

**Supplementary Appendix for:**  
**Rent and the Evolution of Inequality in Late Industrial United States**

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**Further Details of the Data Construction  
and Estimation Procedures**

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## I. Current Population Surveys and the Coding of the EGP Class Schema

Drawn from the monthly Current Populations Surveys (hereafter, CPS), the merged Outgoing Rotation Groups (hereafter, ORG) are compiled annually by the US Bureau of Labor Statistics (BLS). Each household entering the CPS is interviewed for 4 months, then ignored for 8 months, and then interviewed again for 4 more months. At the end of each of the four-month interview periods, households rotate out of the sample, returning after the first rotation but then leaving the sample permanently at the end of sixteen months. Individuals in the fourth month of each rotation group are designated as the “outgoing rotation group” and asked additional questions during the interview (such as their usual weekly earnings and usual weekly hours). Each year, the Bureau of Labor Statistics gathers together the data from all months, and creates the Merged Outgoing Rotation Group File. A household appears only once in any file year, but may reappear in the following year.

There are two advantages of using the ORG instead of the March CPS Annual Demographic supplement: (1) In each year, the ORG sample is drawn from all twelve months and is therefore three times as large as the March CPS sample (that is, 1/4 the size of the March CPS in each month but over a total of 12 months); (2) Unlike the March CPS, the ORG includes information on whether or not individuals are members of a labor union. The main limitation of the ORG data relative to the March CPS is that a lower top-code is imposed on the earnings variables (see below).

### *Choice of Time Period for CPS Analysis*

We analyze the individual-level ORG data from 1983 through 2002. Unlike the March CPS, which asks about prior year earnings and labor force participation, the data in ORG refer to the interview year. As a result, we analyze earnings data from 1983 through 2002.

Why start with the 1983 ORG? The occupation coding from 1979 to 1982 is based on the 1970 Census Occupation Classification (hereafter, COC). And from 1983 onward, the occupation coding is based on the 1980 COC (with some minor changes in the early 1990s for the slightly revised 1990 COC). It is not possible to reconcile the 1970 and 1980 COCs without introducing substantial distortions into the individual-level data (see Technical Paper 59, US Department of Commerce, Bureau of the Census), especially when constructing our class schema (since some 1970 occupations are split across several new 1980 occupations that, by our coding, are placed within separate EGP classes).

For example, there is no separate category for supervisors in the 1970 COC, as supervisors and regular workers are typically categorized together in a single omnibus occupation (e.g., supervisors of stevedores are classified simply as stevedores; see Technical Paper 59, US Department of Commerce, Bureau of the Census). This represented a serious problem for our class schema, since, as shown below, approximately 20% of the individuals in Class II are supervisors of non-manual employees, and approximately 80% of the individuals in Class V are supervisors of manual workers. Thus, since we wanted to adopt an explicit social class definition of alternative occupations, we began analysis with the 1983 CPS, which is the first year in which the 1980 COC is utilized.

### *Exclusions for the Construction of the Baseline CPS Analysis Sample*

The sample size of the ORG data varies throughout the time period. As of 2002, the smallest sample size is 277,856 (ORG year 1996) and the largest sample is 348,521 (ORG year 1983). We implemented a scheme to limit the sample for our baseline analysis:

1. Age: We first limited the sample to all individuals between (and including) the ages 18 and 64. In 2002, for example, this age exclusion resulted in a sample of 263,104 individuals.
2. Work status: We then limited the sample to those who reported usual work hours of 35 or more per week (working full-time) and not working in the Armed Forces.<sup>1</sup> In 2002, for example, this full-time work status exclusion resulted in a sample of 152,512 individuals.
3. Earnings: We then limited the sample to those who reported average weekly earnings of \$50 or more.<sup>2</sup> In 2002, for example, this earnings exclusion resulted in a sample of 138,667 individuals.
4. EGP class: We finally limited the sample to those who are employed in one of the 7 EGP classes described in the next section.<sup>3</sup> In 2002, for example, this class exclusion resulted in a sample of 137,423 individuals.

Over the entire 1983 to 2002 time period, our baseline analysis sample includes 2,646,935 individuals.

**Table S1. The Number of Observations in the Original and the Baseline Analysis Samples**

Year	Original Sample	Restricted Sample
1983	348,521	134,673
1984	343,665	138,474
1985	343,591	141,928
1986	338,051	140,665
1987	337,000	141,943
1988	320,821	136,129
1989	324,711	139,213
1990	341,162	146,433
1991	337,649	141,161

<sup>1</sup> Unlike the March CPS, the ORG data do not include information on how many weeks in the past year individuals worked. Thus, there is no way to construct a full-year sample.

<sup>2</sup> ORG data do not provide earnings data for self-employed individuals.

<sup>3</sup> Our exclusion of those not in the EGP classes I, II, IIIa, IIIb, V, VI, and VIIa means that we exclude: (1) all of those in farming and other primary occupations (classes IVc and VIIb), (2) those who are self-employed small proprietors (IVa and IVb), (3) and those who are in occupations assigned to classes IIIa, IIIb, V, VI, and VIIa, but who report being self-employed. These exclusions match the typical approach in labor economics, wherein all farmers and self-employed workers are excluded from analysis.

1992	332,184	139,004
1993	328,085	137,123
1994	319,234	127,910
1995	314,351	127,852
1996	277,856	113,147
1997	280,655	115,959
1998	280,392	117,667
1999	282,716	119,710
2000	283,236	121,766
2001	303,036	128,755
2002	329,972	137,423
Total	6,366,888	2,646,935

### *Constructing Uniform Variables Across the Entire Merged Data File*

*Constructing Uniform Education Variables.* The questions by which educational attainment were obtained changed in 1992. We followed Jaeger (1997) in creating uniform educational attainment variables.

*Race/Ethnicity.* We create a four-category race variable: (1) white, non-Hispanic, which includes those who self-identified as white for the race question but who did not self-identify as Hispanic for the ethnicity question (2) black, which includes all who self-identified as black for the race question regardless of whether or not they self-identified as non-Hispanic or Hispanic for the ethnicity question, (3) Hispanic, which includes those who self-identified as either white or other for the race question and who self-identified as Hispanic for the ethnicity question, and (4), other non-Hispanic, which includes those who self-identified as other for the race question (and, hence, primarily Asian) but who did not self-identify as Hispanic for the ethnicity question. All missing data for race was imputed by the Census bureau with its hot deck procedure, and we accepted all such imputation. However, for the Hispanic ethnicity variable, a small proportion of respondents had missing data or were coded as don't know (from a low of .27 percent in 1995 to a high of 1.94 percent in 1993 for our analytic sample of our full-time workers). We recoded these values to zero, and hence the white, non-Hispanic and other, non-Hispanic categories may contain a few Hispanic respondents. We did, however, experiment with alternative codings of race/ethnicity, and the results of consequence for the paper remained virtually identical.

*Income and Earnings: Adjustments for Inflation.* The earnings variable we analyzed (EARNWKE)<sup>4</sup> was converted to constant 2000 dollars using the Bureau of Labor Statistics' Personal Consumption Expenditures Deflator (PCED), which is now favored to traditional CPI-adjustment. See

<sup>4</sup> EARNWKE is the weekly earnings variable compiled for the NBER release of the ORG data. For hourly workers, EARNWKE is the product of hourly wage and usual hours worked per week; for weekly workers, EARNWKE is self-reported earnings per week including overtime payment, tips, and commissions. We used, for our tables, new weight variable [NEARNWT], constructed from the weight variable EEARNWT provided by ORG data (NEARNWT = Sum of EARNWT / (# of respondents of the year). See CPS Labor Extracts (Apr 2002) for detailed description of the two variables, EARNWKE and EARNWT.

<http://www.bea.doc.gov/bea/dn/nipaweb/SelectTable.asp?Selected=Y>, and in particular Table 1.1.9, which contains the deflator.

*Income and Earnings: Procedures to Deal with Top-Codes.* To protect the anonymity of respondents, the Bureau of Labor Statistics assigns top-codes to earnings variables. Because three top codes are used for the weekly earnings variable from 1983 through 2002, in order to generate a uniform dataset, we imposed on all years the lowest top-code for each source of income that we analyze.<sup>5</sup> That is, for earnings we impose the common top-code of \$1,368 (which is the nominal 1988 ORG top-code of \$999 in 2000 dollars) on all years.<sup>6</sup> For example, for our restricted sample of the 1983 ORG there were a total of 134,673 full-time workers. The original top-code in this year was \$1,600 in 2000 dollars (equivalent to the nominal 1983 ORG top-code of \$999). Of these 134,673 workers, 3,142 had earnings at the original top-code, and we assigned an additional 1,786 respondents to the common top-code because they reported wage and salary income between \$1,355 and \$1,600. As a percentage of the sample over all years, 5.647 percent of workers are at the common top-code (149,575 of 2,648,746 respondents).<sup>7</sup>

We then calculated yearly multipliers, using a “Pareto imputation” production (see Klein 1962:150-4). In short, Vilfredo Pareto long ago asserted that there is negative linear relationship between the log of income and the log percentage of units (e.g., persons, households) in excess of that income, such that:

$$\log P(y) = \log A - \alpha \log y$$

where  $P(y)$  is the percentage of units with income in excess of income level  $y$ , and where  $A$  and  $\alpha$  are intercept and slope parameters from the estimated regression of  $\log P(y)$  on  $\log(y)$ . This relationship can be used to calculate the mean income of all units above a certain income level:

$$mean(y_0) = \frac{\alpha y_0}{\alpha - 1}$$

where  $mean(y_0)$  is the Pareto-calculated mean of income among those whose income is greater than  $y_0$ , and  $\alpha$  is the parameter of the distribution as calculated above.

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<sup>5</sup> The three nominal top codes are \$999 (1983-1988), \$1,923 (1989-1997), and \$2,884 (1998-2002).

<sup>6</sup> From our reading of the literature, it does not appear that the changing top-codes are handled with sufficient care. Often the top-coded values are simply multiplied by a scalar. Or, in other cases, the issue is side-stepped by the use of median regression or by truncating the data. One possible criticism of our procedure is that we throw away data by replacing reported values for some years with the lower imposed top-coded values. We have sought consistency across years, and we believe that our procedure is the best at achieving consistency without truncating the data and while allowing for regressions that estimate means.

<sup>7</sup> We compared the number top-coded originally and the number top-coded with the imposed lowest top-code. Before 1988, the majority of workers at the imposed common top-code were originally top-coded. However, after 1988, less than a third (less than 20% in many years) of workers at the imposed common top-code were top-coded on the original earnings variable.

We use Pareto’s hypothesized association to impute mean wage and salary income among those above the top-code. We do so separately for each year and calculated a multiplier, which is the imputed mean divided by the imputed common top-code (which is akin to simply substituting the imputed value for the top-coded respondents). Table S2 shows the number and percentage of respondents at the common imposed top-code and calculated multiplier for each year. These multiplier values are consistent with the ranges of multipliers utilized by others (see Katz and Autor, 1999).

**Table S2. Respondents Top-Coded in Each Year and the Pareto-Calculated Multiplier**

Year	Number of Respondents at the (Imposed) Common Top-Code	Percentage of Respondents at the (Imposed) Common Top-Code	Pareto-calculated Top-Code Multiplier
1983	4928	3.659	1.438
1984	5421	3.915	1.424
1985	5700	4.016	1.430
1986	6416	4.561	1.443
1987	6994	4.927	1.468
1988	7276	5.345	1.540
1989	5741	4.124	1.416
1990	6825	4.661	1.426
1991	6775	4.799	1.452
1992	6947	4.998	1.454
1993	7564	5.516	1.474
1994	6951	5.422	1.476
1995	7599	5.933	1.507
1996	6293	5.553	1.498
1997	7022	6.046	1.533
1998	8232	6.986	1.542
1999	9421	7.857	1.592
2000	9789	8.027	1.690
2001	11093	8.602	1.730
2002	12588	9.147	1.729

*Constructing Our Own Coding of the EGP Class Schema for the CPS Data*

For our measure of social class, we implemented our own coding of what has become the dominant schema in the literature – variously referred to as the EGP schema (after Erikson, Goldthorpe, Portocarero 1979), Goldthorpe’s class schema (after Goldthorpe 1987), or the CASMIN coding (after Goldthorpe and Müller 1982) – which has been effectively deployed in a wide variety of substantive contexts, most prominently in studies of social mobility (e.g., Erikson and Goldthorpe 1992; Hout 1989) and voting (see Heath, Jowell, and Curtice 1985; Manza and Brooks 1999).

The following excerpts from *The Constant Flux* (Erikson and Goldthorpe 1992:41-42) describe each of the EGP classes.<sup>8</sup> Following most of the excerpts are examples, or other information, intended to give the reader a sense of each class. Our detailed coding of the unit-level 1980/1990 COC into each class is provided in Table S4 (presented at the end of the appendix).

*Class I.* “Higher-grade professionals, administrators, and officials; managers in large industrial establishments; large proprietors.” This class includes: (1) professional occupations regardless of employer size and (2) managers regardless of employer size (excluding some service managers; see discussion below).<sup>9</sup>

*Class II.* “Lower-grade professionals, administrators, and officials; higher-grade technicians; managers in small industrial establishments; supervisors of non-manual employees.” This class includes: (1) Occupations that are considered white collar but are not as esteemed as what are normally thought of as the professions (e.g., nurses and medical technicians); (2) private or publicly employed managers; (3) some service managers regardless of employer size; (4) supervisors of non-manual workers (e.g., supervisors of financial records processing).

*Class IIIa.* “Routine non-manual employees, higher-grade (administration and commerce).” Example: Secretaries.

*Class IIIb.* “Routine non-manual employees, lower-grade (sales and service).” Examples: Sales workers (retail and personal), attendants at amusement and recreation facilities.

*Class IVa.* “Small proprietors, artisans, etc., with employees.” (This class is excluded from our analyses of labor market earnings.)

*Class IVb.* “Small proprietors, artisans, etc., without employees.” (This class is excluded from our analyses of labor market earnings.)

*Class IVc.* “Farmers and small-holders; other self-employed workers in primary production.” (This class is excluded from our analyses of labor market earnings.)

*Class V.* “Lower-grade technicians; supervisors of manual workers.” Examples: Dental hygienists, supervisors of material moving equipment operators.

