

Income Stratification among Occupational Classes

Income Stratification among Occupational Classes in the United States

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Stratification and inequality are among the most central concepts in sociology, and although related, they are fundamentally distinct: inequality refers to the extent to which resources are distributed unevenly across individuals or between population subgroups, whereas stratification refers to the extent to which population subgroups occupy distinct hierarchical layers within an overall resource distribution. Despite the centrality of stratification in theories of class structure, prior empirical studies have focused exclusively on measures of inequality, which do not accurately capture the degree of class stratification and suffer from a variety of methodological limitations. In this paper, we employ a novel rank-based index of stratification to measure the degree to which occupational classes inhabit distinct, non-overlapping, and hierarchically arranged layers in the distribution of personal market income. The stratification index is nonparametric, both scale and translation invariant, and independent of the level of inequality. Based on this index, our results show that the US income distribution is highly stratified by occupational class and that the degree of class stratification increased substantially from 1980 to 2016. Moreover, we find that this trend is almost entirely due to growing stratification among aggregate occupational classes rather than among the disaggregate occupations nested within them. Finally, a set of counterfactual analyses indicate that the rise of occupational class stratification is driven by increases in the income returns to education, deunionization, and deindustrialization, although the relative importance of these factors varies by gender.

Introduction

Stratification and inequality are among the oldest, most central, and most intensely debated concepts in sociology (e.g., [Blau and Duncan 1967](#); [Bourdieu 1984](#); [Erikson and Goldthorpe 1992](#); [Marx 1976](#); [Tilly 1999](#); [Weber 1992](#)), and

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although related, they represent distinct social phenomena. Inequality refers to the extent to which a valued resource is distributed unevenly across individuals or between population subgroups (Allison 1978; Yitzhaki and Lerman 1991; Zhou 2012). Stratification, by contrast, refers to the extent to which population subgroups occupy separate hierarchical layers within an overall distribution of resources (Lasswell 1965; Yitzhaki and Lerman 1991; Zhou 2012).¹ The distinction between inequality and stratification parallels the distinction between variation and segmentation and the associated distinction between levels and ranks. Inequality refers to variation in absolute levels, whereas stratification refers to segmentation of relative ranks (Zhou 2012).

The concept of stratification is intimately related to that of class. For example, in *The International Encyclopedia of Sociology*, social stratification is broadly defined as “the division of a society into a number of...hierarchically arranged groupings...of which...classes are the most familiar” (Mann 1984, 366). Analogously, in the same volume, classes are broadly defined as “hierarchically arranged economic groupings,” which constitute “a form of social stratification...governed by economic considerations” (Mann 1984, 45). In general, theories of class structure are widely thought to “primarily make a claim about compartmentation,” or “the separation of strata” into hierarchical social entities (Kingston 2000, 53–54). Although more precise definitions of class are as varied as they are disputed, most delimitations of the concept involve at least some reference to population segmentation or hierarchical grouping, that is, to stratification (Wright 2005).

Research on stratification, apart from research on inequality, is important for several reasons. First, it is important because the degree of class stratification can exacerbate or ameliorate the social and political consequences of inequality (Lipset 1960; Wilkinson and Pickett 2009). Although recent growth in income inequality is subject to a wide array of explanations that have distinct normative implications, a concomitant rise in stratification among different social groups would indisputably imply a more rigid, divided, and hierarchical social order. In this situation, the isolation and homogenization of relatively disadvantaged groups may provide fertile ground for interpersonal distrust, cultural antagonism, and political extremism. Conversely, if recent growth in inequality were accompanied by a decline in stratification, where the overall distribution of resources grows more uneven but different social groups do not become increasingly isolated and hierarchically arranged, the social and political costs of growing inequality might be less pronounced. Thus, research on class stratification is central for understanding the collateral consequences of inequality.

Second, research on stratification is important because it can inform ongoing theoretical debates about the continuing relevance of class analysis (Breen and Rottman 1995; Grusky and Weeden 2001; Hout, Brooks, and Manza 1993; Kingston 2000; Pakulski and Waters 1996; Savage et al. 2013; Weeden and Grusky 2005, 2012; Wodtke 2015, 2016, 2017; Wright 1996). For example, according to the “death of class” perspective, “classes exist only if...there are relatively discrete, hierarchically ordered social groups,” and because of several different economic, political, and cultural changes since the 1970s, this pattern of stratification is thought to have declined to the point of irrelevance in modern

society (Kingston 2000, 210–12). Although income inequality has risen over the period in question, the “death of class” perspective rightly contends that “the degree of economic inequality and the degree of class structuration are separate matters...[as] the link between the two may be quite variable” (Kingston 2000, 53).

Similarly, the “decomposition of class” perspective also contends that classes, at least as conventionally defined in terms of aggregate occupational groups, no longer sufficiently capture the degree of “structuration” at the site of production (Grusky and Sorensen 1998; Grusky and Weeden 2001; Weeden and Grusky 2005). But unlike the “death of class” perspective, this approach does not reject the importance of production-based groups altogether. Rather, it contends that aggregate occupational classes have decomposed into small “microclasses” at the level of disaggregate occupations, which more accurately capture the degree of “structuration” in modern societies. The concept of “class structuration” is multidimensional and complex, but it involves, among other things, an indeterminate combination of internal homogeneity and external distinctiveness among different occupations (Giddens 1984; Grusky and Sorensen 1998; Kingston 2000). As such, class structuration resembles the concept of class stratification, and measuring the degree to which classes are separated into distinct population segments is therefore essential to evaluating arguments about the “death” and “decomposition” of class.

Despite the centrality of stratification to theories of class structure, prior empirical studies rely exclusively on measures of inequality that do not accurately reflect the distinct concept of stratification. For example, many prior studies of class structure and income distribution decompose a measure of total income inequality, such as the variance of log income, into between- versus within-class components (e.g., Halaby and Weakliem 1993; Morgan and Tang 2007; Weeden et al. 2007; Wodtke 2016). This type of variance decomposition, while important and informative about the level of *class inequality*, does not accurately reflect the level of *class stratification*, which is conceptually, operationally, and empirically distinct. This is because, as we explain in detail below, measures of between- versus within-group inequality are not mechanically related to whether those same groups occupy non-overlapping segments within the overall distribution of income. To our knowledge, no prior study appropriately measures the degree to which the income distribution is composed of layer upon layer of distinct occupational groups.

In this study, we employ a rank-based index of stratification to measure the extent to which occupational classes inhabit separate, non-overlapping, and hierarchical segments of the personal income distribution. The stratification index is nonparametric, invariant under any rank-preserving transformation of income, and most importantly, independent of the level of inequality (Zhou 2012). With this index, we examine whether the income distribution has become more or less stratified by occupational class over time, and then we decompose the overall trend in stratification into separate components associated with changing levels of stratification among aggregate occupational classes versus changing levels of stratification among a set of occupational microclasses nested within them. Finally, we use counterfactual reweighting methods to investigate

whether the observed trend in class stratification is related to educational changes, declines in union membership, or shifts in the industrial structure of the economy.

Results from the US Current Population Survey (CPS) indicate that the income distribution is highly stratified by occupational class and that the degree of class stratification increased substantially from 1980 to 2016. In addition, we find that the upward trend in stratification is almost entirely due to growing stratification among aggregate occupational classes rather than among the disaggregate occupations nested within them. Finally, results indicate that the rise of income stratification among aggregate occupational classes is driven by increases in the income returns to education, declines in union coverage, and employment growth in the service sector of the economy, although the relative importance of these factors varies by gender.

