D-C)
	Within Demographic Groups	Between Demographic Groups	Total Within Occupational Inequality	Percent Explained
Actual Within Occupational Inequality				
1983-1985	.09548	.01064	C	.10612
2000-2002			D	.12861
Expected Within Occupational Inequality Only if the Following Components Change				
(1) Percent Occupation	.09923	.01212	E ₁	.11135 .23240
(2) Percent Demographic Composition	.09541	.01164	E ₂	.10705 .04152
(3) (1)+(2)	.09887	.01310	E ₃	.11197 .25992
(4) (1)+(2)+Occupational Mean Wage	.09996	.01228	E ₄	.11225 .27248

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Most of the rise still remains unexplained. Even after factoring in the changes in the occupational mean wages—which adds changes in $\ln(\bar{y}_{jk}/\bar{y}_j)$ on top of the changes already implemented by the third scenario—the amount of growth explained in within-occupational inequality is only 27 percent (shown as (4) in Table 2). In sum, this decomposition on occupational structure, which allows for changes in demographic composition, the distribution of occupations, and their occupational mean wages, accounts for approximately one-fourth of the increase in intra-occupational inequality. This result seems consistent with Table 1 and Figures 1 and 2, which reinforces the conclusion that most of the rise in wage inequality occurred within occupations and that occupational structure, even broadly construed, does not explain this rise.

SOURCES OF GROWTH IN WITHIN-OCCUPATIONAL WAGE INEQUALITY

The next step is a fully multivariate analysis. Table 3 shows the estimates of the multilevel growth models of the occupation-specific Gini index (multiplied by 100). Results for the Baseline Model indicate that, on average, wage inequality increased across occupations by .0491 points annually. This finding is consistent with earlier results for the Theil index, shown in Figure 1.

Model 1 in Table 3 shows the results of the estimation of Equation 3.⁵ An increase (1 percentage point) in the proportion of female workers in an occupation significantly reduces growth in wage inequality in that occupation by .0470 points, net of the other variables (where the Gini index measures wage inequality). This effect is net of the overall, average proportion of female workers in an occupation. This finding indicates that occupations that experience increases in female workers have less inequality growth over this time period. This is inconsistent with Hypothesis 3a, which predicts that

increases in female employment would increase wage inequality.

Although not shown in Table 3, we estimated another specification that includes a quadratic term for the proportion female. The coefficient for this term is positive, indicating that the negative effect of the proportion female declines as the proportion increases. Using this model, we calculated the net effect of an increase of 1 percentage point in female employment for occupations where the proportion of female workers is 90 percent or 10 percent. In both cases, the net effects are still negative and thus consistent with the basic result from Model 1.

Another statistically significant result for Model 1 in Table 3 is the net effect of employment in the public sector. An increase of 1 percentage point in public sector employment in an occupation reduces growth in within-occupational inequality by .0535 points, net of the other variables. This indicates that inequality in the public sector declined across this period. Furthermore, the interaction between year and public sector employment is statistically significant in Model 1. This interaction indicates that within-occupational wage inequality decreased by .0012 points per year without changing the proportion of public sector employment.

In contrast to public sector employment, employment in manufacturing does not have a statistically significant direct net effect on growth in within-occupational inequality, according to the results for Model 1. This finding is inconsistent with Hypothesis 4a, which predicts that increases in manufacturing employment reduce growth in wage inequality. Also noteworthy is that the mean level of manufacturing employment does not have a statistically significant net effect on wage inequality. This means that, net of the other variables, occupations with more manufacturing employment are not more equal during this period. Although the interaction between year and the mean level of manufacturing employment is statistically significant, this negative effect indicates a temporal reduction in the level of inequality within the manufacturing sector. This has not been a major concern of the deindustrialization argument.

The net effect of unionized employment is a statistically significant predictor of growth in

⁵ In estimating these models, we weight each occupation by the proportion of the total sample of workers employed in the particular occupation. Unweighted results are available from the author on request; they are similar to the reported weighted results.