*Class VI.* “Skilled manual workers.” Examples: Mining machine operators, tool and die makers.<sup>10</sup>

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<sup>8</sup> We were unable to use employer size in our coding because the ORG do not have employer-size variables. This limitation only effects managers, who we then had to assign to class I. From looking at the March CPS, we determined that approximately 39 percent of those managers that Goldthorpe splits across classes I and II worked for firms with less than 25 workers. It may therefore be that our class I contains more lower-level managers than might be justified by the EGP schema. On the other hand, Goldthorpe theoretical schema relies upon the number of individuals supervised rather than simply the’s employer size. In this sense, the CPS simply cannot make the fine distinction that we would wish to have.

<sup>9</sup> We are unable to include in Class I Goldthorpe’s large proprietors (e.g., individuals of any occupation who employ 25 or more employees) because ORG do not have employer-size variables.

<sup>10</sup> Class VI includes occupations that are broadly classified as “Precision production, craft, and repair occupations” in the COC; however, there are numerous exceptions.

*Class VIIa.* “Semi- and unskilled manual workers (not in agriculture).” Example: Lathe and turning machine operators, textile sewing machine operators.<sup>11</sup>

*Class VIIb.* “Agricultural and other workers in primary production.” (This class is excluded from our analyses of labor market earnings.)

*Generating the EGP Class Schema with 1980/1990 Occupational Codes.* Our decisions regarding the mapping of occupations into classes were based on three primary sources: (1) Goldthorpe and Heath (1992); (2) Goldthorpe and Müller (1982); (3) The *Dictionary of Occupational Titles* (U.S. Department of Labor 1991; hereafter “DOT”) and ONet (U.S. Department of Labor 1998) in conjunction with Goldthorpe (2000). In this ordering, the first source was given the most weight in our decisions, with the second and third following in declining weight.

Goldthorpe and Heath (1992) map occupations from Britain’s OPCS Standard Occupational Classification system into Goldthorpe’s latest coding of the EGP class schema. As the most recent and authoritative source, it was almost always followed when there was a close match between the British OPCS coding of an occupational title and a corresponding occupational title in the U.S. 1980/1990 COC coding.

Despite wanting to follow Goldthorpe and Heath (1992) as closely as possible, we decided to go against their classification where we felt that US-UK differences were obvious. For example, we moved “librarians” from Class II to Class I. They have a higher average income in the US compared to the somewhat similar occupation “archivists”, which Goldthorpe classified as Class I. Also, Abbot (1988) maintains that librarians in the U.S. are professionals, and we feel that the professions are, to some extent, what Class I defines.

Goldthorpe and Heath (1992) have a number of occupations that are classified as Class I if they are self-employed, but in a lower class for those who are privately/publicly employed (e.g., nurses). We eliminated this route to Class I classification because ORG do not provide employer-size information.

Many occupations remained to be classified after the close matches between Goldthorpe and Heath (1992) and the 1980/90 COC codes had been exhausted. We then proceeded to consider Goldthorpe and Müller (1982) because it was used for the 1960 COC in the U.S. We were hesitant at first, since the codes for the 1980 COC were quite different than those of the 1960 COC, but we found that there was strong agreement between Goldthorpe and Heath (1992) and Goldthorpe and Müller (1982) when occupations were present in both the 1960 COC and the 1990 British OPCS coding system. In many cases, our initial reaction was to reject some of the old Goldthorpe and Müller classifications because they were contrary to our previous beliefs. However, the DOT and ONet seemed to confirm the Goldthorpe and Müller (1982) schema even despite our beliefs. For example, we believed that the occupation “crane operator”, which was not in Goldthorpe and Heath (1992), but was in Goldthorpe and Müller (1982) (as “Cranemen, derrickmen, and hoistmen”) should be placed in a “higher” class than it is in Goldthorpe and Müller (1982), because we were familiar with examples of highly-paid and well-trained crane operators. But, the DOT and ONet indicated that in general, the characteristics of this job have not changed much over the past 40 years, and hence that the occupation should be coded as it was for the 1960 COC scheme (i.e., in class VI).

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<sup>11</sup> Class VIIa includes occupations that are broadly classified as “Operators, fabricators, and laborers” in the COC; however, there are numerous exceptions.

There was, however, one serious limitation to the Goldthorpe and Müller (1982) classification. Presumably because of the relatively coarse nature of the 1960 COC, Goldthorpe and Müller (1982) employed a collapsed 7-class representation of the full 11-class EGP schema. And while we only discuss 7 classes here, our classification is based on the complete 11-class EGP schema (that is, we drop four classes – IVa, IVb, IVc, and VIIb – from consideration in the analysis of earnings). The collapsed 7-class schema of Goldthorpe and Müller (1982) is problematic because its Class I corresponds to Classes I & II in the 11-class EGP schema that we outline above. Thus, even after our scrupulous mining of both Goldthorpe and Müller (1982) and Goldthorpe and Heath (1992), cross-checked against the DOT and ONet databases, many occupations were still not classified.

To classify these remaining occupations, we relied on Goldthorpe’s latest justification for the EGP class schema (Goldthorpe 2000), in which he says that class positions are determined by employment relations. Working within the labor market tradition, he makes categories based on the intersection of two variables: (1) the difficulty employers have in assessing incumbents’ performance through monitoring and (2) the job specificity of incumbents’ skills and assets. If the work done by an incumbent is easy to monitor and requires low asset specificity, then the employment relationship is described as a labor contract. Classes IIIb, VI, VIIa, and VIIb are made up of occupations in which the employment relationship is a labor contract. If the performance of an occupation’s incumbents is difficult to gauge through monitoring and incumbents have high asset specificity, then the employment relationship is described as a service relationship. Classes I and II are composed of people whose employment relationship is a service relationship. The other two combinations are mixed. The remaining classes in his schema fit into the two mixed categories. Class V occupations are characterized by high specificity of human assets and low difficulty of monitoring while Class IIIa occupations are characterized by low specificity of human assets and high difficulty of monitoring.

We used the DOT occupation descriptions to obtain our own subjective measure of difficulty of monitoring. DOT Specific Vocational Preparation (SVP) ratings were used as a measure of specificity of job skills. However, because occupational specificity may sometimes be a poor measure of job specificity, we supplemented the SVP ratings with job descriptions in assessing specificity of skills. Generally speaking, this procedure placed those occupations under the general census classifications “Precision, production, craft and repair occupations” in class VI and those under “Operators, fabricators, and laborers” in class VIIa.

After these three steps – consideration of Goldthorpe and Heath (1992), the Goldthorpe and Müller (1982), and then DOT and ONet based on our reading of Goldthorpe (2000), we then compared the mean and median of income and education for each occupation to the corresponding values to which they were initially assigned.<sup>12</sup> For occupations with large deviations from the class-specific means, we then consulted the detailed occupation descriptions in the DOT for a final judgment. Only a handful of occupations were reassigned in this final state. Examples include the case of librarians, as described above.

Finally, we appealed to John Goldthorpe for his comments on the construction of our EGP class schema. First, he suggested that we examine experience-earnings profiles of the

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<sup>12</sup> It may seem inappropriate to make decisions based in any way on income, which is frequently the dependent variable in our work. However, this final step convinced us that our final revisions to the coding were made necessary by national differences in occupations between the U.S. and U.K; hence, unusual income patterns merely triggered our recognition.

borderline occupations, as these he felt accurately capture the different employment relations typical of alternative EGP classes. Second, he made four specific suggestions: (1) move technicians (occ80=213, 214, 215, 235), fire prevention (occ80=416, 417), and production coordinators (occ80=363) from Class II to Class V; (2) move electrical and electronic equipment repairers (occ80=523, 525) from Class VI to Class V; (3) move health record technicians (occ80=205) from Class IIIa to Class V; (4) move cashiers (occ80=276) from Class IIIb to Class IIIa. After further consulting the DOT and also using a larger sample drawn from ORG to generate experience-earnings profiles, we implemented the first two of his suggestions, but not the last two.<sup>13</sup> Our final coding of the class schema is presented in the table at the end of this data appendix.

*Procedures to Resolve 1992 Changes in the COC.* The ORG occupation classification system changed slightly in 1992, in accordance to the Census Bureau switch from the 1980 to the 1990 COC. There were few changes, and for the most part they did not pose a problem in the construction of our class schema. We merged and split categories as others have done (e.g., Hauser and Warren 1997). However, the introduction of two new managerial occupations was of particular importance for the class schema.

The 1990 COC introduces two new management occupational categories. The category “managers, not elsewhere classified” (hereafter “n.e.c. managers”) is available over the entire 1983-2002 period. However, from 1992 onwards the occupation categories “managers, food serving and lodging establishments” (hereafter “f.s.l. managers”) and “managers, service organizations, n.e.c.” (hereafter “s.o. managers”) were added to the 1990 COC and hence first employed in ORG in 1992. By looking at the size, mean education, and mean income of f.s.l. and s.o. managers alongside changes before and after 1992 in the size, mean education, and mean income of n.e.c. managers, we concluded that the two new management occupation classifications were formerly grouped with n.e.c. managers. Thus, we performed the following allocation scheme over the entire time series in order to split f.s.l and s.o. managers (who belong in Class II) from n.e.c. managers who belong in Class I.

The allocation strategy we adopted proceeded in 2 steps:

Step 1. Limiting the sample to cases for which the variable of interest was relevant, we performed a logistic regression where the outcome variable was the dichotomous variable for f.s.l. managers to be allocated (e.g., f.s.l. manager=1 instead of f.s.l. manager=0). For the entire time period, we allocated a value of 1 to those observations with the predicted values from the logistic regression model above a threshold and 0 to all others. The threshold was determined by the average percentage of cases in years for which the outcome is observed. In other words, since f.s.l. managers account for 13.87% of those who were f.s.l. managers, s.o. managers, or n.e.c. managers between 1992 and 2001, we allocated the 13.87% of relevant observations that had the highest predicted values from the logistic regression. The predictor variables included 45 industry dummy variables, education and its square, experience, its square, and its cube, a gender dummy variable, a black dummy variable, a dummy variable for other races, three region

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<sup>13</sup> We do not mean to imply that John Goldthorpe has endorsed our class schema, and indeed he urged us to feel free to make whatever decisions we thought were appropriate in the US context. However, we are tremendously grateful for his wise counsel, and extraordinarily impressed at his ability to pick out just a few occupations that rightfully should have been moved into Class V. And, of course, it was further heartening that he did not find many more occupations that he also felt we should consider moving.

dummy variables, along with interactions between gender and marital status, education (and its square), and experience (and its square and cube).

Step 2. Excluding observations that were allocated as f.s.l. managers from step 1, we performed a second logistic regression where the outcome variable was the dichotomous variable for s.o. managers to be allocated (e.g., s.o. manager=1 instead of s.o. manager=0). The allocation procedure is similar to that in step 1. We allocated the 8.08% of relevant observations that had the highest predicted values from the logistic regression to be s.o. managers, because s.o. managers account for 8.08% of those who were f.s.l. managers, s.o. managers, or n.e.c. managers between 1992 and 2001. The independent variables are the same as described in step 1.

To estimate the relative validity of this allocation procedure, we compared the allocated values to the original values over the years that both the original and allocated variables were available. As shown in Table S3, the procedure was largely successful. For example, we found that 77% of those people allocated to the status of f.s.l. manager over the 1992-2001 period were actually coded as f.s.l. managers in the original data.

**Table S3. Percentages of Allocated Values that Match Observed Values in Years that Both Observed and Allocated Values are Available**

Managers	% of Allocated Values that Would Match Observed Values if Allocations were Purely Random	% of Allocations that Match Observed Values After Employing Our Allocation Scheme
f.s.l. managers	14.21	76.52
s.o. managers	8.69	70.30
n.e.c. managers	78.09	93.14

Note: Purely random allocation is a procedure in which we first randomly arranged the order of the observations, then allocated the top 13.87% to be f.s.l. managers, the next 8.08% to be s.o. managers, and the rest to be n.e.c. managers.

Using two separate logistic regressions to allocate managerial status has a potential problem, since among all individuals reported as n.e.c. managers, individuals could be allocated to a status as an f.s.l. manager *and* as an s.o. manager. Our sequencing of the allocation procedure allocated f.s.l. managers first and then s.o. managers to overcome this problem. An alternative way to solve this problem is to allocate the observations based on a multinomial logistic regression model. We tried this method, but it did not produce an allocation that matched the observed data as well as our two-step procedure. Moreover, running two logistic regressions separately, we found that no individual (out of those that were allocated to either f.s.l. manager or s.o. manager) would have been allocated to both manager types if given the chance. Finally, for our purposes, it does not really matter which of the two managerial occupations the observations are allocated to because f.s.l. managers and s.o. managers are both in Class II.

Table S4 shows how our coding of the EGP class schema is related to the 1980 and 1990 COC codes.