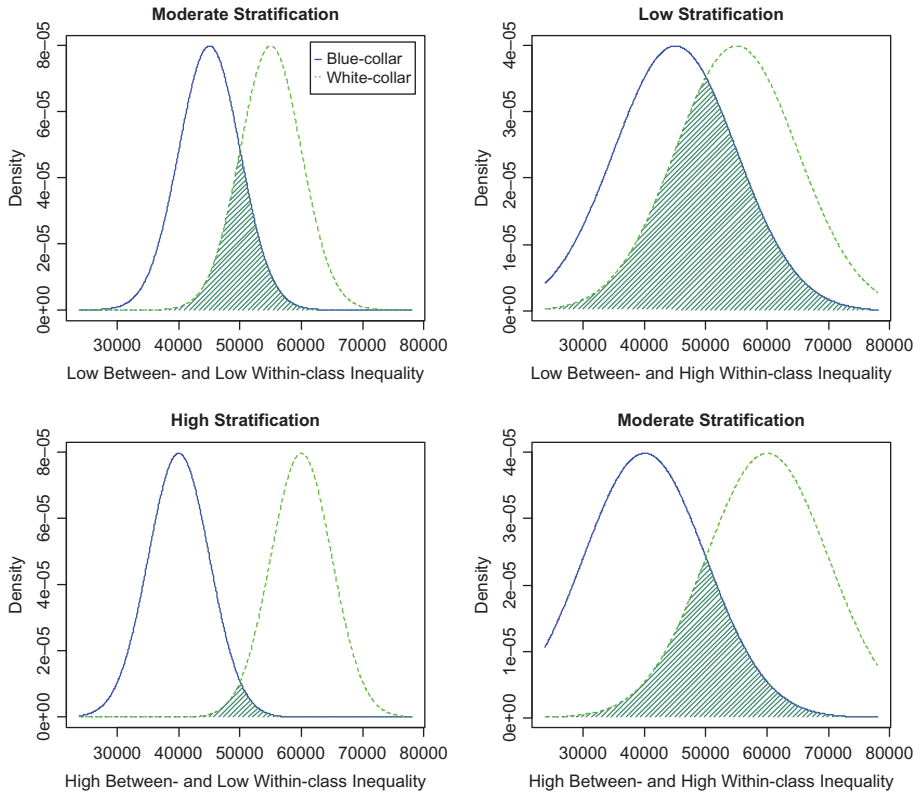
This study makes several contributions to research on class structure and income distribution. First, methodologically, it employs a novel index of stratification that, unlike measures of inequality, accurately reflects the degree to which classes occupy distinct hierarchical layers in the distribution of income.² Second, substantively, this study presents the first trend estimates of income stratification, as opposed to income inequality, among occupational classes in the United States. Third, theoretically, this analysis adjudicates between the “death” and “decomposition” of class perspectives, on the one hand, and the view that society has become increasingly stratified along aggregate class lines, on the other.

Class Inequality versus Class Stratification

Class inequality refers to the extent to which resources are unevenly distributed across classes, whereas class stratification refers to the extent to which “people can be differentiated hierarchically on one or more criteria into distinct layers” (Clark and Lipset 1991, 397). Although both concepts are important to the debate on class structure, prior empirical studies have relied exclusively on measures of inequality that only capture the degree to which income is unevenly distributed among different classes and not the degree to which classes occupy distinct hierarchical layers in the overall distribution (e.g., Halaby and Weakliem 1993; Morgan and Tang 2007; Weeden et al. 2007; Wodtke 2016). The weight of the evidence from this research suggests that levels of inequality (a) between aggregate occupational classes, (b) between occupational microclasses within aggregate classes, and (c) within microclasses are all substantively large and have increased since the 1980s.

In general, higher levels of within-class inequality, and lower levels of between-class inequality, will tend to be associated with lower levels of class stratification. This relationship is depicted graphically in figure 1, which displays a series of hypothetical income distributions for blue-collar and white-collar workers. In this figure, the level of class stratification, or the degree to which the class-specific distributions are non-overlapping, increases with the level of between-class inequality and decreases with the level of within-class inequality.

Figure 1. Stylized illustration of possible links between stratification and inequality among blue-collar and white-collar workers



It might seem reasonable, then, to infer that levels of class stratification have remained stable over time as a result of the ostensibly offsetting increases in both between- and within-class inequality documented by prior research. Unfortunately, it is difficult to draw inferences about the level of class stratification from information on levels of class inequality because the relationship between these constructs is not mechanically determined. In different situations, an increase in within-class inequality, or a decrease in between-class inequality, need not generate a decline in class stratification. In fact, these changes may even lead to higher levels of stratification, depending on the underlying shifts in the shape of the income distribution.

Consider, for example, the stylized graph in figure 2, which displays another set of hypothetical income distributions among blue-collar workers (B) and white-collar workers (W) at two time points. In this figure, each letter represents an individual, and an individual's vertical position represents her absolute income. At both time points, the two groups of workers are highly but not perfectly stratified, as their income distributions overlap to at least some degree. Changes from time 1 to time 2 are highlighted with asterisks and parenthesized numbers. They show that the income distribution among white-collar workers

Figure 2. Stylized illustration of the indeterminate relationship between stratification and inequality among blue-collar (B) and white-collar (W) workers

	Time 1		Time 2
High Income	W ₁ W ₂		B ₁ '(+4) W ₁ W ₂
.	W ₃	→	B ₂ '(+3) W ₃
.	W ₄		W ₄
.	B ₁ B ₂ W ₅		W ₅
.	B ₃ B ₄ W ₆ W ₇		W ₆ W ₇
.	W ₈ W ₉ W ₁₀		W ₈ W ₉ W ₁₀
.	W ₁₁ W ₁₂	→	W ₁₁ W ₁₂
.			B ₃ '(-3)
.			B ₄ '(-4)
.	B ₅		B ₅
.	B ₆ B ₇		B ₆ B ₇
.	B ₈ B ₉ B ₁₀	→	B ₈ B ₉ B ₁₀
Low Income	B ₁₁ B ₁₂		B ₁₁ B ₁₂

Note: From time 1 to time 2, both between-group inequality and within-group inequality among white-collar workers have remained the same. Although within-group inequality has increased among blue-collar workers, the two groups have become more stratified. Specifically, the stratification index has increased from 0.65 at time 1 to 0.73 at time 2 (see the Methods section for details).

has remained the same, while the income distribution among blue-collar workers has become more internally dispersed due to a transfer of income from poorer to richer workers. As a result, by any measure of inequality that satisfies the principle of transfers, the level of within-class inequality has increased owing to the growth in income dispersion among blue-collar workers, while the level of between-class inequality has remained the same because average incomes have not changed for either occupational group. Nevertheless, the level of stratification among the two classes has actually increased, as the degree to which their income distributions overlap has declined.

The indeterminate relationship between class inequality and class stratification is further complicated by the fact that there are many different and equally defensible methods for measuring inequality, such as the Gini coefficient, the Theil index, the variance of log income, and so on (Allison 1978; Schwartz and Winship 1980). Because each of these methods is differentially sensitive to different types of distributional shifts, they may generate different and at times conflicting trends in between- or within-class inequality. By extension, they may also differ in the degree to which they correspond with levels of class stratification. For example, the link between stratification and measures of inequality that are more, rather than less, sensitive to changes in the tails of the distribution may be especially tenuous because the degree of distributional overlap among population subgroups is not highly influenced by tail behavior. In other words, if the richest white-collar worker were to become even richer, or the poorest blue-collar worker were to become even poorer, some measures of class inequality would increase substantially, while the level of class stratification would generally remain unchanged.

In sum, class inequality and class stratification are conceptually and operationally distinct. As a result, prior research on class structure and income inequality provides little information about the level of income stratification among different classes, which must be evaluated apart from inequality using methods that accurately capture the degree to which classes occupy separate layers of the income distribution.

Trends in Class Stratification: Death, Decomposition, or Resurrection?

The “death of class” perspective broadly contends that aggregate occupational classes are no longer an especially important determinant of life conditions in modern society (Clark and Lipset 1991; Kingston 2000; Pakulski and Waters 1996). According to this view, the link between aggregate occupational classes and patterns of economic allocation has weakened over time owing to a variety of political, technological, and cultural changes. For example, the “death of class” perspective contends that “the significance of class as a basis for political identification and behavior and as a force for change has been declining” (Pakulski and Waters 1996, 132). As a result, corporatist deals between occupational classes, employers, and the state are thought to have collapsed; the influence of class-based political activism on regulatory institutions has purportedly waned; and the labor market is therefore hypothesized to have become increasingly fragmented along individual rather than occupational class lines. In addition, rapid technological change is thought to have generated “continuous and intense” task differentiation at the site of production, further exacerbating the “fragmentation of occupational categories” (Pakulski 2005, 177). The ability of aggregate occupational classes to maintain various forms of social closure, which may have formerly imposed a distinctive hierarchical structure on the distribution of economic resources, is also thought to have weakened. Thus, the “death of class” perspective predicts a decline in aggregate occupational class stratification, such that the income distribution is at present highly individualized and unstructured.

Consistent with the “death of class” perspective, the “decomposition of class” perspective also contends that aggregate occupational classes have become increasingly fragmented over time, but it disputes the conclusion that patterns of economic allocation are now highly individualized and unstructured. Rather, the “decomposition of class” perspective contends that patterns of economic allocation have become increasingly structured by highly disaggregate occupations, or “microclasses,” which are defined as small groups of technically similar jobs institutionalized in the labor market (Grusky and Sorensen 1998; Grusky and Weeden 2001; Weeden and Grusky 2005). According to this perspective, occupational microclasses are more strongly linked with the distribution of economic resources than are aggregate classes because the forces of supply and demand, social closure, and individual self-selection now operate primarily through small occupational groups. As a result, “class structuration” has come

to exist “principally at the disaggregate level” (Grusky and Weeden 2001, 206–7). Thus, the “decomposition of class” perspective predicts a decline in aggregate class stratification and an increase in stratification among occupational microclasses, such that the level of microclass stratification within aggregate occupational classes is at present comparable to or greater than the overall level of aggregate class stratification.