Table 3. Estimates of Multilevel Growth Models of Occupational Wage Inequality

	Baseline Model	Model 1	Model 2
Intercept	23.9101***	16.6108***	16.3396***
Year	.0491***	-.0489	-.0479
Slope Change by the Change of Proportion			
Female		-.0470***	-.0483***
African American		-.0131	-.0141
Hispanic		.0022	.0029
Other races		-.0237	-.0231
Southern region		.0592***	.0600***
BA or more		.0056	.0066
Educational diversity index		.0078	.0072
Public sector employment		-.0535***	-.0532***
Part-time employment		.0131	.0410***
Unionized employment		.0294**	.0319***
Manufacturing Sector		-.0079	-.0050
Part-time employment × sales occupation			-.0589**
Part-time employment × service occupation			-.0645***
Yearly Slope Change of Group Mean			
Year × BA or more		.0023***	.0024***
Year × educational diversity index		.0006	.0006
Year × public sector employment		-.0012*	-.0011*
Year × part-time employment		-.0008	-.0010
Year × unionized employment		.0036***	.0036***
Year × manufacturing sector		-.0011**	-.0010**
Effect of Group Mean			
Female		-.0032	-.0059
Black		-.0220	-.0185
Hispanic		.0455	.0370
Other races		-.2226*	-.2213*
Southern region		-.0575	-.0609
BA or more		.0700***	.0648***
Educational diversity index		.1288***	.1344***
Public sector employment		.0345*	.0342*
Part-time employment		.0932***	.1147***
Unionized employment		-.0905***	-.0957***
Manufacturing sector		-.0033	-.0057
σ_{int}^2	23.6162***	16.3422***	15.5909***
$\sigma_{int,t}$	-.2207***	-.2577***	-.2352***
σ_t^2	.0286***	.0218***	.0207***
$\sigma_{toep(2)}$	.0010***	.0009***	.0009***
σ_e^2	.0022***	.0022***	.0022***
$r_{int}^{w,a}$		.3080	.3398
$r_t^{w,b}$		.2370	.2755
-2LL	21746.1	19752.5	19502.0

^a Pseudo- R^2 calculated by $(\sigma_{int}^2, BaseModel - \sigma_{int, Model_i}^2) / \sigma_{int, BaseModel}^2$

^b Pseudo- R^2 calculated by $(\sigma_t^2, BaseModel - \sigma_t^2, Model_i) / \sigma_t^2, BaseModel$

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests).

within-occupational inequality. An increase of 1 percentage point in unionized employment increases growth in the occupation-specific Gini by .0294 points. This finding is inconsistent with Hypothesis 5a, which predicts that increases in unionized employment reduce wage

inequality.⁶ Furthermore, the interaction between year and the mean level of unionized

⁶ We estimated a model that included a quadratic term for the proportion unionized, but the coefficient for this term is not statistically significant.

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employment is statistically significant and positive. This means that wage inequality within the unionized sector increased across this period. Although the net effect of the mean level of unionized employment is statistically significant and negative, this result simply shows that inequality tends to be lower in occupations where union membership is higher for any given year (i.e., in terms of a cross-section).

The results in Table 3 provide qualified support for Hypothesis 6a, which predicts that insecure employment relations (measured in terms of part-time employment) increase growth in within-occupational wage inequality. Although the net effect of part-time employment is not statistically significant in Model 1, we investigated an additional specification, shown as Model 2. Model 2 includes interaction terms between part-time employment and both sales occupations and service occupations. In contrast to Model 1, the main effect for part-time employment in Model 2 is highly positive and statistically significant. The coefficients for the two interaction terms are highly negative and statistically significant. These results mean that, outside of sales and service occupations, an increase of 1 percentage point in part-time employment increases growth in wage inequality by .0410 points. In sales occupations, however, a 1 percentage point increase in part-time employment actually reduces growth in inequality by .0179 points (.0410 – .0589 = –.0179). Similarly, a 1 percentage point increase in part-time employment in service occupations reduces growth in inequality by .0235 points (.0410 – .0645 = –.0235). Increases in part-time employment in these occupations may force down the wages of full-time sales and service workers, resulting in reduced within-occupational inequality.

Contrary to the skill-based technological change (SBTC), the net effects of the educational variables do not support Hypothesis 7a, which predicts that increases in the variability of educational attainment in an occupation increases wage inequality in that occupation. Results for both Models 1 and 2 in Table 3 indicate that increases in the educational diversity index and the proportion of workers with a college degree do not increase the growth of within-occupational wage inequality.⁷ Contrary to

expectations in the economics literature, increases in the dispersion in educational attainments do not appear to have a net effect on the growth of occupation-specific wage inequality. Furthermore, there is no additional net effect of changes in the proportion of workers who have at least a four-year college degree.

The interaction between year and the mean educational diversity index is not statistically significant. This result also contradicts the SBTC view, which contends that the return to having a college degree increased in recent years as highly skilled workers became more valuable to employers. This argument implies that the average net effect of inequality in educational attainments should be increasing over time as the revenue gap between highly educated and poorly educated workers purportedly widens. These results do not support this prediction because the coefficient for the interaction between year and the mean educational diversity index is not statistically significant in Models 1 or 2.

The interaction between year and the mean proportion of college-educated workers is statistically significant and positive. This finding does not, however, clearly support the SBTC view. The interaction coefficient is estimated net of the mean educational diversity index, the main indicator of variation in the skill levels of workers. Therefore, the positive net effect of this interaction is more indicative of increasing wage inequality among college-educated workers net of increases in the returns to education. This increasing wage inequality among college-educated workers is not directly relevant to the SBTC view.