**Table S4. Our Coding of 1980 and 1990 COC Codes into EGP Classes**

	1980 COC <sup>1</sup>	1990 COC <sup>1</sup>
<b>Class I</b>		
Legislators	3	3
Chief exec., general administration, public administration	4	4
Administrators and officials, public administration	5	5
Administrators, protective services	6	6
Financial managers <sup>3</sup>	7	7
Personnel and labor relations managers <sup>3</sup>	8	8
Purchasing managers <sup>3</sup>	9	9
Managers, marketing, advertising; and public relations <sup>3</sup>	13	13
Administrators, education and related fields <sup>3</sup>	14	14
Managers, medicine and health <sup>3</sup>	15	15
Managers and administrators, n.e.c.	19	22
Accountants and auditors	23	23
Underwriters	24	24
Other financial officers	25	25
Management analysts	26	26
Architects	43	43
Aerospace engineers	44	44
Metallurgical and materials	45	45
Mining engineers	46	46
Petroleum engineers	47	47
Chemical engineers	48	48
Nuclear engineers	49	49
Civil engineers	53	53
Agricultural engineers	54	54
Electrical and electronic engineers	55	55
Industrial engineers	56	56
Mechanical engineers	57	57
Marine and naval architects	58	58
Engineers, n.e.c.	59	59
Surveyors and mapping scientists	63	63
Computer systems analysts and scientists	64	64
Operations and systems researchers and analysts	65	65
Actuaries	66	66
Statisticians	67	67
Mathematical scientists, n.e.c.	68	68
Physicists and astronomers	69	69

Chemists, except biochemists	73	73
Atmospheric and space scientists	74	74
Geologists and geodesists	75	75
Physical scientists, n.e.c.	76	76
Agricultural and food scientists	77	77
Biological and life scientists	78	78
Forestry and conservation scientists	79	79
Medical scientists	83	83
Physicians	84	84
Dentists	85	85
Veterinarians	86	86
Optometrists	87	87
Podiatrists	88	88
Health diagnosing practitioners, n.e.c.	89	89
Pharmacists	96	96
Earth, environmental, and marine science post-secondary teachers	113	113
Biological science post-secondary teachers	114	114
Chemistry post-secondary teachers	115	115
Physics post-secondary teachers	116	116
Natural science post-secondary teachers, n.e.c.	117	117
Psychology post-secondary teachers	118	118
Economics post-secondary teachers	119	119
History post-secondary teachers	123	123
Political science post-secondary teachers	124	124
Sociology post-secondary teachers	125	125
Social science post-secondary teachers, n.e.c.	126	126
Engineering post-secondary teachers	127	127
Mathematical science post-secondary teachers	128	128
Computer science post-secondary teachers	129	129
Medical science post-secondary teachers	133	133
Health specialties post-secondary teachers	134	134
Business, commerce, and marketing post-secondary teachers	135	135
Agriculture and forestry post-secondary teachers	136	136
Art, drama, and music post-secondary teachers	137	137
Physical education post-secondary teachers	138	138
Education post-secondary teachers	139	139
English post-secondary teachers	143	143
Foreign language post-secondary teachers	144	144
Law post-secondary teachers	145	145
Social work post-secondary teachers	146	146
Theology post-secondary teachers	147	147

Trade and industrial post-secondary teachers	148	148
Home economics post-secondary teachers	149	149
Teachers, postsecondary, n.e.c.	153	153
Postsecondary teachers, subject not specified	154	154
Librarians	164	164
Archivists and curators	165	165
Economists	166	166
Psychologists	167	167
Sociologists	168	168
Social scientists, n.e.c.	169	169
Urban planners	173	173
Lawyers	178	178
Judges	179	179
Airplane pilots and navigators	226	226
Ship captains & mates, except fishing boats	828	828
Marine engineers	833	833
<b>Class II</b>		
Managers, properties and real estate	16	18
Postmasters and mail superintendents	17	16
Funeral directors	18	19
Mangers, food serving and lodging establishments	19	17
Managers, service organizations, n.e.c.	19	21
Personnel, training, and labor relations specialists	27	27
Purchasing agents and buyers, farm products	28	28
Buyers, wholesale and retail trade except farm products	29	29
Purchasing agents and buyers, n.e.c.	33	33
Business and promotion agents	34	34
Construction inspectors	35	35
Inspectors and compliance officers, exc. construction	36	36
Management related occupations, n.e.c.	37	37
Registered nurses	95	95
Dietitians	97	97
Inhalation therapists	98	98
Occupational therapists	99	99
Physical therapists	103	103
Speech therapists	104	104
Therapists, n.e.c.	105	105
Physicians' assistants	106	106
Teachers, prekindergarten and kindergarten	155	155
Teachers, elementary school	156	156
Teachers,, secondary school	157	157
Teachers, special education	158	158

Teachers, n.e.c.	159	159
Counselors, educational and vocational	163	163
Social workers	174	174
Clergy	176	176
Authors	183	183
Technical writers	184	184
Designers	185	185
Musicians and composers	186	186
Actors and directors	187	187
Painters,sculptors,craft-artists, & artist print-makers	188	188
Dancers	193	193
Artists, performers, and related workers, n.e.c.	194	194
Editors and reporters	195	195
Public relations specialists	197	197
Announcers	198	198
Clinical laboratory technologists and technicians	203	203
Radiology technicians	206	206
Licensed practical nurses	207	207
Health Technologists and technicians,	208	208
Engineering technicians,	216	216
Drafting occupations	217	217
Surveying and mapping technicians	218	218
Biological technicians	223	223
Chemical technicians	224	224
Science technicians, n.e.c.	225	225
Air traffic controllers	227	227
Broadcast equipment operators	228	228
Computer programmers	229	229
Tool programmers, numerical control	233	233
Supervisors and proprietors, sales occupations	243	243
Sales engineers	258	258
Sales representatives, mining, manufacturing, wholesale	259	259
Auctioneers	284	284
Supervisors, general office	303	303
Supervisors, computer equipment operators	304	304
Supervisors, financial records processing	305	305
Chief communications operators	306	306
Supervisors; distribution, scheduling, and adjusting clerks	307	307
Supervisors, firefighting & fire prevention occupations	413	413
Supervisors, police and detectives	414	414
Supervisors, guards	415	415
Police and detectives, public service	418	418
Sheriffs, bailiffs, and other law enforcement officers	423	423

**Class IIIa**

Religious workers, n.e.c.	177	177
Health record technologists and technicians	205	205
Legal assistants	234	234
Insurance sales occupations	253	253
Real estate sales occupations	254	254
Securities & financial services sales occupations	255	255
Advertising and related sales occupations	256	256
Sales occupations, other business services	257	257
Sales support occupations, n.e.c.	285	285
Computer operators	308	308
Peripheral equipment operators	309	309
Secretaries	313	313
Stenographers	314	314
Typists	315	315
Interviewers	316	316
Hotel clerks	317	317
Transportation ticket and reservation agents	318	318
Information clerks, n.e.c.	323	323
Classified-ad clerks	325	325
Correspondence clerks	326	326
Order clerks	327	327
Personnel clerks, except payroll and timekeeping	328	328
Library clerks	329	329
File clerks	335	335
Records clerks	336	336
Bookkeepers, accounting, and auditing clerks	337	337
Payroll and timekeeping clerks	338	338
Billing clerks	339	339
Cost and rate clerks	343	343
Billing, posting, and calculating machine operators	344	344
Duplicating machine operators	345	345
Mail preparing and paper handling machine operators	346	346
office machine operators, n.e.c.	347	347
Telephone operators	348	348
Communications equipment operators, n.e.c.	349, 353	353
Postal clerks, exc. mail carriers	354	354
Mail carriers, postal service	355	355
Mail clerks, exc. postal service	356	356
Messengers	357	357
Dispatchers	359	359
Traffic, shipping, and receiving clerks	364	364

Meter readers	366	366
Weighers, measurers, checkers, and samplers	368, 369	368
Expeditors	373	373
Material recording, scheduling, & distributing clerks, n.e.c.	374	374
Insurance adjusters, examiners, and investigators	375	375
Investigators and adjusters, except insurance	376	376
Eligibility clerks, social welfare	377	377
Bill and account collectors	378	378
General office clerks	379	379
Bank tellers	383	383
Proofreaders	384	384
Data-entry keyers	385	385
Statistical clerks	386	386
Teachers aides	387	387
Administrative support occupations, n.e.c.	389	389
Inspectors, agricultural products	489	489
<b>Class IIIb</b>		
Recreation workers	175	175
Sales workers, motor vehicles and boats	263	263
Sales workers, apparel	264	264
Sales workers, shoes	265	265
Sales workers, furniture and home furnishings	266	266
Sales workers, radio, television, hi-fi, and appliances	267	267
Sales workers, hardware and building supplies	268	268
Sales workers, parts	269	269
Sales workers, other commodities	274	274
Sales counter clerks	275	275
Cashiers	276	276
Street and door-to-door sales workers	277	277
News vendors	278	278
Receptionists	319	319
Housekeepers and butlers	405	405
Dental assistants	445	445
Attendants, amusement and recreation facilities	459	459
Welfare service aides	467	465
Child care workers, except private household	468	466, 467, 468
Personal service occupations, n.e.c.	469	469

**Class IVa and Class IVb**

All occupations in Classes IIIa, IIIb, V, VI, & VIIa when worker is “self-employed, not incorporated/farm” in the

## MORG

### **Class IVc**

All occupations in Class VIIb when worker is “self-employed, not incorporated/farm” in the MORG

### **Class V**

Photographers	189	189
Athletes	199	199
Dental hygienists	204	204
Electrical and electronic technicians	213	213
Industrial engineering technicians	214	214
Mechanical engineering technicians	215	215
Technicians, n.e.c.	235	235
Production coordinators	363	363
Fire inspection and fire prevention occupations	416	416
Firefighting occupations	417	417
Correctional institution officers	424	424
Supervisors, food preparation and service occupations	433	433
Supervisors, cleaning and building service workers	448	448
Supervisors, personal service occupations	456	456
Captains and other officers, of fishing boats	497	497
Supervisors, mechanics and repairers	503	503
Electronic repairers, communications & industrial equipment	523	523
Data processing equipment repairers	525	525
Telephone line installers and repairers	527	527
Telephone installers and repairers	529	529
Miscellaneous electrical and electronic equipment repairers	533	533
Supervisors; brickmasons, stonemasons, and tile setters	553	553
Supervisors, carpenters and related workers	554	554
Supervisors, electricians & power transmission installers	555	555
Supervisors; painters, paperhangers, and plasterers	556	556
Supervisors; plumbers, pipefitters, and steamfitters	557	557
Supervisors, n.e.c.	558	558
Supervisors, extractive occupations	613	613
Supervisors, production occupations	633	628
Supervisors, motor vehicle operators	803	803
Railroad conductors and yardmasters	823	823
Supervisors, material moving equipment operators	843	843
Supervisors, handlers, equipment cleaners, and laborers, n.e.c.	863	864

**Class VI**

Barbers	457	457
Hairdressers and cosmetologists	458	458
Automobile mechanics	505	505
Automobile mechanic apprentices	506	506
Bus, truck, and stationary engine mechanics	507	507
Aircraft engine mechanics	508	508
Small engine repairers	509	509
Automobile body and related repairers	514	514
Aircraft mechanics, exc. Engine	515	515
Heavy equipment mechanics	516	516
Farm equipment mechanics	517	517
Industrial machinery repairers	518	518
Machinery maintenance occupations	519	519
Household appliance and power tool repairers	526	526
Heating, air conditioning, and refrigeration mechanics	534	534
Camera, watch, & musical instrument repairers	535	535
Locksmiths and safe repairers	536	536
Office machine repairers	538	538
Mechanical controls and valve repairers	539	539
Elevator installers and repairers	543	543
Millwrights	544	544
Specified mechanics and repairers, n.e.c.	547	547
Not specified mechanics and repairers	549	549
Brickmasons and stonemasons	563	563
Brickmason and stonemason apprentices	564	564
Tile setters, hard and soft	565	565
Carpet installers	566	566
Carpenters	567	567
Carpenter apprentices	569	569
Drywall installers	573	573
Electricians	575	575
Electrician apprentices	576	576
Electrical power installers and repairers	577	577
Painters, construction and maintenance	579	579
Paperhangers	583	583
Plasterers	584	584
Plumbers, pipefitters, and steamfitters	585	585
Plumber, pipefitter, and steamfitter apprentices	587	587
Insulation workers	593	593
Sheetmetal duct installers	596	596
Structural metal workers	597	597
Drillers, earth	598	598

Drillers, oil well	614	614
Explosives workers	615	615
Mining machine operators	616	616
Tool and die makers	634	634
Tool and die maker apprentices	635	635
Precision assemblers, metal	636	636
Machinists	637	637
Machinist apprentices	639	639
Boilermakers	643	643
Precision grinders, filers, and tool sharpeners	644	644
Patternmakers and model makers, metal	645	645
Lay-out workers	646	646
Precious stones and metals workers (jewelers)	647	647
Engravers, metal	649	649
Sheet metal workers	653	653
Sheet metal worker apprentices	654	654
Miscellaneous precision metal workers	655	655
Patternmakers and model makers, wood	656	656
Cabinet makers and bench carpenters	657	657
Furniture and wood finishers	658	658
Miscellaneous precision woodworkers	659	659
Dressmakers	666	666
Tailors	667	667
Upholsterers	668	668
Shoe repairers	669	669
Miscellaneous precision apparel & fabric workers	673, 674	674
Hand molders and shapers, except jewelers	675	675
Patternmakers, lay-out workers, and cutters	676	676
Optical goods workers	677	677
Dental laboratory and medical appliance technicians	678	678
Bookbinders	679	679
Electrical and electronic equipment assemblers	683	683
Miscellaneous precision workers, n.e.c.	684	684
Butchers and meat cutters	686	686
Bakers	687	687
Food batchmakers	688	688
Inspectors, testers, and graders	689	689
Adjusters and calibrators	693	693
Water and sewage treatment plant operators	694	694
Power plant operators	695	695
Stationary engineers	696	696
Miscellaneous plant and system operators	699	699
Rolling machine operators	707	707

Grinding, abrading, buffing, & polishing machine operators	709	709
Furnace, kiln, and oven operators, exc. food	766	766
Welders and cutters	783	783
Locomotive operating occupations	824	824
Railroad brake, signal, and switch operators	825	825
Rail vehicle operators, n.e.c.	826	826
Operating engineers	844	844
Longshore equipment operators	845	845
Hoist and winch operators	848	848
Crane and tower operators	849	849
Excavating and loading machine operators	853	853
Grader, dozer, and scraper operators	855	855

### **Class VIIa**

Demonstrators, promoters and models, sales	283	283
Stock and inventory clerks	365	365
Launderers and ironers	403	403
Cooks, private household	404	404
Child care workers, private household	406	406
Private household cleaners and servants	407	407
Crossing guards	425	425
Guards and police, exc. public service	426	426
Protective service occupations, n.e.c.	427	427
Bartenders	434	434
Waiters and waitresses	435	435
Cooks	436, 437	436
Food counter, fountain and related occupations	438	438
Kitchen workers, food preparation	439	439
Waiters'/waitresses' assistants	443	443
Miscellaneous food preparation occupations	444	444
Health aides, except nursing	446	446
Nursing aides, orderlies, and attendants	447	447
Maids and housemen	449	449
Janitors and cleaners	453	453
Elevator operators	454	454
Pest control occupations	455	455
Guides	463	461
Ushers	464	462
Public transportation attendants	465	463
Baggage porters and bellhops	466	464
Marine life cultivation workers	483	483
Groundskeepers and gardeners, except farm	486	486

