

# Extract from “Don’t Blame the Robots: Assessing the Job Polarization Explanation of Growing Wage Inequality”

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## Figure 1: Occupational Employment Trends, 1959–2007

	Shares of total employment						Changes in employment shares				
	1959	1969	1979	1989	1999	2007	1959–69	1969–79	1979–89	1989–99	1999–2007*
<i>High wage</i>	20.9%	22.4%	25.2%	29.3%	33.0%	34.0%	1.5(ppt.)	2.8(ppt.)	4.1(ppt.)	3.7(ppt.)	1.3(ppt.)
<i>Managers</i>	9.4	8.7	10.0	12.0	14.3	14.6	-0.7	1.3	2.0	2.3	0.4
<i>Professionals</i>	9.1	11.0	12.0	13.6	15.1	15.9	1.9	1.0	1.7	1.4	1.0
<i>Technicians</i>	2.3	2.7	3.2	3.7	3.6	3.5	0.3	0.5	0.5	0.0	-0.1
<i>Middle wage</i>	65.7	63.5	60.6	56.2	51.4	48.0	-2.2	-2.9	-4.4	-4.7	-4.3
<i>Sales</i>	8.8	8.5	10.2	12.1	11.4	11.5	-0.3	1.7	1.9	-0.7	0.1
<i>Office and administration</i>	16.0	18.6	17.7	16.9	15.5	14.2	2.6	-0.9	-0.8	-1.4	-1.6
<i>Production, craft and repair</i>	14.6	13.1	13.0	11.3	11.3	10.2	-1.6	-0.1	-1.7	0.0	-1.4
<i>Operators, fabricators and laborers</i>	26.2	23.3	19.7	15.9	13.2	12.0	-3.0	-3.6	-3.8	-2.7	-1.4
<i>Low wage (service occupations)</i>	13.4	14.1	14.2	14.5	15.6	18.0	0.7	0.1	0.3	1.0	3.0
<i>Protective service</i>	1.2	1.1	1.5	1.8	2.0	2.2	0.0	0.4	0.3	0.2	0.3
<i>Food prep, buildings and grounds, cleaning</i>	5.1	6.2	7.6	7.7	7.6	8.9	1.1	1.4	0.2	-0.1	1.6
<i>Personal care and personal services</i>	7.1	6.8	5.1	5.0	6.0	6.9	-0.3	-1.7	-0.1	1.0	1.1
<i>Total</i>	100.0	100.0	100.0	100.0	100.0	100.0					

Note: \* Computed at a decadal rate of change.

Source: Authors analysis of Acemoglu and Autor (2011, Table 2) (Data are rescaled to sum to 100.0%).

**Figure 2:** Occupational shifts and wage gaps, all workers, 1973–2007

			Annualized			2000–07
	1973–79	1979–89	1989–00			
			1989–95	1995–00	Total	
<b>Occupational shifts (annual percentage-point change)</b>						
<i>High</i>	0.40	0.51	0.46	0.44	0.45	0.27
<i>Middle</i>	-0.34	-0.58	-0.45	-0.45	-0.45	-0.46
<i>Low: service occupations</i>	-0.06	0.07	-0.01	0.01	0.00	0.19
<b>Annual change in log wage gap</b>						
<i>90/50</i>	0.34	0.72	0.84	0.19	0.54	0.57
<i>50/10</i>	-1.18	1.52	-0.60	-0.61	-0.61	0.01

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata. See Appendix for details.

**Figure 3:** Occupational shifts and wage gaps, men only, 1973–2007

	Annualized					
	1973–79	1979–89	1989–00			2000–07
			1989–95	1995–00	Total	
<b>Occupational shifts (annual percentage-point change)</b>						
<i>High</i>	0.38	0.35	0.29	0.30	0.29	0.05
<i>Middle</i>	-0.46	-0.46	-0.34	-0.33	-0.34	-0.22
<i>Low: service occupations</i>	0.08	0.11	0.05	0.03	0.04	0.17
<b>Annual change in log wage gap</b>						
<i>90/50</i>	-0.25	1.04	1.15	0.67	0.93	0.51
<i>50/10</i>	0.59	0.39	-0.01	-0.84	-0.39	0.20

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata. See Appendix for details.

**Figure 4:** Occupational shifts and wage gaps, women only, 1973–2007

	Annualized					
	1973–79	1979–89	1989–00			2000–07
			1989–95	1995–00	Total	
<b>Occupational shifts (annual percentage-point change)</b>						
<i>High</i>	0.50	0.73	0.68	0.59	0.64	0.54
<i>Middle</i>	-0.10	-0.70	-0.59	-0.58	-0.58	-0.75
<i>Low: service occupations</i>	-0.40	-0.03	-0.09	-0.02	-0.06	0.21
<b>Annual change in log wage gap</b>						
<i>90/50</i>	0.24	0.99	1.01	0.34	0.70	0.44
<i>50/10</i>	-2.36	2.19	-0.56	-0.32	-0.45	0.42

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata. See Appendix for details.