The net effects of the group means of the proportion of college-educated workers and the educational diversity index are highly positive and statistically significant. These two variables are important in predicting which occupations will have greater inequality in any given year. Because these variables are constant over time, however, they cannot explain the *growth* in wage inequality—the main focus of the SBTC view.

Compared to the Baseline Model in Table 3, Model 2 explains 27.6 percent of the variance of the growth rate, while Model 1 explains 23.7 percent. The variance of the Baseline Model

⁷ The removal of one of these two variables does not result in the other becoming statistically significant

(i.e., multicollinearity is not a significant problem).

(.0286) is reduced in Model 2 (.0207). All of the model-fit test statistics are significant, indicating that Model 1 fits the data better than the Baseline Model, and Model 2 fits the data better than Model 1. Given that the best-fitting model (Model 2) has an explained variance of only 27.6 percent, these results do not support Hypothesis 2a because most of the intra-occupational wage inequality remains unexplained.

SOURCES OF CHANGE IN BETWEEN-OCCUPATIONAL WAGE INEQUALITY

Table 4 shows results for the multilevel growth models of mean wage, as Equation 5 illustrates. In the Baseline Model, the effect of year is not statistically significant. This indicates that there is no clear evidence for an increase in occupation-specific mean wages over this time period. This finding seems broadly consistent with Figure 1, which shows only minimal change in the between-occupational component in the decomposition of the Theil index from 1983 to 2002.

According to Model 1 in Table 4, an increase of 1 percentage point in female employment in an occupation reduces its growth in the mean wage by .0293 dollars. In Model 2, an interaction term is added to indicate female employment in high-wage occupations: it is negative and significant. (The interaction for female employment and low-wage occupations is not statistically significant and was dropped from the model.) Thus, for high-wage occupations, an increase of 1 percentage point in female employment reduces growth in the mean wage by .0611 dollars (.0205 + .0406 = .0611). This implies that increasing female employment decreases between-occupational inequality because mean wages are reduced more in high-wage occupations than in other occupations. This conclusion is the opposite of the prediction in Hypothesis 3b.

In occupations that increase manufacturing employment, mean wage also tends to increase. The results for Model 2 show that an increase of 1 percentage point in manufacturing employment increases the growth in mean wage by .0188 dollars. Traditionally, manufacturing employment provided higher paying jobs for workers without a college degree, who would have few desirable job opportunities otherwise. Therefore, declining employment in the manu-

facturing sector probably contributes to growing between-occupational inequality because it increases the number of workers with wages below the overall mean. This result is consistent with Hypothesis 4b.

The results for Model 2 also show that an increase of 1 percentage point in public sector employment outside of low-wage occupations decreases the mean wage by .0541 dollars. In occupations that are not low-wage, private sector workers tend to have higher wages than public sector workers. Model 2 also includes a statistically significant interaction effect for public sector employment and low-wage occupations. A 1 percentage point increase in public sector employment in low-wage occupations increases the mean wage by .0125 dollars ($-.0541 + .0666 = .0125$). Thus, for low-wage occupations, the net effect of public sector employment is opposite that for high-wage occupations. These findings suggest that privatization increases between-occupational inequality because the mean wages of workers in low-wage occupations decrease and the wages of workers in high-wage occupations increase.

Regarding the effect of unionization, the results for Model 2 in Table 4 indicate that an increase of 1 percentage point in union membership in high-wage occupations increases the mean wage by .0847 dollars. Model 2 also includes an interaction term between union membership and low-wage occupations. A 1 percentage point increase in union membership in low-wage occupations increases the mean wages by .0406 dollars ($.0847 + [-.0441] = .0406$). Thus, in general, declines in unionization reduce wages more in high-wage occupations than in low-wage occupations, thereby ameliorating between-occupational inequality. This finding seems inconsistent with Hypothesis 5b, which predicts that reductions in unionization increase between-occupational inequality. We argue, however, that the descriptive statistics partially support Hypothesis 5b because they suggest that declines in unionization have been more pronounced in low-wage occupations. In other words, they appear to support Hypothesis 5b because the overall decline in unionization has indeed increased between-occupational inequality, but the underlying reason for this increase is the excessive decline of unionization in low-wage occupations (rather than the net effects of unions on wages).