Graders and sorters, agricultural products	488	488
Fishers	498	498
Concrete and terrazzo finishers	588	588
Glaziers	589	589
Paving, surfacing, and tamping equipment operators	594	594
Roofers	595	595
Construction trades, n.e.c.	599	599
Mining occupations, n.e.c.	617	617
Lathe and turning machine set-up operators	703	703
Lathe and turning machine operators	704	704
Milling and planing machine operators	705	705
Punching and stamping press machine operators	706	706
Drilling and boring machine operators	708	708
Forging machine operators	713	713
Numerical control machine operators	714	714
Misc. metal, plastic, stone, & glass mach. operators	715	715
Fabricating machine operators, n.e.c.	717	717
Molding and casting machine operators	719	719
Metal plating machine operators	723	723
Heat treating equipment operators	724	724
Misc. metal & plastic processing machine operators	725	725
Wood lathe, routing, & planing machine operators	726	726
Sawing machine operators	727	727
Shaping and joining machine operators	728	728
Nail and tacking machine operators	729	729
Miscellaneous woodworking machine operators	733	733
Printing machine operators	734	734
Photoengravers and lithographers	735	735
Typesetters and compositors	736	736
Miscellaneous printing machine operators	737	737
Winding and twisting machine operators	738	738
Knitting, looping, taping, & weaving machine operators	739	739
Textile cutting machine operators	743	743
Textile sewing machine operators	744	744
Shoe machine operators	745	745
Pressing machine operators	747	747
Laundering and dry cleaning machine operators	748	748
Miscellaneous textile machine operators	749	749
Cementing and gluing machine operators	753	753
Packaging and filling operators	754	754
Extruding and forming machine operators	755	755
Mixing and blending machine operators	756	756
Separating, filtering, and clarifying machine operators	757	757

Compressing and compacting machine operators	758	758
Painting and paint spraying machine operators	759	759
Roasting and baking machine operators, food	763	763
Washing, cleaning, and pickling machine operators	764	764
Folding machine operators	765	765
Crushing and grinding machine operators	768	768
Slicing and cutting machine operators	769	769
Motion picture projectionists	773	773
Photographic process machine operators	774	774
Miscellaneous machine operators, n.e.c.	777	777
Machine operators, not specified	779	779
Solderers and brazers	784	784
Assemblers	785	785
Hand cutting and trimming occupations	786	786
Hand molding, casting, and forming occupations	787	787
Hand painters, coating, and decorating occupations	789	789
Hand engraving and printing occupations	793	793
Miscellaneous hand working occupations	795	795
Production inspectors, checkers, and examiners	796	796
Production testers	797	797
Production samplers and weighers	798	798
Graders, and sorters, exc. agricultural	799	799
Truck drivers	804, 805	804
Driver-sales workers	806	806
Bus drivers	808	808
Taxi cab drivers and chauffeurs	809	809
Parking lot attendants	813	813
Motor transportation occupations, n.e.c.	814	814
Sailors and deckhands	829	829
Bridge, lock, and lighthouse tenders	834	834
Industrial truck and tractor equipment operators	856	856
Miscellaneous material moving equipment operators	859	859
Helpers, mechanics and repairers	864	865
Helpers, construction trades	865	866
Helpers, surveyor	866	867
Helpers, extractive occupations	867	868
Construction laborers	869	869
Production helpers	873	874
Garbage collectors	875	875
Stevedores	876	876
Stock handlers and baggers	877	877
Machine feeders and offbearers	878	878
Freight, stocks, and material handlers, n.e.c.	883	883

Garage and service station related occupation	885	885
Vehicle washers and equipment washers	887	887
Hand packers and packagers	888	888
Laborers, except construction	889	889

**Class VIIb**

Farmers (except horticultural)	473	473
Horticultural specialty Farmers	474	474
Managers, Farms (except horticultural)	475	475
Managers, Horticultural specialty Farmers	476	476
Supervisors, farm workers	477	477
Farm workers	479	479
Nursery workers	484	484
Supervisors, related agricultural occupations	485	485
Animal caretakers, except farms	487	487
Supervisors, forestry and logging workers	494	494
Forestry workers, except logging	495	495
Timber cutting and logging occupations	496	496
Hunters and trappers	499	499

Notes:

1. COC80 is the value assigned to the occupation(s) in the (3-digit) occupational classification system used in the ORG from 1983-1991. COC90 contains the corresponding values for the period 1992-2002.
2. Among these six types of managers, those who work at establishments with less than 25 employees should be allocated into Class II. However, as ORG do not provide employer size information, we were not able to make such allocation.

## II. Coding of the Herzenberg et al. Work System Categorization and Subsequent Data Analysis for Comparison to the EGP Class Analysis

To fully develop an employment-relations based decomposition of the labor market, we would need detailed data on the contracts under which alternative workers are employed. Since no such data exist which can also be used to model trends in inequality, we develop a “work system” based typology, drawing upon the book *New Rules for a New Economy* by Herzberg, Alic, and Wial (1998). These authors categorize census occupations into four groups based on their conception of how work is organized. As Herzberg et al. (1998:8) write, “Each type of work system relies on a different basic approach to organize production and motivate or control how hard and well people work.” For the *high-skill autonomous* work system, workers are responsible for their own performance. For the *semiautonomous* work system, bureaucratic incentives are used. For the *unrationalized labor-intensive* work system, work is low-skilled but not easily monitored by machine pacing or quality monitoring, as for janitors and security guards. And, finally, for the *tightly constrained* work system, work is paced by “machine technology, customer pressure, or flow of work” as for telephone operators and fast food workers (see Herzberg et al. (1998:10, 42-3).

Herzenberg et al. (1998:185-89) provide an appendix that details how they assigned occupations to alternative work systems for their typology. They used the same three-digit census occupation codes for their classification which we utilized for the EGP class schema, but they also assigned occupations to more than one group based on fairly arbitrary wage levels (e.g., the top 25 percent of earners in executive, administrative, and managerial occupations were allocated to the high-skill autonomous work system, while all others in these occupations were allocated to the semiautonomous work system). We chose not to allocate individuals within occupations by wage levels. We were uncomfortable defining categories for analysis using the dependent variable of primary interest. Instead, we created additional work system groups for occupations apportioned across work systems by Herzenberg and his colleagues. As a result, we created seven new categories, and our exhaustive typology is listed in Table 1 (and, again, described in detail in the supplementary appendix). Table 1 shows that nearly 60 percent of the workforce between 1983 and 2002 is in the high-skill autonomous work system or the semiautonomous work system. This reflects, as one might expect, the shift toward what Bell would regard as a post-industrial labor market.

*The Coding.* Herzenberg et al. (1998) categorize occupations into four groups based on their conceptualization of the organization of production – tightly constrained, unrationalized labor-intensive, semiautonomous, and high-skill autonomous. These four work system groups differ in terms of skill requirements, wage levels, and the degree of autonomy during tasks performance

*Tightly constrained*: “undemanding in terms of skills. Production paced by machine technology, customer pressure, or flow of work” (Herzenberg et al. 1998: Table 1 in p.10). This group includes workers in assembly-line-type jobs.

*Unrationalized labor-intensive*: “Low wages. Work not susceptible to machine pacing or quality monitoring” (Herzenberg et al. 1998: Table 1 in p.10). This group includes workers such as janitors, gardeners, waiters/waitresses, nurse’s aides, and hospital orderlies.

*Semiautonomous*: “Usually firm-specific skills. Bureaucratic incentives (pay, promotion, corporate culture) motivate workers” (Herzenberg et al. 1998: Table 1 in p.10). This group includes workers such as secretaries, middle managers, factory quality inspectors, and supervisors.

*High-skill autonomous*: “Workers responsible for own performance” (Herzenberg et al. 1998: Table 1 in p.10). This group includes professionals, upper-level managers, craft workers, and many technicians.

The authors provide a description of their assignment of census-coded occupations to work system groups in the appendix of the book (see Appendix B, starting on page 185). They used three-digit census occupation codes (based on the 1990 COC) for the classification. However, they often assigned occupations to more than two work system groups based on wage levels (e.g., the highest paid 25 percent of those in executive, administrative, and managerial occupations were allocated to the high-skill autonomous group, while the remainder of those in such occupations were allocated to the semiautonomous group).

Instead of using wages to allocate individuals in the same occupation to two or more work system groups, we created hybrid work system groups (i.e., for the same example just given, we assigned all of those in executive, administrative, and managerial occupations to a “High-skill autonomous + Semiautonomous” group. Consequently, we have eleven work system groups, as shown in Table S5.

**Table S5. Our Coding of 1980 and 1990 COC Codes into Work System Groups**

	1980 COC <sup>1</sup>	1990 COC <sup>1</sup>
<b>High-skill Autonomous</b>		
Accountants and auditors	23	23
Underwriters	24	24
Management analysts	26	26
Architects	43	43
Aerospace engineers	44	44
Metallurgical and materials	45	45
Mining engineers	46	46
Petroleum engineers	47	47
Chemical engineers	48	48
Nuclear engineers	49	49

Civil engineers	53	53
Agricultural engineers	54	54
Electrical and electronic engineers	55	55
Industrial engineers	56	56
Mechanical engineers	57	57
Marine and naval architects	58	58
Engineers, n.e.c.	59	59
Surveyors and mapping scientists	63	63
Computer systems analysts and scientists	64	64
Operations and systems researchers and analysts	65	65
Actuaries	66	66
Statisticians	67	67
Mathematical scientists, n.e.c.	68	68
Physicists and astronomers	69	69
Chemists, except biochemists	73	73
Atmospheric and space scientists	74	74
Geologists and geodesists	75	75
Physical scientists, n.e.c.	76	76
Agricultural and food scientists	77	77
Biological and life scientists	78	78
Forestry and conservation scientists	79	79
Medical scientists	83	83
Physicians	84	84
Dentists	85	85
Veterinarians	86	86
Optometrists	87	87
Podiatrists	88	88
Health diagnosing practitioners, n.e.c.	89	89
Registered nurses	95	95
Pharmacists	96	96
Dietitians	97	97
Inhalation therapists	98	98
Occupational therapists	99	99
Physical therapists	103	103
Speech therapists	104	104
Therapists, n.e.c.	105	105
Physicians' assistants	106	106
Earth, environmental, and marine science post-secondary teachers	113	113
Biological science post-secondary teachers	114	114
Chemistry post-secondary teachers	115	115
Physics post-secondary teachers	116	116
Natural science post-secondary teachers, n.e.c.	117	117

Psychology post-secondary teachers	118	118
Economics post-secondary teachers	119	119
History post-secondary teachers	123	123
Political science post-secondary teachers	124	124
Sociology post-secondary teachers	125	125
Social science post-secondary teachers, n.e.c.	126	126
Engineering post-secondary teachers	127	127
Mathematical science post-secondary teachers	128	128
Computer science post-secondary teachers	129	129
Medical science post-secondary teachers	133	133
Health specialties post-secondary teachers	134	134
Business, commerce, and marketing post-secondary teachers	135	135
Agriculture and forestry post-secondary teachers	136	136
Art, drama, and music post-secondary teachers	137	137
Physical education post-secondary teachers	138	138
Education post-secondary teachers	139	139
English post-secondary teachers	143	143
Foreign language post-secondary teachers	144	144
Law post-secondary teachers	145	145
Social work post-secondary teachers	146	146
Theology post-secondary teachers	147	147
Trade and industrial post-secondary teachers	148	148
Home economics post-secondary teachers	149	149
Teachers, postsecondary, n.e.c.	153	153
Postsecondary teachers, subject not specified	154	154
Teachers, prekindergarten and kindergarten	155	155
Teachers, elementary school	156	156
Teachers,, secondary school	157	157
Teachers, special education	158	158
Teachers, n.e.c.	159	159
Counselors, educational and vocational	163	163
Librarians	164	164
Archivists and curators	165	165
Economists	166	166
Psychologists	167	167
Sociologists	168	168
Social scientists, n.e.c.	169	169
Urban planners	173	173
Social workers	174	174
Recreation workers	175	175
Clergy	176	176
Religious workers, n.e.c.	177	177
Lawyers	178	178

Judges	179	179
Authors	183	183
Technical writers	184	184
Designers	185	185
Musicians and composers	186	186
Actors and directors	187	187
Painters, sculptors, craft-artists, & artist print-makers	188	188
Photographers	189	189
Dancers	193	193
Artists, performers, and related workers, n.e.c.	194	194
Editors and reporters	195	195
Public relations specialists	197	197
Announcers	198	198
Athletes	199	199
Supervisors and proprietors, sales occupations	243	243
Insurance sales occupations	253	253
Real estate sales occupations	254	254
Securities & financial services sales occupations	255	255
Advertising and related sales occupations	256	256
Sales occupations, other business services	257	257
Sales engineers	258	258
Sales representatives, mining, manufacturing, wholesale	259	259
Insurance adjusters, examiners, and investigators	375	375
Investigators and adjusters, except insurance	376	376
Fire inspection and fire prevention occupations	416	416
Firefighting occupations	417	417
Police and detectives, public service	418	418
Sheriffs, bailiffs, and other law enforcement officers	423	423
Farmers (except horticultural)	473	473
Horticultural specialty Farmers	474	474
Managers, Farms (except horticultural)	475	475
Managers, Horticultural specialty Farmers	476	476
Captains and other officers, of fishing boats	497	497
Automobile mechanics	505	505
Automobile mechanic apprentices	506	506
Bus, truck, and stationary engine mechanics	507	507
Aircraft engine mechanics	508	508
Small engine repairers	509	509
Automobile body and related repairers	514	514
Aircraft mechanics, exc. Engine	515	515
Heavy equipment mechanics	516	516
Farm equipment mechanics	517	517
Industrial machinery repairers	518	518