**Figure 5:** Correlations between occupational employment changes, occupational wage changes, and changes in the overall wage distribution, 1979–2007

	$R^2$ from OLS regression of change in log occupation wage on change in log employment share	$R^2$ from OLS regression of change in log wage on change in log occupation wage	$R^2$ from OLS regression of change in log wage on change in log employment share
1979–1989	0.01	0.117	0.098
1989–2000	0.008	0.025	0.097
2000–2007	0.013	0.026	0.027

*Notes:* In each regression, observations are percentiles. For log occupation wages and log employment shares, they are occupation percentiles. For log wages, they are percentiles in the overall wage distribution. For the first-column regressions, if occupations are used as observations instead of occupation percentiles, the R-squared values are the following: 0.029 for the 1979–1989 period with 260 observations, 0.041 for the 1989–2000 period with 326 observations, and 0.031 for the 2000–2007 period with 323 observations. (The number of observations varies across periods due to the occupation coding changes discussed in the text and in the appendix.) Thus, the result that very little of the variation in log occupation wages can be explained by changes in occupational employment shares is robust to using either occupations or occupation percentiles as observations.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 6:** Explanatory power of detailed occupation dummies, 1979–2007

	Women		Men	
	R-squared	Partial R-squared	R-squared	Partial R-squared
	(1)	(2)	(3)	(4)
1979	0.355	0.294	0.370	0.206
1989	0.446	0.368	0.444	0.269
2000	0.418	0.340	0.424	0.273
2007	0.405	0.313	0.415	0.265
<b>Change</b>				
1979–1989	0.092	0.075	0.075	0.063
1989–2000	-0.029	-0.028	-0.020	0.005
2000–2007	-0.012	-0.027	-0.009	-0.008

*Notes:* The R-squares are from cross-sectional OLS regressions of log hourly wages on the 250+ detailed occupation dummies, along with (in all cases) a quartic in age, and dummies for region of the country (using the four major Census regions), marital status, and race/ethnicity (using mutually exclusive categories of white non-Hispanic, black non-Hispanic, Hispanic any race, and other). The partial R-squares are calculated in the following way: the log hourly wage and each detailed occupation dummies are separately regressed on the remaining controls (the quartic in age and the dummies for region, marital status, and race/ethnicity). Using the residuals from these regressions, residual log hourly wages are regressed separately on the residuals from the occupation dummies regressions. The partial R-squares are the R-squares from these regressions.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 7:** Share of wage variance explained by detailed occupations, 1979–2007

	Men			Women		
	Variance of log wages	Variance explained by detailed occupations	Share explained by detailed occupations	Variance of log wages	Variance explained by detailed occupations	Share explained by detailed occupations
<b>1979</b>	0.250	0.051	20.6%	0.188	0.055	29.4%
<b>1989</b>	0.327	0.088	26.9	0.273	0.101	36.8
<b>2000</b>	0.355	0.097	27.3	0.301	0.102	34.0
<b>2007</b>	0.384	0.102	26.5	0.338	0.106	31.3
<b>Change</b>						
<b>1979–1989</b>	0.077	0.036	47.3	0.085	0.045	53.4
<b>1989–2000</b>	0.028	0.009	32.7	0.028	0.002	6.0
<b>2000–2007</b>	0.029	0.005	17.0	0.037	0.004	9.9

*Notes:* Variance explained by detailed occupations is found by multiplying the variance of log wages by the partial Rsquare values presented in Table 4a, which isolate the explanatory power of detailed occupations net of other controls in cross-sectional OLS wage regressions.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 8:** Overall and composition-adjusted changes in upper-tail and lower-tail inequality, 1979–2007