Although the “death” and “decomposition” of class perspectives both contend that the forces of structuration in modern society have worked to erode the level of aggregate class stratification over time, a number of technological, industrial, and institutional changes in recent decades may have generated higher, rather than lower, levels of income stratification among large occupational groups. First, advances in computing and automation are thought to have increased the demand for complex analytic skills and to have displaced workers who perform routine tasks, leading to larger income differences between broad categories of workers with different levels of human capital (Autor, Levy, and Murnane 2003). To the extent that aggregate occupational classes are linked with education and involve the performance of routine versus analytic tasks, this pattern of “skill-biased technological change” may have generated higher levels of aggregate class stratification over time.

Second, large-scale shifts in employment patterns across industries, where the proportion of workers employed in the goods-producing sector has declined and the proportion employed in the service sector has increased, may also have precipitated rising levels of stratification among aggregate occupational classes. These macroeconomic changes represent the substitution of low-wage jobs in the service sector (e.g., retail clerks) for better-paid jobs in manufacturing (e.g., craft workers)—a process hypothesized to have “hollowed out” the middle of the income distribution (Harrison and Bluestone 1988; Massey and Hirst 1998). To the extent that this pattern of “deindustrialization” has occurred disproportionately among manual versus non-manual workers, income stratification among aggregate occupational classes may have increased over time.

Finally, changes in labor market institutions also may have led to increased income stratification among aggregate occupational classes. For example, union coverage among wage and salary workers in the United States declined from about 25 percent in 1980 to just over 10 percent in 2015 (Hirsch and Macpherson 2017). Because unions tend to boost the incomes of low-skill workers and compress earnings dispersion in highly unionized industries (Card, Lemieux, and Riddell 2004; Freeman and Medoff 1984; Western and Rosenfeld 2011), union coverage may attenuate the level of aggregate class stratification. To the extent that “deunionization” has disproportionately occurred among aggregate occupational classes that reside in the middle or lower end of the income distribution, it may have generated higher levels of income stratification over time. Other institutional changes, such as declines in the real value of the minimum wage and reductions in top marginal tax rates, are unlikely to affect levels of class stratification because their influence is confined to the lower and upper tails of the income distribution.

In sum, the “death of class” perspective predicts that aggregate class stratification has declined over time and that the income distribution has become

increasingly individualized and unstructured. Similarly, the “decomposition of class” perspective also predicts a decline in stratification among aggregate occupational classes, but it additionally posits that stratification among occupational microclasses has increased. In contrast to both of these perspectives, an alternative view, henceforth termed the “resurrection of class” perspective, contends that the most important technological, industrial, and institutional changes of the past several decades have generated an increase in income stratification among aggregate occupational classes.

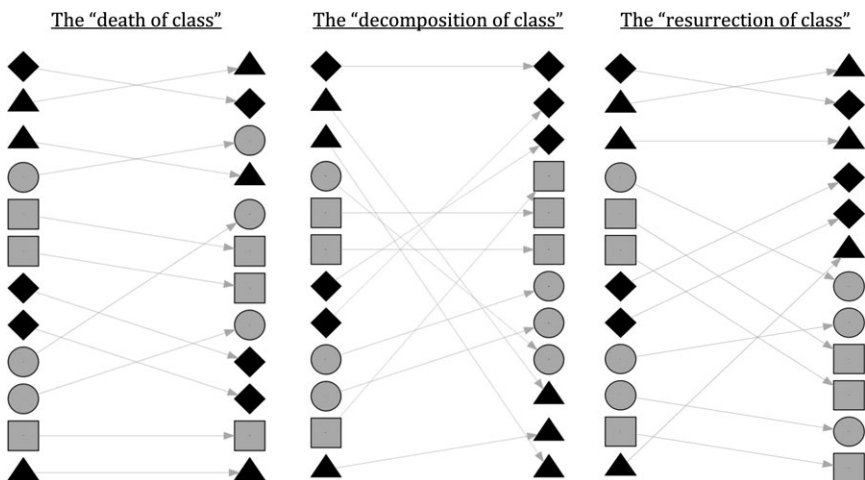
These competing hypotheses are depicted stylistically in figure 3, where nodes represent individuals and an individual’s vertical position reflects her relative income. Nodes in this figure have different colors and shapes. Each color denotes membership in a different aggregate class, and each color-shape combination denotes membership in a different occupational microclass. The left panel depicts the “death of class” scenario in which incomes have become less stratified among both aggregate classes and microclasses over time. The center panel depicts a “decomposition of class” scenario in which incomes have become less stratified among aggregate classes but more stratified among microclasses. Finally, the right panel depicts the “resurrection of class” scenario in which incomes have become more stratified among aggregate classes.

Data and Methods

Data and Measures

To investigate the level of income stratification among occupational classes over time, we use data from the 1980 to 2016 waves of the March CPS, which

Figure 3. Stylized illustration of hypothesized trends in occupational class stratification



Note: Each node represents an individual, black and gray colors denote two aggregate occupational classes (say white-collar and blue-collar workers), and each combination of color and shape denotes an occupational microclass.

contains information from a series of nationally representative samples of American households (King et al. 2017).³ For this study, the cumulative analytic sample consists of 1,498,566 observations of individuals (54 percent male, 46 percent female) who were between age 25 and 64 and who were employed in a nonagricultural industry for at least 40 weeks during the year preceding the survey.⁴

Aggregate occupational classes are measured using a four-category version of the Featherman-Hauser typology (Featherman and Hauser 1978), which is preferred over similar alternatives (e.g., Erikson and Goldthorpe 1992) because it can be precisely measured in the March CPS and because prior research suggests that it provides a better fit to US income data (Weeden and Grusky 2005). This typology is constructed by collapsing codes from the Standard Occupational Classification (SOC) system into the following broad categories: (a) professional and managerial occupations, (b) sales and clerical occupations, (c) craft occupations, and (d) operatives, service workers, and general laborers. In addition, we conducted ancillary analyses with a ten-category version of the Feather-Hauser typology and with a five-category version of the Erikson-Goldthorpe typology. Results from these analyses are presented in figure A1 of the Appendix. They are similar to those we present in the main text.

Occupational microclasses are measured using the Weeden-Grusky typology, which is designed to capture institutionalized occupations “as revealed by the distribution of occupational associations, unions, and licensing arrangements, as well as the technical features of the work itself” (Weeden and Grusky 2005, 155–56). This typology is constructed by collapsing codes from the 1970 SOC system into 124 different occupational groups.⁵ Because occupations are recorded with the 1980 or 1990 SOC codes in CPS waves fielded after 1982, we back-code these data into the 1970 SOC system using the following procedures. First, we multiply each observation by the number of 1970 SOC codes that contribute to its 1980 or 1990 SOC code. Second, we assign gender-specific weights to each record in the expanded dataset equal to the proportion of the 1980 or 1990 SOC code drawn from the constituent 1970 SOC codes. Finally, in all analyses, we weight each record in the expanded dataset by these proportions.

The dependent variable in this study is personal market income, which consists of wages and salaries from employment, earnings from privately held businesses, and investment income in the form of interest, dividends, and rent. The March CPS uses a series of questions to measure income in nominal dollars from these different sources, and the amounts are then summed to arrive at a measure of personal market income. Nominal incomes are adjusted for price inflation using the Consumer Price Index—Research Series, with all values expressed in 2016 dollars.⁶ To avoid problems associated with incomes imputed via a “hot-deck” procedure in the March CPS, we exclude these allocated values from all analyses (Mouw and Kalleberg 2010).⁷

In addition, to investigate whether trends in income stratification by occupational class are related to skill-biased technological change, deindustrialization, or deunionization, we also analyze measures of education, industry, and union coverage. Education is measured as a four-level categorical variable denoting

whether a respondent has less than 12 years, exactly 12 years, between 13 and 15 years, or at least 16 years of schooling. Industry is a categorical measure that denotes whether a respondent works in (a) the extractive, construction, or manufacturing industries; (b) the utilities or transportation industries; (c) wholesale or retail trade; (d) finance, real estate, or business services; (e) the personal and other services sector; or (f) the public sector.⁸ Union coverage is a binary measure that indicates whether a respondent belongs to a labor union or is otherwise covered by a union contract. Because the US Census Bureau reports that union data in the March CPS contain errors for years prior to 1990, we limit our analyses of these data to the period from 1990 to 2016 (King et al. 2017). In addition, because questions about union coverage are only asked of CPS respondents who were not self-employed and in rotation groups 4 and 8, analyses of these data are based on annual subsamples about one-fifth the normal size.