Machinery maintenance occupations	519	519
Electronic repairers, communications & industrial equipment	523	523
Data processing equipment repairers	525	525
Household appliance and power tool repairers	526	526
Telephone line installers and repairers	527	527
Telephone installers and repairers	529	529
Miscellaneous electrical and electronic equipment repairers	533	533
Heating, air conditioning, and refrigeration mechanics	534	534
Camera, watch, & musical instrument repairers	535	535
Locksmiths and safe repairers	536	536
Office machine repairers	538	538
Mechanical controls and valve repairers	539	539
Elevator installers and repairers	543	543
Millwrights	544	544
Specified mechanics and repairers, n.e.c.	547	547
Not specified mechanics and repairers	549	549
Brickmasons and stonemasons	563	563
Brickmason and stonemason apprentices	564	564
Tile setters, hard and soft	565	565
Carpenters	567	567
Carpenter apprentices	569	569
Electricians	575	575
Electrician apprentices	576	576
Electrical power installers and repairers	577	577
Paperhangers	583	583
Plasterers	584	584
Plumbers, pipefitters, and steamfitters	585	585
Plumber, pipefitter, and steamfitter apprentices	587	587
Concrete and terrazzo finishers	588	588
Glaziers	589	589
Insulation workers	593	593
Paving, surfacing, and tamping equipment operators	594	594
Roofers	595	595
Sheetmetal duct installers	596	596
Structural metal workers	597	597
Drillers, earth	598	598
Construction trades, n.e.c.	599	599
Drillers, oil well	614	614
Explosives workers	615	615
Mining machine operators	616	616
Mining occupations, n.e.c.	617	617
Tool and die makers	634	634
Tool and die maker apprentices	635	635

Precision assemblers, metal	636	636
Machinists	637	637
Machinist apprentices	639	639
Boilermakers	643	643
Precision grinders, filers, and tool sharpeners	644	644
Patternmakers and model makers, metal	645	645
Lay-out workers	646	646
Precious stones and metals workers (jewelers)	647	647
Engravers, metal	649	649
Sheet metal workers	653	653
Sheet metal worker apprentices	654	654
Miscellaneous precision metal workers	655	655
Patternmakers and model makers, wood	656	656
Cabinet makers and bench carpenters	657	657
Furniture and wood finishers	658	658
Miscellaneous precision woodworkers	659	659
Dressmakers	666	666
Tailors	667	667
Upholsterers	668	668
Shoe repairers	669	669
Miscellaneous precision apparel & fabric workers	673, 674	674
Hand molders and shapers, except jewelers	675	675
Patternmakers, lay-out workers, and cutters	676	676
Optical goods workers	677	677
Dental laboratory and medical appliance technicians	678	678
Bookbinders	679	679
Electrical and electronic equipment assemblers	683	683
Miscellaneous precision workers, n.e.c.	684	684
Butchers and meat cutters	686	686
Bakers	687	687
Food batchmakers	688	688
Inspectors, testers, and graders	689	689
Adjusters and calibrators	693	693
Water and sewage treatment plant operators	694	694
Power plant operators	695	695
Stationary engineers	696	696
Miscellaneous plant and system operators	699	699
Printing machine operators	734	734
Photoengravers and lithographers	735	735
Typesetters and compositors	736	736
Miscellaneous printing machine operators	737	737

**High-skill Autonomous + Semiautonomous**

Legislators	3	3
Chief exec., general administration, public administration	4	4
Administrators and officials, public administration	5	5
Administrators, protective services	6	6
Financial managers <sup>3</sup>	7	7
Personnel and labor relations managers <sup>3</sup>	8	8
Purchasing managers <sup>3</sup>	9	9
Managers, marketing, advertising; and public relations <sup>3</sup>	13	13
Administrators, education and related fields <sup>3</sup>	14	14
Managers, medicine and health <sup>3</sup>	15	15
Postmasters and mail superintendents	17	16
Mangers, food serving and lodging establishments	.	17
Managers, properties and real estate	16	18
Funeral directors	18	19
Managers, service organizations, n.e.c.	.	21
Managers and administrators, n.e.c.	19	22
Other financial officers	25	25
Personnel, training, and labor relations specialists	27	27
Purchasing agents and buyers, farm products	28	28
Buyers, wholesale and retail trade except farm products	29	29
Purchasing agents and buyers, n.e.c.	33	33
Business and promotion agents	34	34
Construction inspectors	35	35
Inspectors and compliance officers, exc. construction	36	36
Management related occupations, n.e.c.	37	37
Clinical laboratory technologists and technicians	203	203
Dental hygienists	204	204
Health record technologists and technicians	205	205
Radiology technicians	206	206
Licensed practical nurses	207	207
Health Technologists and technicians,	208	208
Electrical and electronic technicians	213	213
Industrial engineering technicians	214	214
Mechanical engineering technicians	215	215
Engineering technicians,	216	216
Drafting occupations	217	217
Surveying and mapping technicians	218	218
Biological technicians	223	223
Chemical technicians	224	224
Science technicians, n.e.c.	225	225
Airplane pilots and navigators	226	226

Air traffic controllers	227	227
Broadcast equipment operators	228	228
Computer programmers	229	229
Tool programmers, numerical control	233	233
Legal assistants	234	234
Technicians, n.e.c.	235	235
Sales workers, motor vehicles and boats	263	263
Sales workers, apparel	264	264
Sales workers, shoes	265	265
Sales workers, furniture and home furnishings	266	266
Sales workers, radio, television, hi-fi, and appliances	267	267
Sales workers, hardware and building supplies	268	268
Sales workers, parts	269	269
Sales workers, other commodities	274	274
Computer operators	308	308
Peripheral equipment operators	309	309
Supervisors, firefighting & fire prevention occupations	413	413
Supervisors, police and detectives	414	414
Supervisors, guards	415	415
Dental assistants	445	445
Supervisors, mechanics and repairers	503	503
Supervisors; brickmasons, stonemasons, and tile setters	553	553
Supervisors, carpenters and related workers	554	554
Supervisors, electricians & power transmission installers	555	555
Supervisors; painters, paperhangers, and plasterers	556	556
Supervisors; plumbers, pipefitters, and steamfitters	557	557
Supervisors, n.e.c.	558	558
Supervisors, extractive occupations	613	613
Supervisors, production occupations	633	628
Railroad conductors and yardmasters	823	823
Locomotive operating occupations	824	824
Railroad brake, signal, and switch operators	825	825
Rail vehicle operators, n.e.c.	826	826
Ship captains & mates, except fishing boats	828	828
Sailors and deckhands	829	829
Marine engineers	833	833
Bridge, lock, and lighthouse tenders	834	834
Supervisors, material moving equipment operators	843	843
Operating engineers	844	844
Longshore equipment operators	845	845
Hoist and winch operators	848	848
Crane and tower operators	849	849
Excavating and loading machine operators	853	853

Grader, dozer, and scraper operators	855	855
Industrial truck and tractor equipment operators	856	856
Miscellaneous material moving equipment operators	859	859
Supervisors, handlers, equipment cleaners, and laborers, n.e.c.	863	864
<b>High-skill autonomous + Semiautonomous + Unrationalized labor-intensive</b>		
Supervisors, general office	303	303
Supervisors, computer equipment operators	304	304
Supervisors, financial records processing	305	305
Chief communications operators	306	306
Supervisors; distribution, scheduling, and adjusting clerks	307	307
Supervisors, food preparation and service occupations	433	433
Supervisors, cleaning and building service workers	448	448
Supervisors, personal service occupations	456	456
Barbers	457	457
Hairdressers and cosmetologists	458	458
Supervisors, motor vehicle operators	803	803
<b>High-skill Autonomous + Unrationalized Labor-intensive</b>		
Painters, construction and maintenance	579	579
<b>High-skill Autonomous + Semiautonomous + Tightly Constrained</b>		
Production inspectors, checkers, and examiners	796	796
Production testers	797	797
Production samplers and weighers	798	798
Graders, and sorters, exc. agricultural	799	799
<b>Semiautonomous + Unrationalized Labor-intensive</b>		
Demonstrators, promoters and models, sales	283	283
Auctioneers	284	284
Sales support occupations, n.e.c.	285	285
Secretaries	313	313
Stenographers	314	314
Typists	315	315
Interviewers	316	316
Hotel clerks	317	317
Transportation ticket and reservation agents	318	318
Receptionists	319	319
Information clerks, n.e.c.	323	323
Classified-ad clerks	325	325
Correspondence clerks	326	326
Order clerks	327	327
Personnel clerks, except payroll and timekeeping	328	328
Library clerks	329	329

File clerks	335	335
Records clerks	336	336
Bookkeepers, accounting, and auditing clerks	337	337
Payroll and timekeeping clerks	338	338
Billing clerks	339	339
Cost and rate clerks	343	343
Billing, posting, and calculating machine operators	344	344
Duplicating machine operators	345	345
Mail preparing and paper handling machine operators	346	346
office machine operators, n.e.c.	347	347
Communications equipment operators, n.e.c.	349, 353	353
Postal clerks, exc. mail carriers	354	354
Mail carriers, postal service	355	355
Mail clerks, exc. postal service	356	356
Messengers	357	357
Dispatchers	359	359
Production coordinators	363	363
Traffic, shipping, and receiving clerks	364	364
Stock and inventory clerks	365	365
Meter readers	366	366
Weighers, measurers, checkers, and samplers	368, 369	368
Expeditors	373	373
Material recording, scheduling, & distributing clerks, n.e.c.	374	374
Eligibility clerks, social welfare	377	377
Bill and account collectors	378	378
General office clerks	379	379
Proofreaders	384	384
Statistical clerks	386	386
Teachers aides	387	387
Administrative support occupations, n.e.c.	389	389
Supervisors, farm workers	477	477
Farm workers	479	479
Marine life cultivation workers	483	483
Nursery workers	484	484
Supervisors, related agricultural occupations	485	485
Groundskeepers and gardeners, except farm	486	486
Animal caretakers, except farms	487	487
Graders and sorters, agricultural products	488	488
Inspectors, agricultural products	489	489
Supervisors, forestry and logging workers	494	494
Forestry workers, except logging	495	495
Timber cutting and logging occupations	496	496
Fishers	498	498

Hunters and trappers	499	499
Welders and cutters	783	783
Solderers and brazers	784	784
Hand cutting and trimming occupations	786	786
Hand molding, casting, and forming occupations	787	787
Hand painters, coating, and decorating occupations	789	789
Hand engraving and printing occupations	793	793
Miscellaneous hand working occupations	794,795	795
Truck drivers	804,805	804
Driver-sales workers	806	806
Bus drivers	808	808
Taxi cab drivers and chauffeurs	809	809
Parking lot attendants	813	813
Motor transportation occupations, n.e.c.	814	814

**Semiautonomous + Unrationalized Labor-intensive + Tightly Constrained**

Lathe and turning machine set-up operators	703	703
Lathe and turning machine operators	704	704
Milling and planing machine operators	705	705
Punching and stamping press machine operators	706	706
Rolling machine operators	707	707
Drilling and boring machine operators	708	708
Grinding, abrading, buffing, & polishing machine operators	709	709
Forging machine operators	713	713
Numerical control machine operators	714	714
Misc. metal, plastic, stone, & glass mach. operators	715	715
Fabricating machine operators, n.e.c.	717	717
Molding and casting machine operators	719	719
Metal plating machine operators	723	723
Heat treating equipment operators	724	724
Misc. metal & plastic processing machine operators	725	725
Wood lathe, routing, & planing machine operators	726	726
Sawing machine operators	727	727
Shaping and joining machine operators	728	728
Nail and tacking machine operators	729	729
Miscellaneous woodworking machine operators	733	733
Winding and twisting machine operators	738	738
Knitting, looping, taping, & weaving machine operators	739	739
Textile cutting machine operators	743	743
Textile sewing machine operators	744	744
Shoe machine operators	745	745
Pressing machine operators	747	747
Laundering and dry cleaning machine operators	748	748

Miscellaneous textile machine operators	749	749
Cementing and gluing machine operators	753	753
Packaging and filling operators	754	754
Extruding and forming machine operators	755	755
Mixing and blending machine operators	756	756
Separating, filtering, and clarifying machine operators	757	757
Compressing and compacting machine operators	758	758
Painting and paint spraying machine operators	759	759
Roasting and baking machine operators, food	763	763
Washing, cleaning, and pickling machine operators	764	764
Folding machine operators	765	765
Furnace, kiln, and oven operators, exc. food	766	766
Crushing and grinding machine operators	768	768
Slicing and cutting machine operators	769	769
Motion picture projectionists	773	773
Photographic process machine operators	774	774
Miscellaneous machine operators, n.e.c.	777	777
Machine operators, not specified	779	779
 <b>Semiautonomous+Tightly Constrained</b>		
Sales counter clerks	275	275
Cashiers	276	276
 <b>Unrationalized Labor-intensive</b>		
Street and door-to-door sales workers	277	277
News vendors	278	278
Launderers and ironers	403	403
Cooks, private household	404	404
Housekeepers and butlers	405	405
Child care workers, private household	406	406
Private household cleaners and servants	407	407
Correctional institution officers	424	424
Crossing guards	425	425
Guards and police, exc. public service	426	426
Protective service occupations, n.e.c.	427	427
Bartenders	434	434
Waiters and waitresses	435	435
Cooks	436, 437	436
Food counter, fountain and related occupations	438	438
Kitchen workers, food preparation	439	439
Waiters'/waitresses' assistants	443	443
Miscellaneous food preparation occupations	444	444
Health aides, except nursing	446	446

Nursing aides, orderlies, and attendants	447	447
Maids and housemen	449	449
Janitors and cleaners	453	453
Elevator operators	454	454
Pest control occupations	455	455
Attendants, amusement and recreation facilities	459	459
Guides	463	461
Ushers	464	462
Public transportation attendants	465	463
Baggage porters and bellhops	466	464
Welfare service aides	467	465
Child care workers, except private household	468	466, 467, 468
Personal service occupations, n.e.c.	469	469
Carpet installers	566	566
Drywall installers	573	573
Helpers, mechanics and repairers	864	865
Helpers, construction trades	865	866
Helpers, surveyor	866	867
Helpers, extractive occupations	867	868
Construction laborers	869	869
Production helpers	873	874
Garbage collectors	875	875
Stevedores	876	876
Stock handlers and baggers	877	877
Machine feeders and offbearers	878	878
Freight, stocks, and material handlers, n.e.c.	883	883
Garage and service station related occupation	885	885
Vehicle washers and equipment washers	887	887
Hand packers and packagers	888	888
Laborers, except construction	889	889
<b>Unrationalized Labor-intensive + Tightly Constrained</b>		
Assemblers	785	785
<b>Tightly Constrained</b>		
Telephone operators	348	348
Bank tellers	383	383
Data-entry keyers	385	385

Notes:

1. COC80 is the value assigned to the occupation(s) in the (3-digit) occupational classification system used in the ORG from 1983-1991. COC90 contains the corresponding values for the period 1992-2002.