	(1)	(2)	(3)	(4)=(3)-(2)	(5)	(6)	(7)	(8)=(7)-(6)
	50/10	50/10 with constant demographic and occupational composition	50/10 with constant demographic composition	Change in 50/10 due to occupational composition	90/50	90/50 with constant demographic and occupational composition	90/50 with constant demographic composition	Change in 90/50 due to occupational composition
<b>Men</b>								
1979	67.0	72.9	71.8		58.3	61.8	58.8	
1989	71.4	74.9	70.7		69.0	74.3	72.1	
2000	72.2	72.3	71.3		77.4	79.4	78.3	
2007	71.1	71.1	71.1		82.3	82.3	82.3	
1979-2007	4.1	-1.8	-0.7	1.1	24.0	20.5	23.5	3.0
1979-1989	4.4	2.0	-1.2	-3.1	10.7	12.5	13.3	0.8
1989-2000	0.9	-2.6	0.6	3.3	8.4	5.2	6.2	1.0
2000-2007	-1.1	-1.2	-0.2	1.0	4.9	2.8	4.0	1.2
<b>Women</b>								
1979	39.1	48.3	41.1		57.3	62.1	59.0	
1989	64.5	69.3	64.2		67.7	70.9	68.0	
2000	59.0	63.2	58.8		75.7	75.4	75.9	
2007	63.9	63.9	63.9		77.7	77.7	77.7	
1979-2007	24.9	15.6	22.8	7.2	20.4	15.5	18.6	3.1
1979-1989	25.5	21.0	23.1	2.0	10.4	8.7	9.0	0.2
1989-2000	-5.5	-6.1	-5.4	0.7	8.0	4.6	7.9	3.4
2000-2007	4.9	0.7	5.1	4.4	2.0	2.3	1.7	-0.5

*Notes:* Column (1) is  $100 * [\ln(50\text{th percentile wage}) - \ln(10\text{th percentile wage})]$ . Similarly column (5) is  $100 * [\ln(90\text{th percentile wage}) - \ln(50\text{th percentile wage})]$ . Composition adjustments are made using the Dinardo, Fortin, and Lemieux (1996) kernel reweighting approach. The demographic characteristics controlled for in the composition adjustments are a quartic in age, dummies for region of the country (using the four major census regions), marital status, and race/ethnicity (using mutually exclusive categories of white non-Hispanic, black non-Hispanic, Hispanic any race, and other). The occupations are the 250+ detailed occupations. The base year is 2007, which is further explained in the text.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 9: Wage variance for men 1979–2007**

	Wage variance	Residual wage variance	Composition-adjusted residual wage variance	Within-group share of wage variance	Composition-adjusted within-group share of wage variance
<b>1979</b>	0.250	0.158	0.160*	0.630	0.640*
<b>1989</b>	0.327	0.182	0.201	0.556	0.615
<b>1995</b>	0.348	0.197	0.217	0.567	0.624
<b>2000</b>	0.355	0.204	0.208	0.576	0.587
<b>2007</b>	0.384	0.225	0.225	0.585	0.585
<b>Change</b>					
<b>1979–1989</b>	0.077	0.024	0.041*	0.314	0.535*
<b>1989–2000</b>	0.028	0.023	0.007	0.810	0.255
<b>2000–2007</b>	0.029	0.020	0.016	0.690	0.559

\*The 1979 composition-adjusted figures are not directly comparable to other figures because of the major expansion of occupations that occurred between 1982 and 1983.

Notes: The residual wage variances are from cross-sectional OLS regressions of log hourly wages on the 250+ detailed occupation dummies along with a quartic in age and dummies for region of the country (using the four major Census regions), marital status, and race/ethnicity (using mutually exclusive categories of white non-Hispanic, black non-Hispanic, Hispanic any race, and other). The composition-adjusted residual wage variances are calculated according to the procedure described in Lemieux (2006), page 468, using the same set of explanatory variables in the logit as in the wage regressions described above and using 2007 as the base year.

**Figure 10: Wage variance for women, 1979–2007**

	Wage variance	Residual wage variance	Composition-adjusted residual wage variance	Within-group share of wage variance	Composition-adjusted within-group share of wage variance
<i>1979</i>	0.188	0.121	0.132*	0.645	0.699*
<i>1989</i>	0.273	0.151	0.165	0.554	0.604
<i>1995</i>	0.309	0.177	0.191	0.573	0.618
<i>2000</i>	0.301	0.175	0.180	0.582	0.599
<i>2007</i>	0.338	0.201	0.201	0.595	0.595
<b>Change</b>					
<i>1979–1989</i>	0.085	0.030	0.033*	0.351	0.393*
<i>1989–2000</i>	0.028	0.024	0.015	0.864	0.552
<i>2000–2007</i>	0.037	0.026	0.021	0.693	0.561

\*The 1979 composition-adjusted figures are not directly comparable to other figures because of the major expansion of occupations that occurred between 1982 and 1983.

*Notes:* The residual wage variances are from cross-sectional OLS regressions of log hourly wages on the 250+ detailed occupation dummies along with a quartic in age and dummies for region of the country (using the four major Census regions), marital status, and race/ethnicity (using mutually exclusive categories of white non-Hispanic, black non-Hispanic, Hispanic any race, and other). The composition-adjusted residual wage variances are calculated according to the procedure described in Lemieux (2006), page 468, using the same set of explanatory variables in the logit as in the wage regressions described above and using 2007 as the base year.