Methods

To measure the degree to which occupational classes inhabit distinct hierarchical layers in the overall distribution of income, we use a nonparametric index of stratification (Zhou 2012). This index can be expressed in general terms as follows:

$$S = P(Y_i > Y_j | C_i > C_j) - P(Y_i < Y_j | C_i > C_j) = E[\text{sign}(Y_i - Y_j) | C_i > C_j], \quad (1)$$

where Y_i and C_i denote the income and occupational class of the i th respondent, respectively; $C_i > C_j$ indicates that members of class C_i have a higher average percentile rank in the income distribution than members of class C_j ; $P(\cdot)$ denotes a probability distribution function; $E(\cdot)$ is the expectation function, or the expected value; and $\text{sign}(\cdot)$ is the sign function, which returns a value of negative one when its argument is less than zero and positive one when its argument is greater than zero. The stratification index is equal to zero when $P(Y_i > Y_j | C_i > C_j) = P(Y_i < Y_j | C_i > C_j)$, that is, when there is no difference in the relative ranking of incomes between different occupational classes.⁹ This would occur, for example, when the class-specific income distributions perfectly overlap. Conversely, the stratification index is equal to one when $P(Y_i > Y_j | C_i > C_j) = 1$, that is, when different occupational classes form completely separated hierarchical layers in the overall distribution of income.¹⁰

In general, the stratification index is an increasing function of the degree to which different occupational classes are separated from one another in the rank distribution of income, or equivalently, it is an increasing function of the accuracy with which the relative ranking of occupational classes can predict the relative ranking of individual incomes. In fact, the stratification index has a relatively simple substantive interpretation. To appreciate this, note that $P_{\text{accord}} = (1 + S)/2$, where P_{accord} denotes the probability that the rank order of two individuals from different classes accords with the rank order of their respective classes. This indicates, for example, that when $S = 0.5$ there is a 75 percent chance that a randomly selected white-collar worker will earn more than a randomly selected blue-collar worker, when $S = 0.6$ there is an 80 percent

chance that a randomly selected white-collar worker will earn more than a randomly selected blue-collar worker, and so on.¹¹

The stratification index has a number of other desirable properties. First, because it is based on pairwise comparisons of the rank ordering of individual incomes, the stratification index is independent of the level of income inequality. In fact, the stratification index is independent of the shape of the income distribution in general. As a result, it does not depend on any assumptions about the parametric form of this distribution, and it is invariant under any rank-preserving transformation of income. This implies that the stratification index is immune to the psychological and philosophical debate about whether measures of income differences should prioritize translation or scale invariance, as it possesses both properties (Amiel and Cowell 1999).¹² Second, unlike measures of inequality, the stratification index is highly robust to both left- and right-censoring. This is important because survey data on income are typically top-coded to protect respondent anonymity, as is the case in the March CPS.

To adjudicate between the “death,” “decomposition,” and “resurrection” of class hypotheses, we evaluate occupational class stratification in three stages. In the first stage, we evaluate the “death of class” hypothesis by estimating overall levels of stratification between aggregate occupational classes and between occupational microclasses over time. The overall level of aggregate class stratification is defined as

$$S^A = P(Y_i > Y_j | A_i > A_j) - P(Y_i < Y_j | A_i > A_j) = E[\text{sign}(Y_i - Y_j) | A_i > A_j], \quad (2)$$

and similarly, the overall level of microclass stratification is defined as

$$S^M = P(Y_i > Y_j | M_i > M_j) - P(Y_i < Y_j | M_i > M_j) = E[\text{sign}(Y_i - Y_j) | M_i > M_j], \quad (3)$$

where Y_i , A_i , and M_i respectively denote the income, aggregate class, and microclass of the i th respondent. We compute and plot trend estimates for both S^A and S^M to determine whether the income distribution has become more or less stratified by occupational class over time. When computing these trends, we rank classes separately by year and thus allow their relative standing to vary over time, as is appropriate with the stratification index when the subgroups of interest are not inherently hierarchical.

Because microclasses are nested within aggregate classes, a rise or fall in aggregate class stratification would mechanically translate into a rise or fall in microclass stratification. Thus, to evaluate the “decomposition of class” hypothesis, we must additionally determine whether trends in the overall level of microclass stratification are due to changes in the level of microclass stratification within aggregate classes or to changes in the level of microclass stratification between aggregate classes. In the second stage of the analysis, then, we evaluate the “decomposition of class” hypothesis by formally decomposing the level of microclass stratification into a weighted average of two components: (a) microclass stratification between aggregate occupational classes and (b) microclass

stratification within aggregate classes. This decomposition can be expressed as follows:

$$S^M = E[\text{sign}(Y_i - Y_j) | M_i > M_j] = \pi_b S_b^M + \pi_w S_w^M. \quad (4)$$

In this expression, $\pi_b = P(A_i \neq A_j | M_i > M_j)$ is the proportion of pairwise comparisons between microclasses occurring between different aggregate classes, and $S_b^M = E[\text{sign}(Y_i - Y_j) | M_i > M_j, A_i \neq A_j]$ is the level of microclass stratification occurring between aggregate classes. Similarly, $\pi_w = P(A_i = A_j | M_i > M_j)$ is the proportion of pairwise comparisons between microclasses occurring within the same aggregate class, and $S_w^M = E[\text{sign}(Y_i - Y_j) | M_i > M_j, A_i = A_j]$ is the level of microclass stratification occurring within aggregate classes. Based on this decomposition, we construct “counterfactual trends” by fixing either S_b^M or S_w^M at its baseline level to assess whether observed changes in microclass stratification occurred primarily between or within aggregate occupational classes.

Finally, in the third stage of the analysis, we evaluate the “resurrection of class” hypothesis by constructing another set of “counterfactual trends” that assess whether observed changes in aggregate class stratification are related to changes in the income returns to education and the educational attainment of the workforce, broad shifts in employment patterns across industries, and declines in union coverage. For example, to evaluate the impact of changes in educational attainment, we adjust the weight for each respondent in aggregate class a , education level l , and year t by the factor

$$w_{\text{alt}} = \frac{\pi_{1980}(L_i = l | A_i = a)}{\pi_t(L_i = l | A_i = a)}, \quad (5)$$

where L_i denotes a respondent’s level of education and $\pi_t(L_i = l | A_i = a)$ denotes the proportion of respondents with education level l within aggregate class a in year t . Reweighting the sample by w_{alt} transforms the class-specific educational distributions to be the same as those in 1980, but it does not alter the marginal distribution of respondents across classes in any year. By applying the stratification index to the reweighted sample, we can assess how much of the change in occupational class stratification can be attributed to class-specific changes in educational attainment. Analogous methods are used to evaluate the impact of deindustrialization and deunionization.

To evaluate the impact of increasing income returns to education, we fit linear regressions of log income on both education and aggregate class membership separately by survey year, and then for each respondent i in year t , we construct a set of counterfactual incomes equal to

$$\tilde{Y}_{it} = Y_{it} \times e^{(\hat{\beta}_{1980} - \hat{\beta}_t) \mathbf{D}_i}, \quad (6)$$

where Y_{it} denotes the observed income for respondent i in year t , \mathbf{D}_i denotes a column vector of dummy variables that capture the education level of this respondent, and $\hat{\beta}_t$ is an estimated parameter vector that captures income

differences across levels of education in year t .¹³ This calculation translates the incomes of all respondents so that the estimated returns to education, net of class membership, remain at their 1980 level, but it does not otherwise alter the distribution of income. Then, by applying the stratification index to these counterfactual incomes, we can assess how much of the change in aggregate class stratification is driven by increases in the income returns to education.

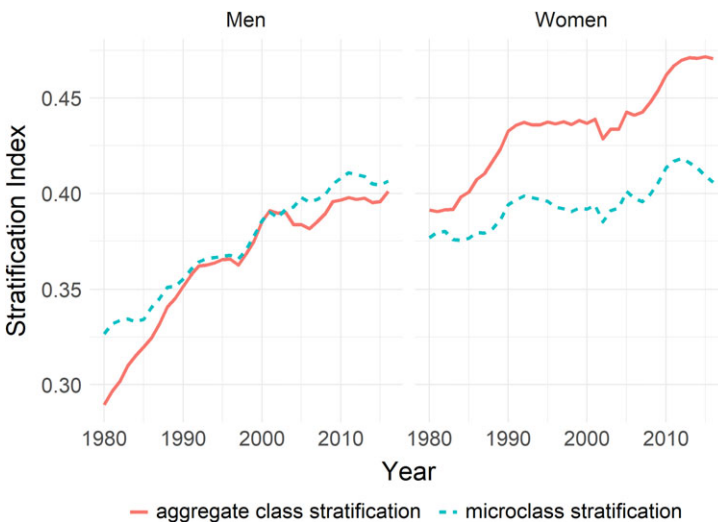
The stratification index, its decomposition into different components, and the counterfactual trends are all estimated with the R package *strat* using sample analogs of the equations outlined previously. Because of its extremely large sample size, the magnitude of sampling error in the March CPS is trivial, and thus we do not report inferential statistics. Instead, we focus on point estimates and their practical significance. To reduce year-to-year fluctuations, we also smooth all estimates by taking a three-year moving average, except for the first and last years.