2. All “dental care assistants” (COC: 445, Obs.= 3869 over all years) were assigned by Herzenberg et al. (1998) to the “Semiautonomous” work system. But, this is the only occupation completely within the “Semiautonomous” group, and we instead assigned it to the “Semiautonomous + High-skill autonomous.”
3. “Legislators (COC: 3)” was not assigned to any work system by Herzenberg et al. (1998), and so we assigned the occupation to the “Semiautonomous + High-skill autonomous” group, to which all executive, administrative, and managerial occupations are assigned.
4. “Supervisors, handlers, equipment cleaners, and laborers, n.e.c.” (COC80 863, COC90: 864; Obs. = 345 over all years) was assigned twice according to Herzenberg et al. (1998) ( to “Semiautonomous + High-skill autonomous” with executive, administrative and managerial occupations and to “Unrationalized labor-intensive” with all handlers, equipment cleaners, helpers, and laborers (OCC codes 864-889)). Since COC80 863 and COC90 864 is a supervisory occupation, we assigned COC 864 to our “Semiautonomous + High-skill autonomous” group rather than “Unrationalized labor-intensive.” We confirmed the reasonableness of this decision by looking at the wage levels of incumbents of this occupation.

### A Comparison of the Work System Typology to the EGP Class Schema and Educational Categories

Table S6 presents a cross-tabulation analogous to Table 2, replacing educational groups with the work system groups. In general, EGP classes I, II, and VI are over-represented in the high-skill autonomous and semi-autonomous groups (which is consistent with the employment relations depiction of the EGP class schema provided in Goldthorpe 2000 and also in his earlier writings). Classes IIIa, IIIb, and VIIa are over-represented in the unrationalized labor-intensive and tightly constrained work systems. Comparing the two time periods across the two panels, changes are modest. Classes IIIa and VI are increasingly likely to be employed in the high-skill autonomous work system, but only slightly so. The proportion of classes IIIa, IIIb, and VIIa employed in the unrationalized labor-intensive and tightly constrained work systems increased slightly. This suggests that class IIIa is perhaps splitting into two groups, as the service sector of the economy grows.

**Table S6. EGP Classes by Work Systems, Full-time Labor Force Participants, Aged 18-64**

<i>Work System</i>	<i>EGP Classes from 1985-1989</i>							<i>EGP Classes from 1996-2000</i>						
	I	II	IIIa	IIIb	V	VI	VIIa	I	II	IIIa	IIIb	V	VI	VIIa
High-skill autonomous	46.23	65.09	14.98	1.84	20.60	78.63	3.93	46.27	65.82	20.90	1.94	22.87	80.05	3.55
High-skill autonomous + Semiautonomous	53.77	30.39	6.73	44.95	61.46	6.20	2.47	53.73	30.89	4.52	39.96	54.43	5.42	2.61
High-skill autonomous + Semiautonomous + Unrationalized labor- intensive	0.00	4.51	0.00	0.00	9.77	2.93	0.00	0.00	3.28	0.00	0.00	11.88	2.92	0.00
High-skill autonomous + Unrationalized labor- intensive	0.00	0.00	0.00	0.00	0.00	2.72	0.00	0.00	0.00	0.00	0.00	0.00	2.71	0.00

High-skill autonomous + Semiautonomous + Tightly constrained	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	3.07
Semiautonomous + Unrationalized labor- intensive	0.00	0.01	72.17	13.13	4.08	5.45	17.84	0.00	0.00	67.77	14.66	4.76	5.45	18.17
Semiautonomous + Unrationalized labor- intensive + Tightly constrained	0.00	0.00	0.00	0.00	0.00	2.59	20.42	0.00	0.00	0.00	0.00	0.00	1.82	17.35
Semiautonomous + Tightly constrained	0.00	0.00	0.00	27.49	0.00	0.00	0.00	0.00	0.00	0.00	27.89	0.00	0.00	0.00
Unrationalized labor- intensive	0.00	0.00	0.00	12.59	4.08	1.47	46.48	0.00	0.00	0.00	15.55	6.05	1.64	49.98
Unrationalized labor- intensive + Tightly constrained	0.00	0.00	0.00	0.00	0.00	0.00	4.85	0.00	0.00	0.00	0.00	0.00	0.00	5.28
Tightly constrained	0.00	0.00	6.12	0.00	0.00	0.00	0.00	0.00	0.00	6.82	0.00	0.00	0.00	0.00
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes: CPS data, 1983-2002 (see note to Table 1).

Finally, to complete the two-by-two comparisons of these three categorizations of the labor market, Table S7 presents a cross-tabulation that examines the distribution of work systems within each educational group, again for the same two time periods. As for the education by EGP cross-tabulation, there is a good deal of variation within educational groups. College graduates and professional degree holders are much more likely than others (and increasingly so across the two time periods) to be working in high skill autonomous and semi-autonomous work systems. But, again, no dramatic changes between the two time periods are evident in the association between work systems and educational attainment groups. In general, Tables 2 through as well as S6 and S7 show that contrary to some of Bell's predictions, the class structure changed only modestly between years 11 and 30 of his futurist prediction.

**Table S7. Educational Groups by Work Systems, Full-time Labor Force Participants, Aged 18-64**

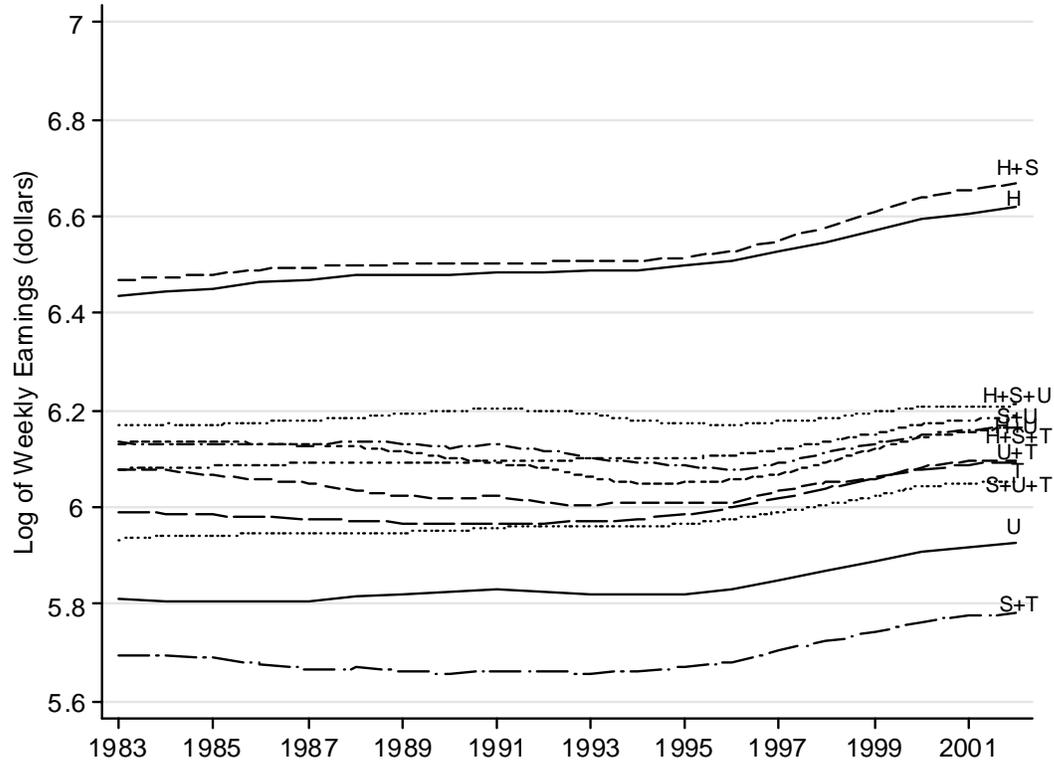
<i>Work System</i>	<b>Educational Groups from 1985-1989</b>					<b>Educational Groups from 1996-2000</b>				
	Some high school or less	High school graduates	Some college	College graduates	More than college	Some high school or less	High school graduates	Some college	College graduates	More than college
High-skill autonomous	20.91	25.15	31.96	52.92	67.49	19.75	25.92	33.15	54.19	69.94
High-skill autonomous + Semiautonomous	12.11	18.91	27.06	31.16	26.69	10.27	18.34	26.67	31.55	25.98
High-skill autonomous + Semiautonomous + Unrationalized labor- intensive	1.26	2.20	2.07	1.40	0.72	1.30	2.02	1.97	1.11	0.47
High-skill autonomous + Unrationalized labor- intensive	0.84	0.38	0.22	0.08	0.04	1.07	0.41	0.17	0.05	0.01
High-skill autonomous + Semiautonomous + Tightly constrained	1.81	1.29	0.78	0.37	0.16	1.50	1.03	0.61	0.23	0.08
Semiautonomous + Unrationalized labor-	15.49	24.51	22.55	9.13	3.20	14.71	21.85	20.65	7.77	2.14

intensive											
Semiautonomous + Unrationalized labor-intensive + Tightly constrained	14.95	6.92	2.52	0.64	0.20	13.02	6.56	2.56	0.58	0.12	
Semiautonomous + Tightly constrained	1.65	1.82	1.17	0.38	0.11	2.54	2.15	1.28	0.43	0.11	
Unrationalized labor-intensive	27.87	15.55	9.65	3.28	1.23	32.64	18.31	10.55	3.33	0.96	
Unrationalized labor-intensive + Tightly constrained	2.76	1.66	0.68	0.18	0.06	2.91	1.98	0.85	0.22	0.07	
Tightly constrained	0.34	1.61	1.33	0.45	0.11	0.29	1.43	1.52	0.54	0.12	
Total	100	100	100	100	100	100	100	100	100	100	

Notes: CPS data, 1983-2002 (see note to Table 1).

### The Increase in Earnings Inequality by Work System

Figure S1 presents five-year moving averages of log weekly earnings for the ten work system groups, presented earlier in Table 1, based on the typology proposed for the book *New Rules for a New Economy* by Herzenberg, Alic, and Wial (1998). As for the prior two figures, a pattern of divergence is present here too. High skill autonomous workers (“H”) and the mixed group of high-skill autonomous and semiautonomous workers (“H+S”) had relative increases in earnings between 1983 and 2002 of 19.7 and 22.1 percent, respectively. In contrast, the more traditional low-skilled work systems composed solely of workers in the unrationalized labor-intensive (“U”), tightly constrained (“T”), and their intersection (“U+T”) had wage increases of 11.6, 12.7, and 2.0 percent, respectively. Other groups had similar amounts of wage growth, and were more generally compacted within a rather narrow range of wages.



**Figure S1. Five-Year Moving Average of Mean Log Weekly Earnings by Work System Group, 1983-2002 Current Population Surveys**

Note: H: High-skill autonomous, S: Semiautonomous, U: Unrationalized labor-intensive, T: Tightly constrained

Does the work system typology enhance the descriptive decomposition of trends already revealed in Figures 1 and 2? A virtue of the work system typology offered by Herzenberg and colleagues is that it was apparently derived without any concern for consistency with either the economics or sociological literatures. Indeed, in the preface to the book, the authors write: “This book has its origins in a report for the congressional Office of Technology Assessment (OTA), uncompleted at the time OTA closed in the fall of 1995. The Twentieth Century Fund came to our rescue . . . What had begun as a government report could thus be turned into a book addressing a broader audience” (Herzenberg et al. 198:xi). The authors are clearly aware of the extensive literature in labor economics on the growth of earnings inequality, but they are generally unaware of sociological approaches to the study of inequality. Thus, in an important sense, the work system categorization can be seen as a competitor to the EGP class schema; it is a categorization of 3-digit occupations intended to capture employment relations that prevail in the labor market.

Comparing Figures 2 and S1, it is useful for sociology to see that EGP classes seem to reveal the trends more clearly, especially the growth of wages for classes IIIa and IIIb relative to classes VI and VIIa (and, perhaps even more importantly, in the reversal of the averages wages

of classes V and II over the time series). Moreover, none of the high-skill autonomous groups of the work system typology seems to have wages as high as the high-wage groups in the other two categorizations. Indeed, the only relatively unique trend line for the work system depiction is for the mixed work system of semi-autonomous and tightly constrained workers, which has the lowest average wages of any group across the three decompositions. Table 1 shows that this group comprises 4.7 percent of labor force. But, as shown in the supplementary appendix, this group includes only two occupations: sales counter clerks and cashiers.

In general, we conclude that (1) the Herzenberg et al. coding of evolving employment relations is as comprehensive of a coding as we can imagine achieving with 3-digit census occupation codes (and hence we did not attempt to construct a better one) but (2) it does not sufficiently enhance the descriptive decomposition of earnings trends which can be achieved simultaneously with both an educational categorization and a social class schema. These conclusions therefore gives us confidence in the EGP class schema.

### III. The Survey of Consumer Finances and the Estimation of Class Differences in Wealth Holding

Because the Survey of Consumer Finance (hereafter, SCF) data does not include detailed occupational codes, it is impossible to directly create the EGP class schema for the SCF data. However, since we wanted to be able to estimate class differences in wealth held in the stock of one's own employer, the SCF data are the only available data that we could utilize. We therefore re-weight the SCF data in order to provide class-based estimates. The weighting scheme uses the joint distribution of the SCF occupational categories and the EGP classes, estimated from an alternative data source which also has some basic wealth measures. In this section of the supplementary appendix, we describe these procedures in detail.

Table S8 presents the broad occupational groups available for the public-release SCF data. The frequencies and the percentages of cases in each group are presented for the 2001 data.

**Table S8. Occupational Categorization, Survey of Consumer Finances, 2001**

Occupational group	Frequency	Percent
Managerial and professional specialty	7,559	48.82
Technical, sales, and administrative support	2,855	18.44
Service	1,337	8.64
Precision production, craft, and repair	1,689	10.91
Operators, fabricators, and laborers	1,718	11.10
Farming, forestry, and fishing	325	2.10

We could have used these occupational groups to track the growth of wealth between 1989 and 2001, but we pursued a class-based decomposition for comparability with the CPS analysis of growth in earnings inequality.