Table 4. Estimates of Multilevel Growth Models of Occupational Mean Wage

	Baseline Model	Model 1	Model 2
Intercept	16.1214 ^{a***}	13.4359 ^{***}	13.0746 ^{***}
Year	-.0033 ^a	.3432 ^{***}	.3517 ^{***}
Slope Change by the Change of Proportion			
Female		-.0293 ^{***}	-.0205*
African American		-.0098	-.0135*
Hispanic		.0167 ^{**}	.0417*
Other races		.0538 ^{***}	.0510 ^{***}
Southern region		-.0001	.0011
BA or more		.0736 ^{***}	.0749 ^{***}
Educational diversity index		.0085	.0088
Public sector employment		-.0409 ^{***}	-.0541 ^{***}
Part-time employment		-.0181 ^{***}	-.0265 ^{***}
Unionized employment		.0816 ^{***}	.0847 ^{***}
Manufacturing sector		.0201 ^{***}	.0188 ^{***}
Female × high wage occupation			-.0406 ^{***}
Part-time employment × high wage occupation			.0696 ^{***}
Public sector × low wage occupation			.0666 ^{***}
Unionization × low wage occupation			-.0441 ^{**}
Yearly Slope Change of Group Mean			
Year × BA or more		.0012 ^{***}	.0012 ^{***}
Year × educational diversity index		-.0049 ^{***}	-.0050 ^{***}
Year × public sector employment		-.0003	-.0003
Year × part-time employment		-.0003	-.0005
Year × unionized employment		-.0011*	-.0011 ^{**}
Year × manufacturing sector		-.0007 ^{***}	-.0007 ^{***}
Effect of Group Mean			
Female		-.0022	-.0085
Black		-.1086 ^{***}	-.1006 ^{***}
Hispanic		-.1767 ^{***}	-.1659 ^{***}
Other races		-.0541	-.0615
Southern region		.0146	.0128
BA or more		.0546 ^{***}	.0627 ^{***}
Educational diversity index		.0320	.0374
Public sector employment		.0206	.0290 ^{**}
Part-time employment		-.0536 ^{***}	-.0583 ^{***}
Unionized employment		-.0101	-.0125
Manufacturing sector		-.0153	-.0151
σ_{int}^2	30.9396 ^{***}	7.6116 ^{***}	8.0224 ^{***}
$\sigma_{int,t}$	-.0549*	-.1317 ^{***}	-.1208 ^{***}
$\sigma_{>t}^2$	.0187 ^{***}	.0067 ^{***}	.0061 ^{***}
$\sigma_{toep(2)}$	.0003 ^{***}	.0003 ^{***}	.0003 ^{***}
σ_e^2	.0007 ^{***}	.0006 ^{***}	.0006 ^{***}
r_{int}^w ^a		.7540	.7407
r_t^w ^b		.6417	.6738
-2LL	13609.2 ^a	11904.9	11870.7

^a Estimates were obtained without using weights.

^b Pseudo- R^2 calculated by $(\sigma_{int, BaseModel}^2 - \sigma_{int, Model}^2) / \sigma_{int, BaseModel}^2$

^c Pseudo- R^2 calculated by $(\sigma_{t, BaseModel}^2 - \sigma_{t, Model}^2) / \sigma_{t, BaseModel}^2$

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests).

The net effect of part-time employment also varies depending on an interaction with high-wage occupations, shown in Model 2 of Table

4. In occupations that are not high wage, a 1 percentage point increase in part-time employment reduces the growth in the mean wage by .0265



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dollars. In high-wage occupations, a 1 percentage point increase in part-time employment increases the mean wage by .0431 dollars ($-.0265 + .0696 = .0431$). These results suggest that contingent work in high-wage occupations often refers to specialized, high-skilled jobs that command wage premiums (Hipple and Stewart 1996). In contrast, increases in part-time employment in low-wage occupations tend to reduce mean wages. These opposing trends support Hypothesis 6b, which predicts that increasing part-time employment also increases between-occupational inequality.

In terms of temporal changes in occupation-specific mean wages, the results in Model 2 in Table 4 provide some support for the SBTC view. An increase of 1 percentage point in college-educated workers increases the mean wage by .0749 dollars. Furthermore, the interaction between year and the average proportion of workers who are college educated is positive and statistically significant. This interaction indicates an increasing return to the educational attainment of college-educated workers across this period. Consequently, this supports the SBTC view and Hypothesis 7b. This widening wage gap by educational level probably increases between-occupational inequality.

As a further check on our interpretations of the results in Table 4, we carried out an analysis of predicted values using the estimates from Model 2. These predicted values are for the mean wage of each occupation in 2000 to 2002 based on the observed value of a particular independent variable in those years, holding constant all of the independent variables at their 1983 to 1985 levels. We then computed the Gini index for the 331 predicted occupation-specific mean wages to derive a direct measure of the change in the between-occupational component resulting from the change in a particular independent variable. These effects tend to be small because growth in between-occupational inequality has been limited. They are consistent, however, with the interpretations discussed above about the net effects of these independent variables on between-occupational inequality.

Finally, these models do fairly well in explaining changes in occupation-specific mean wages. As shown in Table 4, Model 2 explains 74.1 percent of the variance of the intercepts across occupations and 67.4 percent of the variance of

the slopes. Chi-square test statistics indicate that Model 2 is statistically significant relative to Model 1 and the Baseline Model. The large amount of explained variance in Model 2 is, however, inconsistent with Hypothesis 2b, which predicts that the characteristics of occupations cannot explain most of the inequality in between-occupational differences in mean wages.