Results

Trends in Occupational Class Stratification, 1980–2016

In this section, we evaluate the “death of class” hypothesis that occupational class stratification has declined over time and that the income distribution has become increasingly individualized and unstructured. Figure 4 reports trends in income stratification among aggregate occupational classes, shown in solid lines, and among occupational microclasses, shown in dashed lines, from 1980 to 2016. These trends are reported separately for men and women in the left and right panels of the figure, respectively. Several patterns are evident in these data. First, for both men and women, income stratification has increased sharply among aggregate classes. Among men, aggregate class stratification increased by

Figure 4. Trends in income stratification among occupational classes, 1980–2016

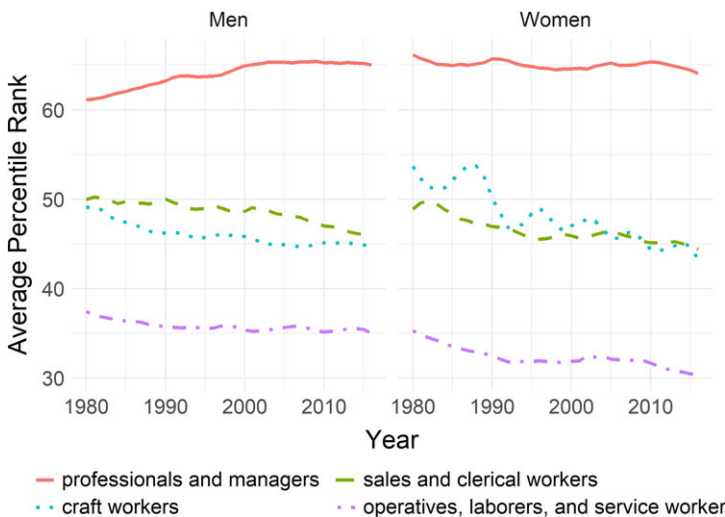


nearly 40 percent, from 0.29 in 1980 to 0.40 in 2016. Similarly, among women, aggregate class stratification increased by about 20 percent, from 0.39 to 0.47. To assess the substantive magnitude of aggregate class stratification, we compared these estimates against measures of income stratification between blacks and whites in the US South computed from the 2016 March CPS and from the 1950 US Census. These comparisons indicate that, at present, the level of aggregate class stratification is relatively extreme. It is about three or four times as high as the current level of income stratification by race ($S_{2016, \text{South}}^{\text{BLK/WHIT}} = 0.16$ for men and 0.14 for women), and it is approaching the level of racial stratification observed in the Jim Crow South ($S_{1950, \text{South}}^{\text{BLK/WHIT}} = 0.49$ for men and 0.45 for women).

Second, this figure also indicates that the level of income stratification among occupational microclasses is substantively large and has increased throughout the period under consideration, although this trend is less pronounced for women. For example, among men, microclass stratification was initially somewhat greater than aggregate class stratification in the early 1980s, but then both measures increased rapidly and eventually converged around 1990, at which point they began to move in tandem. Among women, the level of microclass stratification is also very high, but it is consistently lower than the level of aggregate class stratification and has increased more slowly over time.

To illuminate the distributional changes underlying these broad trends, figure 5 reports the average percentile rank of incomes for each aggregate occupational class from 1980 to 2016, separately by gender. Among men, the average rank of professionals and managers increased steadily, while the average ranks of all other classes declined. Among women, average ranks declined for every aggregate class, although this trend is less pronounced for professionals and

Figure 5. Trends in the average percentile rank of incomes for each aggregate occupational class, 1980–2016

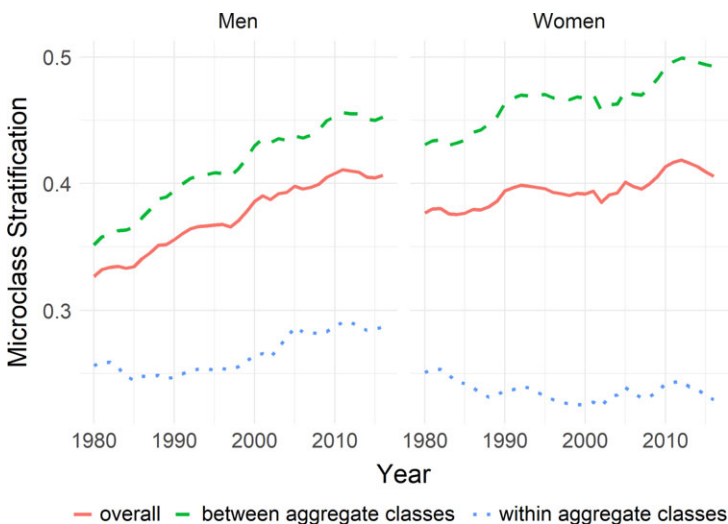


managers. The decline in average ranks across all aggregate classes among women is due in part to the rapid growth in the relative number of professionals and managers in the female labor force, which exerts downward pressure on the average ranks of all four aggregate classes over time. Nevertheless, the distance between the average ranks of each aggregate class still widened among women, as professionals and managers pulled further away from every other occupational group. Thus, for both men and women, the steep rise in income stratification among aggregate occupational classes is driven largely by increasing segmentation between the class of professionals and managers, and everyone else. Taken together, the results presented in this section contradict the “death of class” hypothesis.

A Decomposition of Trends in Microclass Stratification

In this section, we evaluate the “decomposition of class” hypothesis by formally decomposing the overall level of microclass stratification into a weighted average of microclass stratification between aggregate occupational classes and microclass stratification within aggregate classes. Figure 6 reports trends in the overall level of microclass stratification along with trends in the two components of its decomposition, which reveal several important patterns. First, among both men and women, the between-aggregate-class component of microclass stratification far exceeds the within-aggregate-class component, which is generally rather small. In other words, aggregate occupational classes are not highly stratified internally by smaller occupational groups. Because the decomposition accords more weight to the between- rather than the within-aggregate-class component ($\pi_b \approx 0.7$ for both genders), the overall level of microclass stratification is

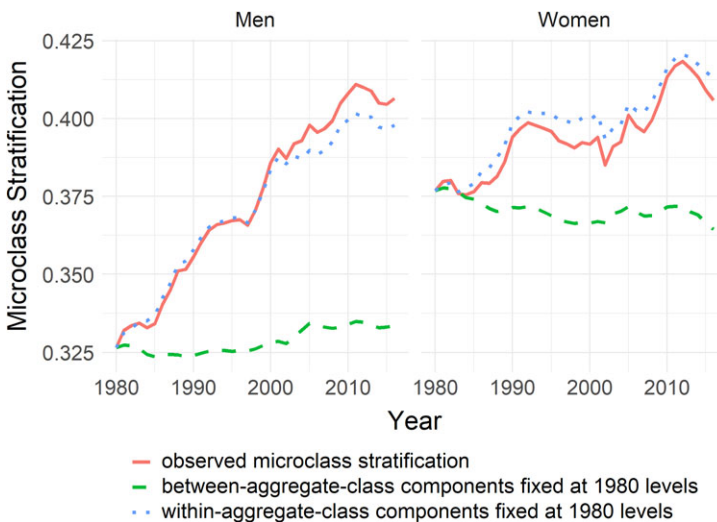
Figure 6. Decomposition of microclass stratification into between- and within-aggregate-class components, 1980–2016



generally much closer to the former of these two quantities. Second, among both men and women, the increase in microclass stratification since 1980 has occurred almost entirely between aggregate occupational classes rather than within them. Specifically, the between-aggregate-class component increased from 0.35 to 0.45 for men and from 0.43 to 0.49 for women. By contrast, the within-aggregate-class component increased only slightly among men, from 0.26 to 0.29, and it declined among women, from 0.25 to 0.23.

Similarly, figure 7 displays a set of counterfactual trends that assess the extent to which the observed increase in microclass stratification occurred between versus within aggregate occupational classes. The first trend, shown with dashed lines, is the overall level of microclass stratification that would have been observed had the between-aggregate-class component of the decomposition remained at its 1980 level. The second trend, shown with dotted lines, is the overall level of microclass stratification that would have been observed had the level of microclass stratification within aggregate classes remained at its 1980 level. For comparative purposes, the figure also displays the observed trend in microclass stratification, shown with solid lines. These trends indicate that if the between-aggregate-class component of microclass stratification had remained at its 1980 level, then microclass stratification would have barely increased at all among men and it would have declined among women. On the other hand, if the within-aggregate-class component had remained at its 1980 level, then microclass stratification would still have increased substantially. Thus, the observed rise in microclass stratification from 1980 to 2016 is explained almost entirely by increasing stratification between rather than within aggregate classes. These results are inconsistent with the “decomposition of class” hypothesis.