Our goal is calculated means of wealth for each of these occupational groups and then to take weighted averages of these means to form estimates of the mean wealth of EGP classes. To do this, we must calculate the weight variables that can be used to re-weight the mean wealth of SCF occupational groups.

#### Defining Weight Variables for Use in the SCF Data

To construct a weighting scheme to yield such a class-based decomposition, we used the 1990 through 1999 Surveys of Income and Program Participation (hereafter, SIPP). These data include detailed census occupations codes, allowing us to construct a joint distribution for the EGP classes (using the scheme described earlier for the CPS data) and the SCF broad occupational groups (as described in the SCF documentation). Importantly, these data also include some wealth measures (unlike the CPS), which are needed to define the weights. Table S9 presents a cross-tabulation of the SCF occupational groups by EGP class, for the 1999 SIPP data.

**Table S9. SCF Occupational Group by EGP Class (for the 1999 Survey of Income and Program Participation)**

Occupational Group	EGP Class										Total
	I	II	IIIa	IIIb	V	VI	VIIa	IVab	IVc	VIIIb	
Managerial and professional specialty	3,959	2,983	27	10	30	0	0	1	0	0	7,010
Technical, sales, and administrative support	27	1,620	3,383	971	175	0	100	100	0	0	6,397
Service	0	165	0	233	200	64	1,795	16	0	0	2,529
Precision production, craft, and repair	0	0	0	0	499	1,697	71	8	0	0	2,289
Operators, fabricators, and laborers	7	0	0	0	33	267	2,665	16	0	0	3,003
Farming, forestry, and fishing	0	0	0	0	1	0	141	1	70	197	414
Total	3,993	4,768	3,410	1,214	938	2,028	4,772	142	70	197	21,642

Again, our goal is to construct an estimate of the mean wealth of EGP classes (i.e.,  $E[Y_{SCF} | EGP = k]$  for EGP class  $k$ ) from the observed mean wealth of each SCF occupational group. In short, there are two basic methods to construct  $E[Y_{SCF} | EGP = k]$  for each EGP class  $k$ , depending on when the weight variable is deployed in the calculations.

For Method 1, we first calculate the mean of the wealth variable by occupational group of the SCF data, and then apply the weight variable to this aggregate mean. For method 2, we re-weight the wealth variable of the SCF data first, and then calculate the aggregate mean of this variable by occupational groups. In either case, we obtain the same basic results as the methods are equivalent for a sample of infinite size.

In short, method 1 constructs the estimates with:

$$E[Y_{SCF} | EGP = k] = \sum_{occ=i}^I \{E[Y_{SCF} | occ = i]w(k, i)\}$$

whereas method 2 constructs the estimates with:

$$E[Y_{SCF} | EGP = k] = \sum_{occ=i}^I E[Y_{SCF} w(k, i) | occ = i]$$

where the weights are

$$w(k, i) = \left( \frac{E[Y_{SIPP} | EGP = k, occ = i]}{E[Y_{SIPP} | occ = i]} \right) (\Pr[occ = i | EGP = k])_{SIPP}$$

$k$  is EGP class category (and  $K$  is the total number of EGP classes),  $i$  is SCF occupational category (and  $I$  is the total number of SCF classes), and the subscripts *SIPP* and *SCF* refer to the datasets from which the components of the equations are estimated.

To implement this estimation scheme, we need to construct the weight variable from the SIPP data. First, we calculated the mean of the wealth variable ( $Y_{SIPP}$ ) by occupational group (where occupational group refers to the occupational group defined for the SCP). Then, we calculated the mean of the wealth variable, given EGP class and SCF occupational group,  $E[Y_{SIPP}|EGP = k, occ = i]$  (i.e., the mean of the wealth variable for cells of Table 7). Thereafter, we calculated the ratio of these two conditional means and multiplied this by the conditional probability of SCF occupational group given EGP class. This conditional probability is calculated from the ratio of  $(\Pr[occ = i, EGP = k])_{SIPP}$  to  $(\Pr[EGP = k])_{SIPP}$ . Thus, the constructed weight variable is:

$$w(k, i) = \left( \frac{E[Y_{SIPP}|EGP = k, occ = i]}{E[Y_{SIPP}|occ = i]} \right) (\Pr[occ = i|EGP = k])_{SIPP}$$

$$\text{where } (\Pr[occ = i|EGP = k])_{SIPP} = \left( \frac{\Pr[occ = i, EGP = k]}{\Pr[EGP = k]} \right)_{SIPP}$$

### Choosing Years and Wealth Variables from the SIPP Data

Table S10 presents the yearly SIPP dataset used to construct the weight variable for each yearly SCF data.

**Table S10. The Yearly SIPP Dataset Used to Construct the Weight Variable for Each Yearly SCF Data**

Year of the SCF Data	Year of the SIPP Data
2001	1999
1998	1998
1995	1994
1992	1992
1989	1990

Table S11 presents the SIPP wealth variable used the weights.

**Table S11. The SIPP Wealth Variable Used for the Weights**

The SCF Wealth Variables Re-Weighted	The SIPP Wealth Variables
Net Worth	Net Worth [xnetworth]
Stocks	Stocks [xstock]
Company stocks	Stocks [xstock]
Home Equity	Home Equity [xhomeequity]

## Demonstration with Fake Data

The following demonstration is somewhat simplified (because we estimate the weight variable from the same dataset which contains all other data), but the example shows the basic calculations.

Fake data

OCC	EGP	NWORTH	WEIGHT
1	1	10000	50
1	1	15000	25
1	2	12000	30
2	2	7000	30
2	2	9000	40
2	2	10000	20
2	3	4000	10
3	3	3000	10
3	4	3500	50
3	4	2000	60
4	4	5000	30
4	4	2000	70
4	5	2500	20
4	5	1000	10
4	5	1500	50
4	6	4000	90
5	6	3000	20
5	6	1000	10
5	7	300	10
5	7	700	70

1. To create ratios network (NWORTH) of each EGP given occupational category:

$$\frac{E[Y_{Fake} | EGP = k, occ = i]}{E[Y_{Fake} | occ = i]}$$

1)  $E[Y_{Fake} | occ = i]$

First, we calculate the mean of NWORTH by each occupational group.

OCC	Mean of the NWORTH
1	11761.9
2	8100
3	2708.333
4	2907.407
5	1109.091

$$2) E[Y_{Fake} | EGP = k, occ = i]$$

Second, we calculate the mean of NWORTH by given EGP and OCC.

OCC	EGP	Mean of NWORTH
1	1	11666.67
1	2	12000
2	2	8555.556
2	3	4000
3	3	3000
3	4	2681.818
4	4	2900
4	5	1687.5
4	6	4000
5	6	2333.333
5	7	650

$$3) \frac{E[Y_{Fake} | EGP = k, occ = i]}{E[Y_{Fake} | occ = i]}$$

To get the result, all we need is get the ratio of those two result above, 2) / 1)

OCC	EGP	1)	2)	3)=2)/1)
1	1	11761.9	11666.67	0.992
1	2	11761.9	12000	1.020
2	2	8100	8555.556	1.056
2	3	8100	4000	0.494
3	3	2708.333	3000	1.108
3	4	2708.333	2681.818	0.990
4	4	2907.407	2900	0.997
4	5	2907.407	1687.5	0.580
4	6	2907.407	4000	1.376
5	6	1109.091	2333.333	2.104
5	7	1109.091	650	0.586

2. Conditional Probability of occupational category given EGP class:  $\left( \Pr[occ = i | EGP = k] \right)_{Fake}$

Now we need to get the information of the second term. To get the conditional probability of each occupational category given EGP class, we need to create the ratio of frequency of each EGP given occupational category. (Note that we are using the weighted frequency.)

$$1) \Pr[EGP = k]$$

First, we calculate the mean of NWORTH by each EGP class group.

EGP	Mean of NWORTH
1	2.12766

2	3.404255
3	0.5673759
4	5.957447
5	2.269504
6	3.404255
7	2.269504

2)  $\Pr[occ = i, EGP = k]$

Then, we calculate the mean of NWORTH by given EGP and OCC.

OCC	EGP	Mean of NWORTH
1	1	2.12766
1	2	0.851064
2	2	2.553191
2	3	0.283688
3	3	0.283688
3	4	3.120567
4	4	2.836879
4	5	2.269504
4	6	2.553191
5	6	0.851064
5	7	2.269504

$$3) \left( \frac{\Pr[occ = i, EGP = k]}{\Pr[EGP = k]} \right)_{Fake}$$

To get the conditional probability, we calculate the ratio of those two result above, 2) / 1)

OCC	EGP	2)	1)	3)=2)/1)
1	1	2.12766	2.12766	1.000
1	2	0.851064	3.404255	0.250
2	2	2.553191	3.404255	0.750
2	3	0.283688	0.567376	0.500
3	3	0.283688	0.567376	0.500
3	4	3.120567	5.957447	0.524
4	4	2.836879	5.957447	0.476
4	5	2.269504	2.269504	1.000
4	6	2.553191	3.404255	0.750
5	6	0.851064	3.404255	0.250
5	7	2.269504	2.269504	1.000

3. Getting Weights: Multiply 1 \* 2:  $w(k, i) = \left( \frac{E[Y_{SIPP} | EGP = k, occ = i]}{E[Y_{SIPP} | occ = i]} \right) (\Pr[occ = i | EGP = k])_{SIPP}$

By multiplying the numbers from 1 and 2 (the third column and the fourth column in the following table), we can get the weights (the fifth column).

OCC	EGP	Conditional Mean (1)	Conditional Probability (2)	Weights (1*2)
1	1	0.992	1.000	0.992
1	2	1.02	0.250	0.255
2	2	1.056	0.750	0.792
2	3	0.494	0.500	0.247
3	3	1.108	0.500	0.554
3	4	0.99	0.524	0.519
4	4	0.997	0.476	0.475
4	5	0.58	1.000	0.580
4	6	1.376	0.750	1.032
5	6	2.104	0.250	0.526
5	7	0.586	1.000	0.586

/\* Fake \*/

input occupation EGP nworth weight

```

1 1 10000 50
1 1 15000 25
1 2 12000 30
2 2 7000 30
2 2 9000 40
2 2 10000 20
2 3 4000 10
3 3 3000 10
3 4 3500 50
3 4 2000 60
4 4 5000 30
4 4 2000 70
4 5 2500 20
4 5 1000 10
4 5 1500 50
4 6 4000 90
5 6 3000 20
5 6 1000 10
5 7 300 10
5 7 700 70

```

end

save "U:\user7\yc328\SCF\fake.dta", replace

use "U:\user7\yc328\SCF\fake.dta"

\* 1) \$wgtING: AGGREGATE LEVEL

set more off

global drop \_all

```

tab occupation EGP
global occ=r(r)
global egp=r(c)
global var="nworth"
global wgt="weight"

```

```

local i=1
while `i'<=$occ{

```

```

        summarize $var [aw=$wgt] if occupation==`i'
        scalar onw`i`=r(mean)
local i=`i'+1
}

gen occegp=.

local i=1
while `i'<=$occ{
    local k=1
    while `k'<=$egp{
        replace occegp=`i``k' if occupation==`i' & EGP==`k'
local k=`k'+1
}
local i=`i'+1
}

local i=1
while `i'<=$occ {
    local k=1
    while `k'<=$egp{
        sum $var [aw=$wgt] if occegp==`i``k'
        scalar ocnw`i``k`=r(mean)
local k=`k'+1
}
local i=`i'+1
}

local i=1
while `i'<=$occ{
    local k=1
    while `k'<=$egp{
        scalar rnw`i``k`=ocnw`i``k'/onw`i'
local k=`k'+1
}
local i=`i'+1
}

/* creating the conditional probability of each occupational group given egg class */
/* note that the weighted frequency is used to get the probability */

sum occupation
gen n=r(N)
egen sumwgt=sum($wgt)

local i=1
while `i'<=$egp{
    egen sumw`i`tmp=sum($wgt) if EGP==`i'
    gen awegp`i`tmp=(sumw`i`tmp/sumwgt)*n
    egen awegp`i`=mean(awegp`i`tmp)
    scalar awegp`i`=awegp`i'
local i=`i'+1
}
drop *tmp aw*

local i=1
while `i'<=$occ{
    local k=1
    while `k'<=$egp{
        egen sumw`i``k`tmp=sum($wgt) if occegp==`i``k'
        gen awoccegp`i``k`tmp=(sumw`i``k`tmp/sumwgt)*n