DISCUSSION

SUMMARY

Our findings indicate that occupations are becoming less directly associated with wages even when using a large number (i.e., 331) of detailed occupational categories.⁸ From 1983 to 2002, the between-occupational variance declined while the within-occupational variance increased. Decomposition calculations indicate that 70.3 percent of the increase in the Theil index of wage inequality between 1983–1985 and 2000–2002 occurred within occupations. The rise in intra-occupational wage inequality is even more obvious after controlling for the increasing educational attainments of the labor force over this period. By 2000 to 2002, approximately three-fourths of the total variance in wages was within-occupational inequality. These results are inconsistent with Hypotheses 1a and 1b, which predict that most inequality is within occupations and that this trend has been increasing in recent years.

In terms of the multivariate analysis of growing wage inequality within occupations, our multilevel growth model reveals some unexpected results. Contrary to hypothesized predictions, the proportion of female workers employed in an occupation actually reduces the growth of wage inequality within occupations. A larger unionized work force increases wage inequality, and reductions in manufacturing employment and changes in the distribution of education do not affect wage inequality. Increases in part-time employment also increase the growth of wage inequality, but only outside of sales and service occupations. Perhaps the

⁸ Our basic conclusions are actually unchanged when using all of the three-digit occupational categories without collapsing any of them (there are more than 500 categories).

least surprising finding is that public-sector employment reduces wage inequality.

The hypothesized predictions are somewhat more evident regarding the growth in mean wages and between-occupational inequality. As expected, reductions in manufacturing employment and unionization decrease the growth in mean wages and between-occupational inequality. By increasing mean wages in high-wage occupations and reducing them elsewhere, increases in part-time employment increase between-occupational inequality. Increasing returns to education are also evident in that mean wages increase faster in occupations with more college graduates or with more growth in the employment of college graduates. Although we do not formally hypothesize the decrease in between-occupational inequality due to increases in female employment, this finding is reasonable given the large negative effect on the growth in mean wages that results from increased female employment in high-wage occupations. As for privatization, it increases between-occupational wage inequality. One caveat to note is that the effects on between-occupational inequality are small because between-occupational inequality was minimal across this time period.

SOME IMPLICATIONS FOR UNDERSTANDING THE SOURCES OF GROWING WAGE INEQUALITY

SKILL-BIASED TECHNOLOGICAL CHANGE. Our findings are mostly inconsistent with the SBTC argument, although we do find some limited support for this view in that mean wages increased faster in occupations with more college graduates or with more growth in the employment of college graduates. As we show, however, most of the growth in wage inequality has been within occupations, and the SBTC hypothesis does not explain this phenomenon.

Furthermore, our results indicate that the educational diversity index and the proportion of college-educated workers do not affect changes in within-occupational wage inequality. Therefore, researchers may need to revisit the *mechanism* by which schooling affects wages. If the effect derives from a competitive labor market for human capital, then its theoretical and policy implications regarding inequality are quite different from those that

would follow if education serves as a screening or rationing device for a relatively small number of “good jobs” (Sørensen and Kalleberg 1981; Thurow 1975). While these two different processes are not mutually exclusive, the effectiveness of altering the distribution of education to reduce wage inequality is diminished to the extent that the screening role of schooling is larger (Aaron 1978). Our results for within-occupational inequality offer some evidence for the limited connection between changes in the distributions of schooling and wages, but this seems inconsistent with the human capital theory of income distribution (Thurow 1975).

UNIONS. Our findings suggest a major change in the relationship between unions and labor market inequality. The traditional view has been that unions increase equality due to reduced wage dispersion within the unionized sector (relative to the nonunionized sector), increased wages for workers with lower skill levels, and improved wages in the nonunion sector due to spillover effects. Our results indicate, however, that given the current level of unionization, increases in unionization actually increase wage inequality within an occupation. Furthermore, inequality within the union sector has been growing. From a cross-sectional perspective, occupations with more unionized workers tend to have greater wage equality and increases in unionization lead to increases in within-occupational inequality. Though the effect is relatively small, the higher net effect of unions in high-wage occupations implies that increases in unionization also increase between-occupational inequality. This further contradicts the traditional view of the relationship between unionization and inequality.⁹

Moreover, these findings suggest the increasing significance of the monopolistic perspective (Freeman and Medoff 1984). According to this

⁹ This interpretation assumes that an increase in unionization occurs relatively equally across low-wage and high-wage occupations. If unionization increases are concentrated primarily in low-wage occupations, then equality would increase. As noted earlier, however, our descriptive statistics for this time period indicate that unions declined relatively faster among low-wage occupations than among high-wage occupations.