Figure 7. Counterfactual trends in microclass stratification, 1980–2016

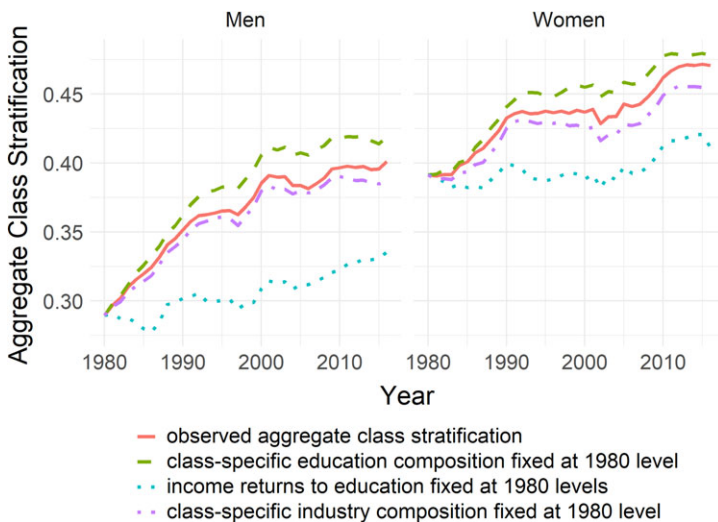


Sources of Rising Stratification between Aggregate Occupational Classes

In this section, we evaluate the “resurrection of class” hypothesis that income stratification among aggregate occupational classes has risen because of skill-biased technological change, deindustrialization, and deunionization. Figure 8 evaluates the influence of education and deindustrialization on aggregate class stratification. Specifically, it displays three counterfactual trends in stratification among aggregate classes. The first trend, shown with dashed lines, is the overall level of aggregate class stratification that would have been observed had class differences in educational attainment remained at their 1980 levels. The second trend, shown with dotted lines, is the overall level of aggregate class stratification that would have been observed had the income returns to education, net of class membership, remained at their 1980 levels. Finally, the third trend, shown with dot-dash lines, is the overall level of aggregate class stratification that would have been observed had the industrial composition of different classes remained invariant since 1980. For comparative purposes, the figure also displays the observed trend in aggregate class stratification, shown with solid lines.

Contrary to expectations, the results in figure 8 indicate that income stratification among aggregate occupational classes would have risen even more than it actually did if class differences in educational attainment had remained at their 1980 levels. This pattern suggests that class differences in educational attainment declined, rather than increased, over the past several decades. Indeed, as indicated by figure A2 in the Appendix, aggregate class disparities in years of education have narrowed over time because education levels among manual workers increased faster than those among non-manual workers. But although changes in educational attainment across aggregate classes have suppressed

Figure 8. Counterfactual trends in aggregate class stratification, 1980–2016



growth in income stratification, figure 8 also indicates that increases in the income returns to education had a substantial inflationary effect. Specifically, had the returns to education remained at their 1980 levels, aggregate class stratification would have increased by only about 16 percent, from 0.29 to 0.34, rather than by nearly 40 percent, among men, and it would have increased by only about 5 percent, from 0.39 to 0.41, rather than by 20 percent, among women. This implies that increases in the returns to education, which are reported for reference in figure A3 of the Appendix, explain about 60 percent of the rise in aggregate class stratification for men and 75 percent of the rise for women. Trends in occupational stratification are therefore largely, but not exclusively, the result of education-related changes in the economy.

In addition to the dominant role of education, figure 8 also suggests that deindustrialization had a small effect on trends in aggregate class stratification. Specifically, if the industrial composition of different aggregate classes had remained at its 1980 level, income stratification would have increased by only 31 percent, rather than 40 percent, among men and by only 15 percent, rather than 20 percent, among women. These estimates imply that shifts in the industrial composition of the economy explain about 13 percent of the rise in aggregate class stratification among men and about 23 percent of the rise among women. As indicated by figure A4 in the Appendix, the effect of industrial composition on rising stratification is driven by steady declines in the proportion of manual workers employed in the goods-producing sector of the economy.

Figure 9 evaluates the influence of deunionization on aggregate class stratification. Specifically, it displays the observed trend in aggregate class stratification, shown with solid lines, and then a counterfactual trend, shown with dashed lines, equal to the level of aggregate class stratification that would have

Figure 9. Counterfactual trends in aggregate class stratification adjusted for deunionization, 1990–2016



been observed had class-specific rates of union coverage remained at their baseline levels. In this figure, we report trends only from 1990 onward because, as noted previously, union data from earlier waves of the March CPS contain errors. In addition, because union data are only available for a subset of respondents, we report estimates for three-year intervals, rather than for each year separately, to ensure that they are based on sufficiently large samples.¹⁴

The trends in figure 9 indicate that deunionization had a substantial effect on income stratification among aggregate occupational classes from 1990 onward, but only for men. Specifically, they indicate that if rates of union coverage across different aggregate classes had remained at levels observed between 1990 and 1992, income stratification would have decreased moderately among men, but among women, it would have remained essentially unchanged. The stark difference between men and women is consistent with gender-specific trends in union coverage across aggregate classes, which are reported for reference in figure A5 of the Appendix. From 1990 to 2016, the decline in union coverage, particularly among the manual classes, was much more pronounced for men than for women. In sum, although there are differences across genders, we find that the rise of aggregate class stratification is closely related to increasing returns to education, deindustrialization, and deunionization. These results are largely consistent with the “resurrection of class” hypothesis.

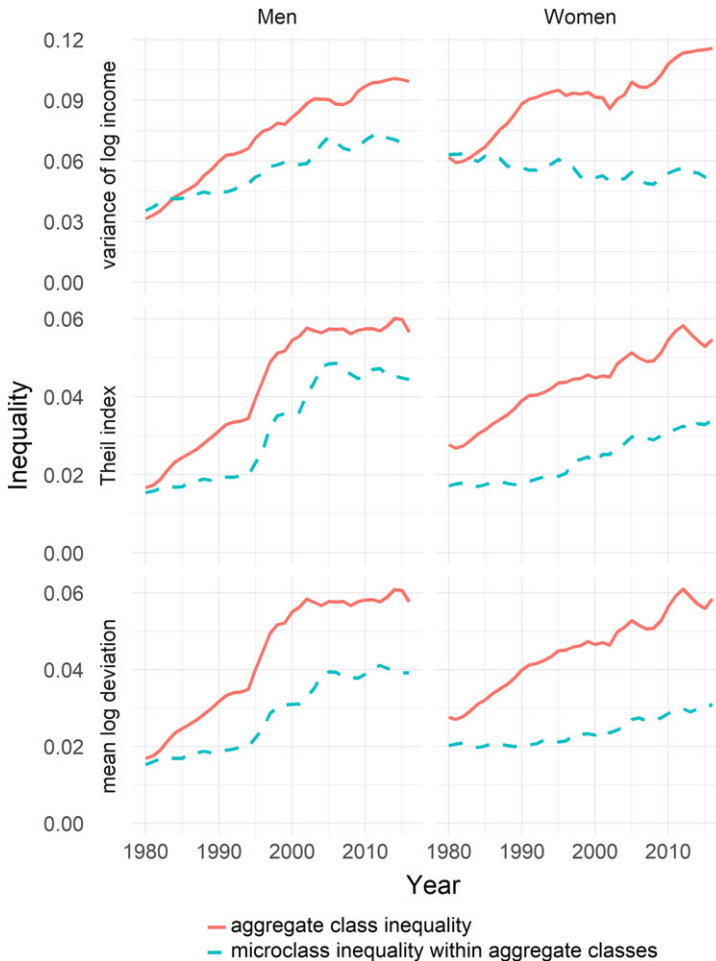
The Empirics of Class Stratification versus Class Inequality

In this section, we compare the empirics of class stratification and class inequality, revealing several important differences in levels and trends. First, consider the study by Weeden et al. (2007), which decomposes the total variance of log hourly wages into components capturing (a) inequality between aggregate occupational classes and (b) microclass inequality within aggregate classes. This study finds that the level of microclass inequality within aggregate classes is comparable to the overall level of aggregate class inequality, or in other words, it documents a substantial amount of microclass inequality within aggregate classes. Our results, by contrast, show that the level of microclass stratification within aggregate classes is substantially smaller than the overall level of aggregate class stratification, indicating that aggregate classes are not highly stratified internally. In addition, Weeden et al. (2007) find that microclass inequality within aggregate classes has increased considerably for both men and women since the 1980s. By contrast, we find that microclass stratification within aggregate classes has barely changed at all over the same period. Taken together, these findings suggest that, although microclasses have come to increasingly and significantly differ in their average income levels within the same aggregate class, there is still a substantial and fairly stable degree of distributional overlap, and thus relatively little stratification, between them.