```

```

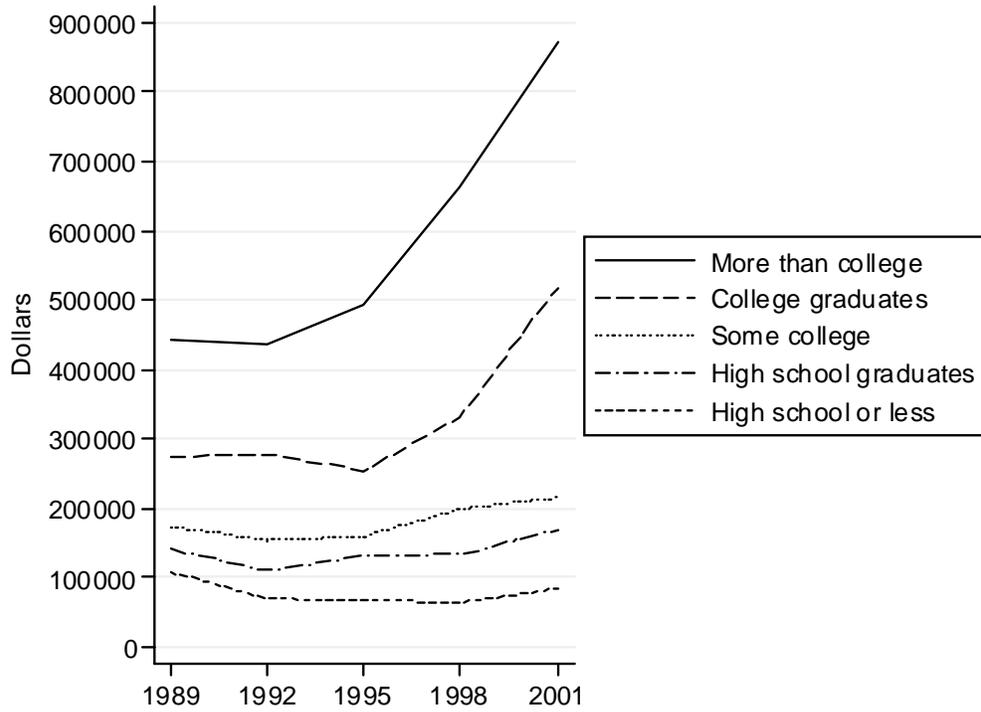
                egen awoccegp`i'`k'=mean(awoccegp`i'`k')
                scalar awoccegp`i'`k'=awoccegp`i'`k'
local k=`k'+1
}
local i=`i'+1
}
drop *tmp aw*

local k=1
while `k'<=$egp{
forvalues i=1`k'(10)$occ`k'{
    scalar awpoc`i'=awoccegp`i'/awegp`k'
}
local k=`k'+1
}

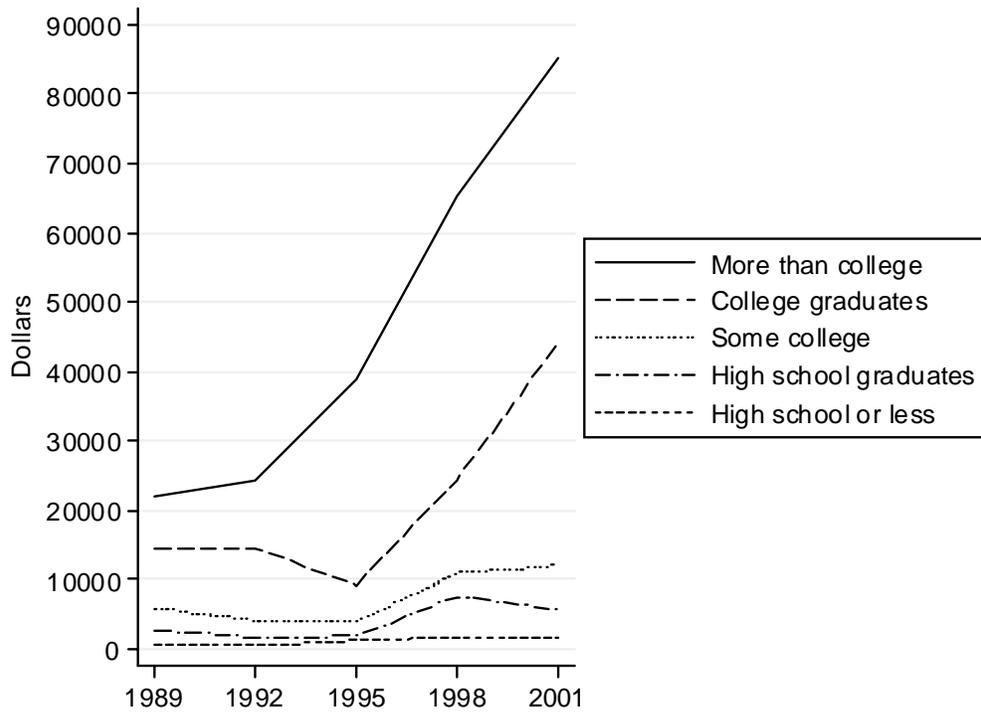
local i=1
while `i'<=$occ{
local k=1
while `k'<=$egp{
    gen wgt`i'`k'=rnw`i'`k'*awpoc`i'`k'
local k=`k'+1
}
local i=`i'+1
}

```

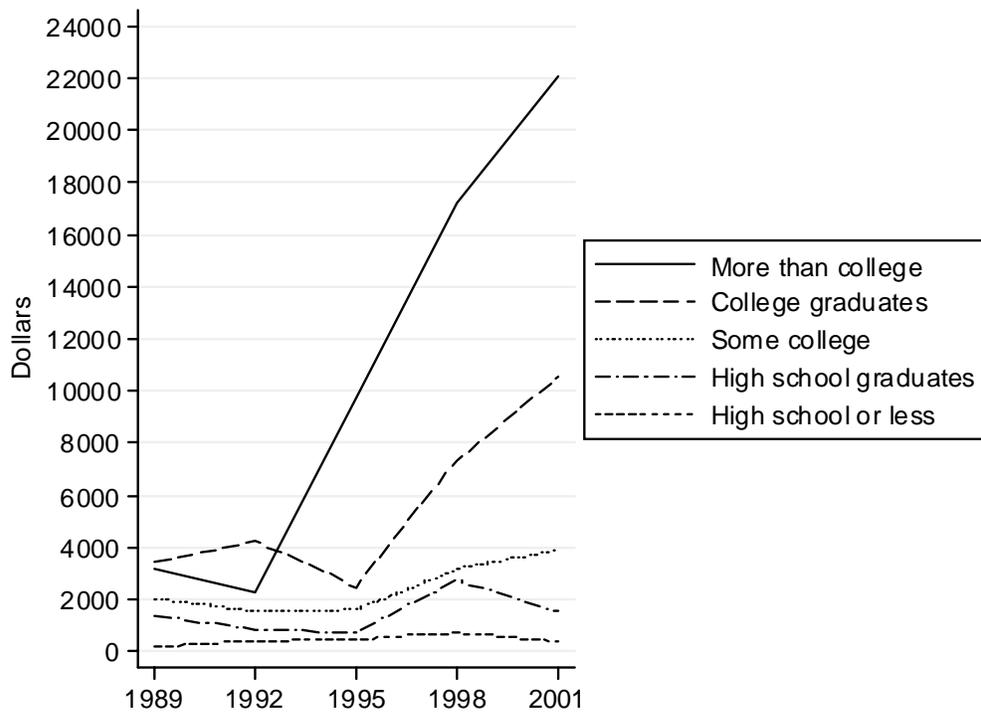
#### IV. Alternative Figures for Wealth Holding Differences by Educational Groups



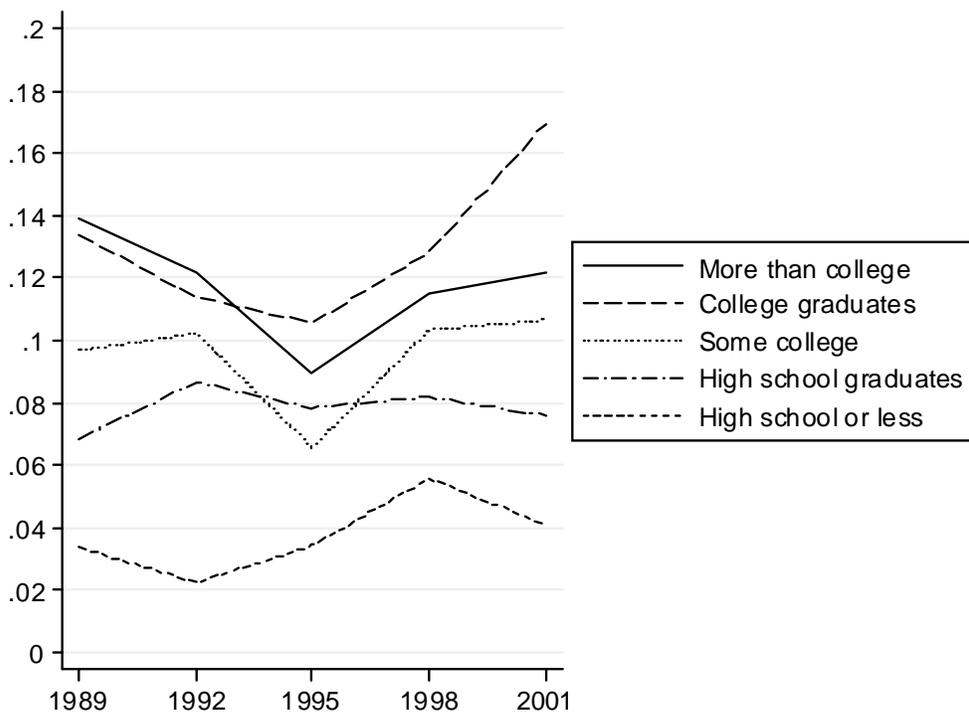
**Figure S2. Mean of Net Wealth by Educational Group, 1989-2001 Surveys of Consumer Finances**



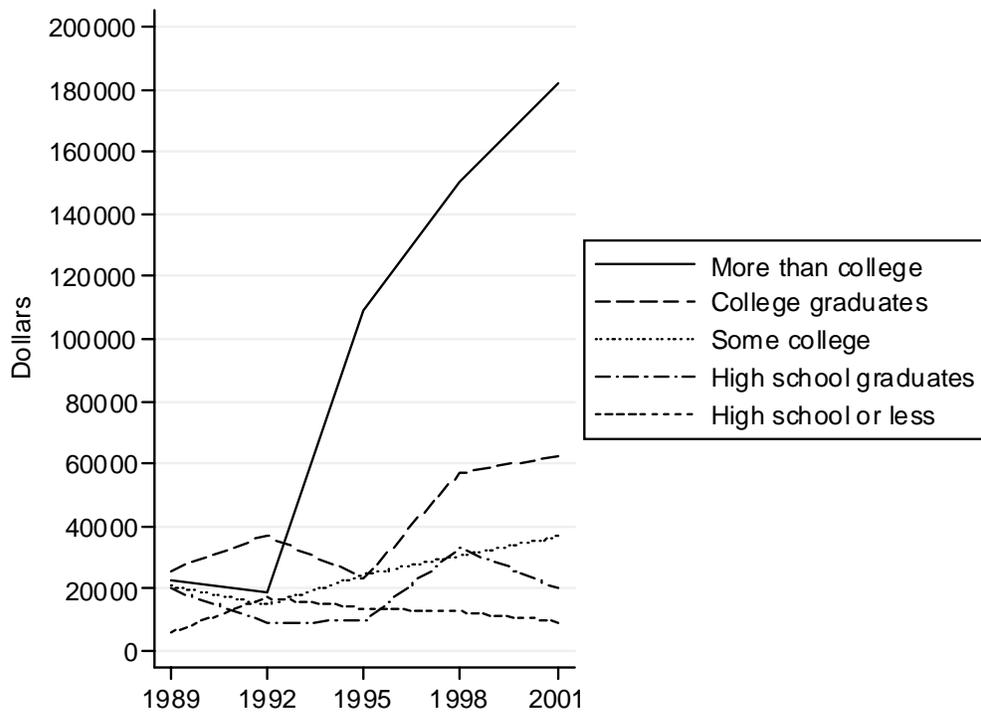
**Figure S3. Mean of Wealth Held in Stocks by Educational Group, 1989-2001 Surveys of Consumer Finances**



(a)



(b)



(c)

**Figure S5. Mean of Wealth Held in Company Stock (panel a), Percent Who Own Company Stock (panel b), and Mean of Wealth Held in Company Stock for Those Who Own Company Stock (panel c) Educational Group, 1989-2001 Surveys of Consumer Finances**

### **Additional References Cited in the Supplement**

- Abbot, Andrew. 1988. *The System of Professions: An Essay on the Expert Division of Labor*. Chicago: University of Chicago Press.
- Autor, David H., Lawrence F. Katz, and Alan B. Krueger. 1998. "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics* 113:1169-1213.
- Erikson, Robert and John H. Goldthorpe. 1992. *The Constant Flux*. Oxford: Clarendon Press.
- Erikson, Robert, John H. Goldthorpe, and Lucianne Portocarero. 1979. "Intergenerational Class Mobility in Three Western European Societies: England, France, and Sweden." *British Journal of Sociology* 30:415-30.
- Goldthorpe, John H. 1987. *Social Mobility and Class Structure in Britain. Second Edition*. Oxford: Clarendon Press.
- Goldthorpe, John H. 2000. *On Sociology: Numbers, Narratives, and the Integration of Research and Theory*. Oxford: Oxford University Press.
- Goldthorpe, John H. and Anthony Heath. 1992. *Revised Class Schema 1992*. Centre for Research into Elections and Social Trends, Working Paper No. 13.
- Goldthorpe, John H. and Walter Müller. 1982. *Social Mobility and Class Formation in Industrial Nations: Proposal for a Comparative Research Project*. Oxford/Mannheim.
- Herzenberg, Stephen A., John A. Alic, and Howard Wial. 1998. *New Rules for a New Economy: Employment and Opportunity in Postindustrial America*. Ithaca and London: Cornell University Press.
- Heath, Anthony, Roger Jowell, and John Curtice. 1985. *How Britain Votes*. London: Pergamon.
- Jaeger, David A. 1997. "Reconciling the Old and New Census Bureau Education Questions: Recommendations for Researchers." *Journal of Business & Economic Statistics* 15:300-309.
- Katz, Lawrence F. and David H. Autor. 1999. "Changes in the Wage Structure and Earnings Inequality." Pp. 1463-1555 in Orley C. Ashenfelter and David Card, eds., *Handbook of Labor Economics, Volume 3*. Amsterdam: Elsevier.
- Klein, Lawrence. 1962. *An introduction to econometrics*. Englewood Cliffs, N.J., Prentice-Hall.

- Lerman, Robert I. 1997. "Reassessing Trends in U.S. Earnings Inequality." *Monthly Labor Review* December:17-25.
- Manza, Jeff and Clem Brooks. 1999. *Social Cleavages and Political Change: Voter Alignments and U.S. Party Coalitions*. Oxford: Oxford University Press.
- National Bureau of Economic Research. 2002. "CPS Labor Extracts: 1979 - 2001." Cambridge, MA: NBER
- U.S. Department of Commerce (Bureau of the Census). 1989. "The Relationship between the 1970 and 1980 Industry and Occupation Classification Systems (Technical Paper 59)," Washington, DC : U.S. Dept. of Commerce, Bureau of the Census.
- U.S. Department of Labor. 1991. *Dictionary of Occupational Titles, Fourth Edition*. Chicago: VGM Career Horizons.
- U.S. Department of Labor. 1998. *O\*NET Dictionary of Occupational Titles*. Indianapolis: JIST Works, Inc.