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view, unions serve as a barrier against nonunion members so the net effect of unionization increases inequality. Rather than having a large spillover effect, the more an occupation becomes unionized, the more unequal the occupation becomes. The increasing inequality within the unionized sector over time suggests that unions are losing their power to set universal wage standards among the broad ranks of its members. This trend may reflect declines in both union membership and political influence. In sum, unions appear to have transitioned from an important equalizer to a weak but monopolistic institution that struggles to increase wages. Consequently, unionization leads to greater inequality in a period when most less-educated workers are not unionized and their wages are diminishing.

**TOWARD A MORE COMPREHENSIVE
SOCIOLOGICAL THEORY OF RISING WAGE
INEQUALITY**

The recent growth in wage inequality coincides with institutional changes in the American economy. Many researchers agree that a new phase of economic development has emerged since the 1980s, often referred to as the New Economy (Acemoglu 2002; Berg and Kalleberg 2001; Budros 1997; Cappelli 2001; Dunne et al. 2004; Hollister 2004; Jacoby 2001; Lindbeck and Snower 2000; Meyer 2001; Zuckerman 2000). The New Economy is said to include: increased globalization in production, marketing, and competition; greater price competition; advances in the use of technology in the workplace, especially involving information (e.g., computers); organizational restructuring to reduce managerial hierarchies, cut costs, shift greater risk to workers, and promote greater flexibility in the employment of labor; declining unionization; increased nonstandard work arrangements; the decline of employment security and traditional internal labor markets; greater teamwork and multitasking among core workers; a shift from Tayloristic to holistic organizational structures; increased competition in capital markets and heightened concerns for shareholder demands for higher profits; reduced organizational commitment among workers; and the increased use of subcontracting, outsourcing, and the downsizing of employment.

The formulation of a detailed theory of growing inequality in the New Economy is beyond the scope of our analysis, but our results do suggest the need for developing a broader approach. To illustrate some of the components of a more comprehensive theory, we discuss several factors for future research to consider. We frame our discussion with Granovetter's (1981:12) general view that wages depend on: "(a) the characteristics of the job and employer; (b) the characteristics of the individual who occupies the job; and (c) how *a* and *b* get linked together—what I will call matching processes."

First, let a multiplicative function represent an individual's wage:

$$WAGE_i = \delta A_i^\alpha B_i^\beta \quad (8)$$

where $WAGE_i$ refers to the individual's wage, A_i refers to the characteristics of that job and employer, and B_i refers to the individual's characteristics. Taking the log of Equation 8, we obtain:

$$\ln WAGE_i = \ln \delta + \alpha \ln A_i + \beta \ln B_i \quad (9)$$

The variance of Equation 9 is:

$$V(\ln WAGE_i) = \alpha^2 V(\ln A_i) + \beta^2 V(\ln B_i) + 2\alpha\beta C(\ln A_i, \ln B_i) \quad (10)$$

where $V(\ln WAGE_i)$ refers to the variance of the log-wage, which is a well-known measure of inequality (Allison 1978). Next, $V(\ln A_i)$ refers to the variances of the variables indicating job and employer characteristics and $V(\ln B_i)$ refers to the variances of the variables indicating the characteristics of individual workers. Last, $C(\ln A_i, \ln B_i)$ refers to the covariance between employer and individual characteristics. This term represents the effect of what Granovetter refers to as the "matching process" on wage inequality.

The institutional changes of the New Economy may have increased wage inequality by increasing the terms on the right-hand side of Equation 10. These changes do not necessarily operate through the occupational structure and its traditional socioeconomic hierarchies, however. For example, the variance of employer characteristics (i.e., $V(\ln A_i)$) has increased because the size and scope of some corporations have vastly expanded due to the globalization of production, consumption, and marketing. The rise of huge multinational firms operating

alongside traditional retail shops has increased the variance in the organizational structure of employers during the last few decades. Earlier studies have investigated the net effects of firm characteristics on wages and earnings (Baron and Bielby 1980; Bronars and Famulari 2001; Grand, Szulkin, and Tahlin 1995; Hedström 1991), but three-digit occupational codes cannot capture changes in organizational variables, such as the increasing scale of multinational corporations.

Frank and Cook (1996) identify other sources of rising intra-occupational wage inequalities, such as the increasing rewards associated with being at the top of one's occupation in terms of organizational "leverage" and relative rank. Various structural factors have increased the scope of market demand for professionals and other experts, but informational uncertainties about quality differentials, psychological factors, and organizational arrangements still promote the identification of a handful of "leaders" in any one area of expertise. These "leaders" receive many offers from an increasingly larger pool of clients. Meanwhile, persons ranked only slightly below the "leaders" receive far fewer offers even though their actual productivity differential may be minor, if not imperceptible to the average consumer. The increasing significance of being at the top in terms of relative rank is most obvious for athletes, entertainers, actors, fashion models, musicians, authors, and artists, but it may also apply to academics, lawyers, scientists, executive managers, engineers, and some highly skilled workers with specialized expertise (Frank and Cook 1996). In terms of the accounting relation in Equation 10, we can think of having a leading relative rank as an individual characteristic (i.e., associated with $V(\ln B_i)$). In this case, however, an increase in the variance of relative ranks is probably not as significant as an increase in the effect of that characteristic (i.e., β^2 in Equation 10) on wage inequality.