Second, consider the results in figure 10, which reports a decomposition of trends in inequality similar to that in Weeden et al. (2007) but now based on the same data and measures as in our analysis of stratification.¹⁵ Specifically, this figure reports results from a decomposition of microclass inequality in personal

market income—as measured by the Theil index, the mean log deviation, and the variance of the logs—into components capturing (a) inequality between aggregate classes and (b) microclass inequality within aggregate classes. For men, the results of this decomposition are broadly consistent with those reported in Weeden et al. (2007), and thus we observe the same differences in relation to our analysis of stratification as outlined previously. For women, trends based on the Theil index and mean log deviation are similar to those reported in Weeden et al. (2007), but the trend based on the variance of log income suggests that microclass inequality within aggregate classes has actually decreased, rather than increased, since the 1980s. This discrepancy illustrates empirically how different measures of inequality may yield conflicting results, which further blurs any potential relationship between inequality and stratification in practice.

Figure 10. Decomposition of microclass inequality into components capturing aggregate class inequality and microclass inequality within aggregate classes, 1980–2016



Finally, consider the study by [Mouw and Kalleberg \(2010\)](#), which includes an analysis of explanations for growth in occupational wage inequality over time. Results from their analysis indicate that controlling for demographic characteristics—including age, race, and union membership—explains away little of the growth in occupational inequality from 1992 to 2008. By contrast, we find that declines in union membership alone explain nearly all of the growth in occupational stratification for men since the early 1990s. In addition, results from [Mouw and Kalleberg \(2010\)](#) indicate that educational changes explain more than 60 percent of the growth in occupational inequality over time. We find comparably large effects of changes in the income returns to education on growth in occupational stratification, but we also find that changes in the educational composition of the labor force had a substantial and partially offsetting deflationary effect on income stratification by occupational class.

Discussion

Although the concept of stratification is central to theories of class structure, prior research has relied exclusively on measures of inequality that do not accurately capture the degree to which the income distribution is stratified by class. In this study, we introduce novel methods that appropriately operationalize the concept of class stratification, and then we estimate the degree to which occupational classes inhabit hierarchically differentiated segments within the distribution of personal market income. Data from the March CPS indicate that occupational stratification increased substantially from 1980 to 2016, and it is, at present, comparable to the extreme level of income stratification observed between whites and blacks in the Jim Crow South. In addition, these data indicate that the increase in occupational stratification is almost entirely the result of growing stratification among aggregate occupational classes rather than among the occupational microclasses nested within them. Finally, a set of counterfactual analyses indicate that the upward trend in aggregate class stratification is driven by increases in the income returns to education, deindustrialization, and deunionization.

Taken together, these results are inconsistent with both the “death” and “decomposition” of class perspectives, which variously contend that modern labor markets are highly individualized and unstructured or are now primarily stratified by disaggregate occupations. In fact, we find that the level of aggregate class stratification has risen and is comparatively extreme and that the level of disaggregate occupational stratification within aggregate classes has remained stable and is comparatively low. These results are more consistent with the “resurrection of class” perspective, which contends that aggregate class stratification should have risen to high levels as a result of several major changes in technologies, institutions, and industrial employment patterns since the 1980s.

The significance of observed trends in class stratification should not be understated. If the well-documented growth in income inequality since the 1980s is among “the most spectacular social developments in...recent history” ([Weeden et al. 2007](#), 702), it would not be inappropriate to similarly classify the

tremendous growth in income stratification documented in the present study. This trend is all the more remarkable when one considers that it is based only on relative ranks and is therefore theoretically independent of trends in the level of income inequality. And it is all the more alarming when one considers the likely interaction effects of high stratification and high inequality on interpersonal distrust, cultural antagonism, and political extremism (Lipset 1960; Wilkinson and Pickett 2009).

Beyond empirically adjudicating between the “death,” “decomposition,” and “resurrection” of class perspectives, this study presents new methods that resolve an inconsistency between theories of class structure and the measures commonly used to evaluate them. Theories of class structure often involve either explicit claims or implicit assumptions about “hierarchical grouping,” “compartmentation,” “structuration,” or in other words, *stratification*. Research on class structure, however, has only employed methods that accurately measure inequality and not stratification, which are conceptually, operationally, and empirically distinct. The stratification index we outline and employ in the present study overcomes this inconsistency by accurately measuring the degree to which population subgroups occupy distinct hierarchical layers within the overall distribution of income. Both stratification and inequality are important features of income distributions that each merit thorough analysis and monitoring, which can now be accomplished by using the stratification index alongside measures of inequality.

Despite its theoretical, empirical, and methodological contributions, this study is not without limitations. The main limitation is our exclusive focus on income. Although the distribution of income figures centrally in debates over the continuing relevance of class analysis, the “death” and “decomposition” of class perspectives also posit that levels of aggregate class stratification along many other dimensions of social life, including health, political ideology, and cultural consumption, have declined or disintegrated over time. Because we focus narrowly on income, it remains unclear whether these other outcomes are also becoming increasingly stratified by aggregate occupational class. A second limitation is our exclusive focus on occupational classes defined in terms of the technical division of labor and our inattention to alternative conceptions of class defined in terms of workplace ownership and authority (e.g., Wodtke 2016; Wright 1985). Unfortunately, the March CPS lacks sufficiently detailed measures to accurately operationalize these alternative class typologies, and thus it also remains unclear whether those in different positions of workplace ownership and authority have become increasingly stratified within the distribution of income.

Yet another limitation is our narrow focus on the United States, given that levels and trends in class stratification almost certainly differ across national contexts. The United States is somewhat unique among developed economies in the severity of its recent changes in income inequality, in the extent to which it has experienced deindustrialization and deunionization, and in its inability to mitigate the consequences of skill-biased technical change via labor market or redistributive policies. Thus, the high level and steep growth in class stratification observed

in the United States may be relatively extreme in cross-national comparison. Nevertheless, many other developed economies have experienced—to varying degrees—large-scale shifts in industrial composition, union membership, and the skills demanded by employers, so whether the United States is an outlier with regard to income stratification among occupational classes remains unclear.

These limitations suggest several important directions for future research. For example, future research might investigate the degree to which different types of cultural consumption are class-stratified by, for example, applying the stratification index to data from the Consumer Expenditure Survey on the consumption of luxury goods, entertainment, and other leisure activities. In addition, future research might examine the degree to which individuals with different levels of ownership and authority in production occupy distinct layers of the income distribution by, for example, applying the stratification index to data from the Survey of Consumer Finances on private business ownership and managerial rank. Finally, future studies should analyze income stratification beyond US borders, and their results should be integrated with cross-national research that examines the effects of income inequality on public health (e.g., [Wilkinson and Pickett 2009](#)), as these unique and separable features of income distribution likely interact to generate different social maladies.

More than two decades ago, in their response to several challenging attacks on the continuing relevance of class analysis, [Hout, Brooks, and Manza \(1993, 271\)](#) argued that “class society is not yet dying, and truly classless societies have not yet been born.” To the extent that a “class society” is one that possesses an income distribution composed of hierarchically arranged occupational groups, this study indicates that class society is not merely far from dying but is in fact undergoing a resurgence. The continuing relevance of class analysis ought to therefore hinge not on its ability simply to document the persistence of class society but rather to clearly identify causes, consequences, and correctives for this remarkable increase in stratification. Much work remains to be done in this regard.

Notes

1. The term “stratification” is also sometimes used in a much broader sense to describe the processes by which inequality is generated, including intergenerational mobility, assortative mating, residential segregation, and so on (e.g., [Mare 2013](#)). In this paper, we use the term in a narrower and more literal sense, namely, to describe the degree to which a society is divided into separate layers (i.e., stratified).
2. An open-source R package, *strat*, is available from the Comprehensive R Archive Network (CRAN) to implement the stratification index ([Zhou 2016](#)).
3. We focus on data collected from 1980 onward for two reasons. First, imputed incomes cannot be identified and excluded before 1976, and failure to adjust for imputed incomes in the CPS has been shown to distort analyses of income distribution ([Mouw and Kalleberg 2010](#)). Second, measurement procedures for wage and salary income changed in 1980, when it first began prompting respondents to include overtime pay, tips, bonuses, and commissions. This change appears to generate an artificial discontinuity in the stratification time series.