Increases in $V(\ln A_i)$ due to the increasing size of multinational firms and increases in the returns to having a leading relative rank (i.e., β^2) probably increase the wages of the most highly paid managers, professionals, and highly skilled and specialized workers. Kalleberg and Mouw's (2006) findings are consistent with this prediction. Studying trends in patterns of wage inequalities over the past few decades, they find

dramatic increases in the ratios of the 90–50 percentiles of the wage distributions in high-wage occupations classified at the three-digit level. In contrast, they did not find this pattern in three-digit low-wage occupations.

Another important institutional change in the New Economy is the decline in internal labor markets, which traditionally provided workers with some insulation from immediate market pressures (Cappelli 2001). Frank and Cook (1996:57) note that "when people work as employees in large firms, their compensation is typically determined by bureaucratic personnel formulas that link pay to seniority, education, [and] job title. . . . [W]ithin any given category, pay usually varies little among individuals, even in the face of substantial individual variations in productivity." The breakdown of these practices has reduced the significance of internal labor markets, which have traditionally reduced wage inequality (Cappelli 2001; Frank and Cook 1996). This change has resulted in greater wage inequality between jobs (i.e., an increase in $V(\ln A_i)$).¹⁰

Changes in matching processes are probably significant in the New Economy as well. Reductions in firm tenure (and in the economic returns to firm tenure) are associated with the decline of internal labor markets, and workers have become more mobile across firms to maximize wages (Cappelli 2001). Workers with certain characteristics are now more likely to be employed in firms that highly value those characteristics, thus leading to an increase in wage inequality (i.e., an increase in $C(\ln A_i, \ln B_i)$ in Equation 10). In an analysis of wages and productivity, Dunne and colleagues (2004) find greater segregation of workers across establishments. They argue that this trend is a highly significant component of rising wage inequality.

In sum, our empirical results call for a broader framework to analyze how various institutional changes associated with the New

¹⁰ Sociologists should be broadly inclusive in considering changes in job, employer, and organizational characteristics, including the increasing use of performance pay schemes in some occupations that may be associated with rising inequality at the upper end of the wage distribution (Lemieux, MacLeod, and Parent 2007).



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Economy have led to greater wage inequality. Sociologists need to account for these institutional changes by collecting and investigating data on organizations, the operation of heightened market competition involving relative rankings, and the spread of new patterns of matching processes. Although research should focus on these additional factors associated with the New Economy, these factors may escape adequate investigation if sociological analyses remain overly focused on the study of occupational structure.

CONCLUSION

Writing before the 1980s, an economist noted that the distribution of income in the United States changed so little that studying it was like “watching the grass grow” (Aaron 1978:17). In contrast, the post-1980 experience might be characterized as a time-elapsed film showing grass spurting up by leaps and bounds within a few seconds. Despite this change, “sociologists have been strangely and remarkably silent on this issue” (Morris and Western 1999:624).

To improve our understanding of wage inequality, we investigated a traditional sociological approach that emphasizes the role of occupational structure and its mediation of the effects of other relevant variables. Our results indicate that wage inequality is largely within detailed occupations, and the rising level of wage inequality across this period is mostly unrelated to changes in the distribution of workers across occupations or to mean differences in wages across occupations. Within-occupational inequality has increased more than between-occupational inequality, and the reduction in the explanatory power of occupation is especially obvious after controlling for education.

Theoretically, these results do not provide much support for the theory of disaggregate structuration, which assumes that detailed occupations are the most important features of the class structure. Our findings from the multivariate analysis are largely inconsistent with the theory. Other variables included in the model cannot explain most intra-occupational wage inequality. This seems contrary to the assumption that detailed occupations are the most fundamental unit that mediates the effects of other sociological variables (e.g., gender, race, or

education) in generating inequality in the labor market.

The high coefficients of determination from the multivariate models of mean wages reinforce this conclusion. Rather than reflecting the intrinsic features of the detailed occupations per se, characteristics of the occupational incumbents can fairly well explain mean wages across occupations. This finding is inconsistent with the view that detailed occupations are fundamentally more important than other sociological variables in determining differences in mean wages in the labor market.

Nonetheless, due to the lack of prior sociological research on this topic, we believe that the dismissal of the significance of occupations for understanding increasing wage inequality would be premature. Occupational structure and between-occupational differentials may continue to be important in affecting intragenerational mobility and long-term incomes, which we are not able to investigate with these data. As the findings of Kalleberg and Mouw (2006) suggest, certain types of occupations (e.g., high wage) may be more closely implicated in rising inequality and should therefore be scrutinized more carefully. Furthermore, using a somewhat different methodology, a recent study by Weeden and colleagues (2007) finds some evidence of slightly increasing intra-occupational wage inequality after 2002. This stands in contrast to our basic conclusion for the 1983 to 2002 period. Whether the differences between our conclusions and those of Weeden and colleagues are purely methodological, or instead reflect some real change in the last few years, needs to be carefully investigated in future work.

As noted earlier, we do not include CPS data after 2002 due to the substantial changes that occurred in the classification of three-digit occupations. Our results regarding intra-occupational inequality may differ from those of Weeden and colleagues (2007) because of their use of varying occupational classifications or other methodological differences, such as the deletion of workers with unusually high wages, the deletion of imputed values on wages, the use of a different measure of inequality, or the decomposition of log-wages rather than dollar-wages. Regarding imputed values on wages, Kalleberg and Mouw (2006) follow the practice of Weeden and colleagues (2007) by deleting such cases where wages are imputed by the

Census Bureau (because the respondent did not disclose this information). We caution, however, that the deletion of imputed values on wages does not necessarily lead to more accurate results and may significantly underestimate the level of inequality if low-wage workers or high-wage workers are more likely not to report their wages (Lillard, Smith, and Welch 1986).¹¹

At this stage of research, we conclude that most of the available evidence suggests that the traditional sociological focus on conventional occupational structure may be inadequate as the primary explanation of rising wage inequality in the United States in recent decades. Although we do not argue that occupations are entirely unrelated to labor market outcomes, our results question whether occupations are

becoming less influential in the New Economy. Do occupations matter less in an economy characterized by evolving organizational structures, heightened market pressures, and intensified matching processes? In terms of understanding the sources of rising wage inequality, occupations may be of declining significance.

ChangHwan Kim is Postdoctoral Associate at the Minnesota Population Center at the University of Minnesota. His research interests include social inequality, labor markets, racial/ethnic relations, and statistics.

Arthur Sakamoto is Professor of Sociology at the University of Texas at Austin. His research interests include social inequality, labor markets, and racial/ethnic relations.



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¹¹ In other results that are available on request from the authors, we investigated data from the Survey of Income Program and Participation, which has fewer missing cases on wages. The results for the period from 1990 to 2001 indicate a decline in the component of inequality that is between three-digit occupations regardless of whether or not imputed values on wages are used.

APPENDIX

Table A. Descriptive Statistics for Occupations, 1983–1985 and 2000–2002

	Total			1983–1985			2000–2002		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Mean Wage	15.508 (5.741)	5.456	45.887	15.136 (5.344)	5.835	45.887	16.720 (6.403)	6.185	43.193
Age	37.274 (3.197)	23.953	47.839	36.246 (3.109)	24.027	46.127	38.627 (3.346)	25.754	47.590
Female	.477 (.312)	.000	.999	.464 (.329)	.000	.997	.483 (.299)	.000	.989
Black	.112 (.063)	.000	.417	.105 (.067)	.000	.383	.118 (.062)	.006	.340
Hispanic	.088 (.063)	.000	.639	.060 (.037)	.000	.317	.118 (.062)	.010	.639
Other Race	.035 (.022)	.000	.288	.026 (.016)	.000	.119	.047 (.029)	.000	.191
South	.344 (.048)	.120	.961	.335 (.057)	.156	.920	.350 (.042)	.125	.961
Less than High School	.116 (.125)	.000	.662	.153 (.143)	.000	.549	.094 (.111)	.000	.662
High School Graduate	.356 (.168)	.000	.694	.381 (.158)	.000	.669	.325 (.172)	.001	.666
Some College	.279 (.118)	.002	.767	.248 (.104)	.002	.591	.300 (.125)	.003	.758
BA+	.248 (.271)	.000	.998	.218 (.263)	.002	.998	.282 (.281)	.000	.996
Education Diversity	.640 (.073)	.089	.776	.642 (.070)	.168	.776	.639 (.079)	.108	.766
Public Sector	.171 (.234)	.000	1.000	.176 (.232)	.000	.987	.163 (.233)	.000	1.000
Part Time	.153 (.146)	.000	.942	.165 (.164)	.000	.936	.136 (.123)	.000	.775
Unionization	.182 (.165)	.000	.944	.225 (.181)	.004	.888	.152 (.150)	.005	.872
Manufacturing Sector	.247 (.303)	.000	1.000	.281 (.317)	.000	1.000	.215 (.290)	.000	1.000
N	5,958			331			331		

Source: Authors' own calculations using the pooled CPS-MORG.

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