4. The CPS is based on a rotating panel design, where about half the respondents interviewed in March of any given year were also interviewed in March of the previous year.
5. The original Weeden-Grusky typology contains 126 microclasses, but because we restrict our sample to nonagricultural industries, the present implementation excludes “farmers” and “farm laborers.”
6. In the CPS, very high incomes are top-coded to protect respondent anonymity. We do not adjust top-coded values because, as explained in the Methods section, the stratification index is insensitive to right censoring.
7. “Hot-deck” imputation in the CPS involves replacing missing incomes with those of the last processed individual who has valid income data and the same values on a set of matching variables.
8. Supplementary analyses based on more detailed measures of education and industry yield substantively similar results.
9. When the average rank is the same across all classes, we also define S to be zero.
10. If the outcome is not strictly continuous, the upper bound of equation (1) could be lower than one due to the presence of ties, where $Y_i = Y_j$. In such cases, we could rescale it by dividing by $P(Y_i > Y_j | C_i > C_j) + P(Y_i < Y_j | C_i > C_j)$.
11. To appreciate the mechanics of the stratification index, consider the following simple numerical example. Suppose that a population consists of two classes, each with four individuals, and that their incomes (in thousands) are $\{10, 20, 30, 40\}$ and $\{23, 27, 45, 50\}$, respectively. The mean rank of the first class is $\frac{1+2+5+6}{4} = 3.5$, and the mean rank of the second class is $\frac{3+4+7+8}{4} = 5.5$. Thus, $S = E[\text{sign}(Y_i - Y_j) | C_i > C_j] = \frac{\sum_i \sum_j \text{sign}(Y_i - Y_j)}{n_1 n_2} = \frac{[(1+1-1-1) + (1+1-1-1) + (1+1+1+1) + (1+1+1+1)]}{4 \times 4} = \frac{8}{16} = 0.5$.
12. A measure of inequality is translation invariant if it remains unchanged after adding the same amount to every individual’s income, and it is scale invariant if the measure remains unchanged after multiplying every individual’s income by the same amount.
13. We also estimated the income returns to education from models that additionally control for age and race. Counterfactual trends based on these alternative estimates are very similar to those based on the simplified regression described here.
14. The average sample size in each three-year interval is 11,396 for men and 10,778 for women.
15. [Weeden et al. \(2007\)](#) focused on hourly wages and defined microclasses using detailed SOC codes, whereas we examine personal market income and define microclasses using the [Weeden-Grusky \(2005\)](#) typology.

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Supplementary Material

Supplementary material is available at *Social Forces* online.

References

- Allison, Paul D. 1978. “Measures of Inequality.” *American Sociological Review* 43:865–80.
- Amiel, Yoram, and Frank Cowell. 1999. *Thinking about Inequality: Personal Judgment and Income Distributions*. Cambridge: Cambridge University Press.
- Autor, D. H., F. Levy, and R. J. Murnane. 2003. “The Skill Content of Recent Technological Change: An Empirical Exploration.” *Quarterly Journal of Economics* 118:1279–333.
- Blau, Peter M., and Otis Dudley Duncan. 1967. *The American Occupational Structure*. New York: John Wiley & Sons.
- Bourdieu, Pierre. 1984. *Distinction: A Social Critique of the Judgement of Taste*. Cambridge, MA: Harvard University Press.
- Breen, Richard, and David Rottman. 1995. “Class Analysis and Class Theory.” *Sociology* 29:453–73.
- Card, David, Thomas Lemieux, and W. Craig Riddell. 2004. “Unions and Wage Inequality.” *Journal of Labor Research* 25:519–62.
- Clark, Terry N., and Seymour M. Lipset. 1991. “Are Social Classes Dying?” *International Sociology* 6(4): 397–410.
- Erikson, Robert, and John H. Goldthorpe. 1992. *The Constant Flux: A Study of Class Mobility in Industrial Societies*. Oxford: Oxford University Press.
- Featherman, David L., and Robert M. Hauser. 1978. *Opportunity and Change*. New York: Academic Press.
- Freeman, Richard B., and James L. Medoff. 1984. *What Do Unions Do?* New York: Basic Books.
- Giddens, Anthony. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge: Polity Press.
- Grusky, David B., and Jesper B. Sorensen. 1998. “Can Class Analysis Be Salvaged?” *American Journal of Sociology* 103:1187–1234.
- Grusky, David B., and Kim A. Weeden. 2001. “Decomposition with Death: A Research Agenda for a New Class Analysis.” *Acta Sociologica* 44:203–18.
- Halaby, Charles N., and David L. Weakliem. 1993. “Ownership and Authority in the Earnings Function: Nonnested Tests of Alternative Specifications.” *American Sociological Review* 58:16–30.
- Harrison, B., and B. Bluestone. 1988. *The Great U-Turn: Corporate Restructuring and the Polarizing of America*. New York: Basic Books.
- Hirsch, Barry T., and David A. Macpherson. 2017. “U.S. Historical Tables: Union Membership, Coverage, Density, and Employment, 1973–2016 (All Wage and Salary Workers).” www.unionstats.com, accessed March 3, 2017.
- Hout, Mike, Clem Brooks, and Jeff Manza. 1993. “The Persistence of Classes in Postindustrial Societies.” *International Sociology* 8:259–77.
- King, Miriam, Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, and Rebecca Vick. 2017. *Integrated Public Use Microdata Series, Current Population Survey* [Machine-readable database]. Minneapolis: Minnesota Population Center.
- Kingston, Paul. 2000. *The Classless Society*. Palo Alto, CA: Stanford University Press.

- Lasswell, T. 1965. *Class and Stratum: An Introduction to Concepts and Research*. Boston: Houghton Mifflin.
- Lipset, Seymour Martin. 1960. *Political Man: The Social Basis of Modern Politics*. Baltimore: Johns Hopkins University Press.
- Mann, Michael. 1984. *The International Encyclopedia of Sociology*. New York: Macmillan.
- Mare, Robert D. 2013. "How Is Inequality in the United States Changing?" Plenary Address at the Annual Meeting of the American Sociological Association. http://www.asanet.org/sites/default/files/presentation_slides_robert_d_mare_2013.pdf, accessed January 16, 2018.
- Marx, Karl. 1976. *Capital: A Critique of Political Economy*, vol. I. New York: Penguin Books.
- Massey, Douglas S., and Deborah S. Hirst. 1998. "From Escalator to Hourglass: Changes in the U.S. Occupational Wage Structure 1949–1989." *Social Science Research* 27:51–71.
- Morgan, Stephen L., and Zun Tang. 2007. "Social Class and Workers' Rent, 1983–2001." *Research in Social Stratification and Mobility* 25:273–93.
- Mouw, Ted, and Arne L. Kalleberg. 2010. "Occupations and the Structure of Wage Inequality in the United States, 1980s to 2000s." *American Sociological Review* 75:402–31.
- Pakulski, Jan. 2005. "Foundations of a Post-Class Analysis." In *Approaches to Class Analysis*, edited by Erik O. Wright, 152–79. New York: Cambridge University Press.
- Pakulski, Jan, and Malcolm Waters. 1996. *The Death of Class*. Thousand Oaks, CA: Sage.
- Savage, Mike, Fiona Devine, Niall Cunningham, Mark Taylor, Yaojun Li, Johs Hjelbrekke, Brigitte Le Roux, Sam Friedman, and Andrew Miles. 2013. "A New Model of Social Class?" *Sociology* 47:219–50.
- Schwartz, Joseph, and Christopher Winship. 1980. "The Welfare Approach to Measuring Inequality." *Sociological Methodology* 11:1–36.
- Tilly, Charles. 1999. *Durable Inequality*. Berkeley: University of California Press.
- Weber, Max. 1992. *Economy and Society*. Berkeley: University of California Press.
- Weeden, Kim A., and David B. Grusky. 2005. "The Case for a New Class Map." *American Journal of Sociology* 111:141–212.
- . 2012. "The Three Worlds of Inequality." *American Journal of Sociology* 117:1723–85.
- Weeden, Kim A., Young-Mi Kim, Matthew Di Carlo, and David B. Grusky. 2007. "Social Class and Earnings Inequality." *American Behavioral Scientist* 50:702–36.
- Western, Bruce, and Jake Rosenfeld. 2011. "Unions, Norms, and the Rise in U.S. Wage Inequality." *American Sociological Review* 76(4):513–37.
- Wilkinson, Richard, and Kate Pickett. 2009. *The Spirit Level: Why Greater Equality Makes Societies Stronger*. New York: Bloomsbury Press.
- Wodtke, Geoffrey T. 2015. "Continuity and Change in the American Class Structure: Workplace Ownership and Authority Relations from 1972 to 2010." *Research in Social Stratification and Mobility* 42:48–61.
- . 2016. "Social Class and Income Inequality in the United States: Ownership, Authority, and Personal Income Distribution from 1980 to 2010." *American Journal of Sociology* 121:1375–415.
- . 2017. "Social Relations, Technical Divisions, and Class Stratification in the United States: An Empirical Test of the Death and Decomposition of Class Hypotheses." *Social Forces* 95:1479–508.
- Wright, Erik O. 1985. *Classes*. London: Verso.
- . 1996. "The Continuing Relevance of Class Analysis." *Theory and Society* 25:693–716.
- . 2005. *Approaches to Class Analysis*. Cambridge: Cambridge University Press.
- Yitzhaki, Shlomo, and Robert I. Lerman. 1991. "Income Stratification and Income Inequality." *Review of Income and Wealth* 37:313–29.
- Zhou, Xiang. 2012. "A Nonparametric Index of Stratification." *Sociological Methodology* 42:365–89.
- . 2016. *strat: An Implementation of the Stratification Index*. R package version 1.0. Available at the Comprehensive R Archive Network (CRAN).