# Figure 11: Service occupation employment share, 1949-2007

	1949	1959	1969	1973	1979	1989	1999	2005	2007
<b>Service occupations (employment shares)</b>									
Current Population Survey				13.8%	13.5%	14.0%	14.0%	15.0%	15.1%
Decennial Census/ACS*		13.4%	14.1%	-	14.2%	14.5%	15.6%	-	18.0%
Occupation Employment Survey (OES)							17.6%	19.0%	19.2%
Decennial Census/ACS**		11.6%	12.6%		12.9%	13.2%	13.0%		
<b>Service occupations (hours shares)</b>									
Current Population Survey				11.8%	11.5%	12.3%	12.4%	13.5%	13.6%
<b>Service occupations, excluding public safety (hours shares)</b>									
<i>All education groups</i>									
Current Population Survey	-	-	-	10.8%	10.5%	11.3%	11.4%	12.4%	12.6%
Decennial Census/ACS	10.7%	-	10.7%	-	9.9%	10.5%	11.6%	12.9%	-
<i>High school or less</i>									
Current Population Survey	-	-	-	13.7%	13.7%	16.3%	17.9%	19.5%	19.8%
Decennial Census/ACS	12.2%	-	13.3%	-	12.9%	15.6%	17.9%	19.8%	-

\*The 1979 composition-adjusted figures are not directly comparable to other figures because of the major expansion of occupations that occurred between 1982 and 1983.

Notes: The residual wage variances are from cross-sectional OLS regressions of log hourly wages on the 250+ detailed occupation dummies along with a quartic in age and dummies for region of the country (using the four major Census regions), marital status, and race/ethnicity (using mutually exclusive categories of white non-Hispanic, black non-Hispanic, Hispanic any race, and other). The composition-adjusted residual wage variances are calculated according to the procedure described in Lemieux (2006), page 468, using the same set of explanatory variables in the logit as in the wage regressions described above and using 2007 as the base year.

**Figure 12:** Employment shares in low-paying occupations, 1979-2007

Occupation wage category*	Employment Shares			
	1979	1989	1999	2007
<i>Lowest 'decile'</i>	10.2%	10.4%	10.2%	10.8%
Service occupations	7.2	7.7	7.7	8.4
Other occupations	3.0	2.7	2.5	2.3
<i>Second 'decile'</i>	10.9	10.1	9.5	9.3
Service occupations	2.5	2.5	2.4	2.5
Other occupations	8.5	7.6	7.1	6.7
<i>Lowest 'fifth'</i>	21.1	20.5	19.7	20.0
Service occupations	9.6	10.2	10.1	11.0
Other occupations	11.5	10.3	9.6	9.1

\* Sorted by mean wage in 1979. The lowest decile has 18 occupations. The second decile has 26 occupations. These are CPS ORG tabulations using Autor-Dorn occupation coding crosswalk. Service occupations exclude public safety occupations. Employment is hours-weighted. Employment trends are adjusted to remove inconsistencies due to coding changes in 1983 and 2003. Agriculture is excluded.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 13:** Determinants of the service occupation intensity of the high school workforce, 1979-2007

Years	A= Service occupation employment intensity of high school* workforce	+ B High school* intensity of service employment	+ C Service intensity of employment	- D High school* intensity of overall workforce
1979	13.7%	69.5%	11.5%	58.4%
1989	16.6	67.1	12.4	50.2
1999	18.3	61.7	12.5	42.4
2007	20.3	56.6	13.9	38.9
<b>Contribution to change, decades**</b>				
1979-1989	100.0%	-75.1%	24.8%	150.3%
1989-1999	100.0	-84.7	11.1	173.6
1999-2007	100.0	-82.9	101.5	81.5
<b>Contribution to change, longer periods**</b>				
1979-1999	100.0%	-40.8%	29.8%	111.0%
1979-2007	100.0	-52.0	48.9	103.1

\* Refers to workers with a high school credential or less education.

\*\* Decomposition based on changes of logged values of  $A = B + C - D$ , where A, B, C, and D refer to variables with those column heads. These are CPS ORG tabulations using Autor-Dorn occupation coding crosswalk. Service occupations exclude public safety occupations. Employment is hours-weighted. Employment trends are adjusted to remove inconsistencies due to coding changes in 1983 and 2003. Agriculture is excluded.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 14: Real hourly wages, 1979-2007 (\$2011)**

	Service occupations*	Median	Service share of median	Service occupations* hours share
1979	\$7.28	\$15.21	47.9%	10.6%
1989	6.74	15.12	47.3	11.4
1995	7.00	14.84	47.2	11.4
2000	8.06	15.99	50.4	11.5
2007	7.57	16.40	46.1	12.6

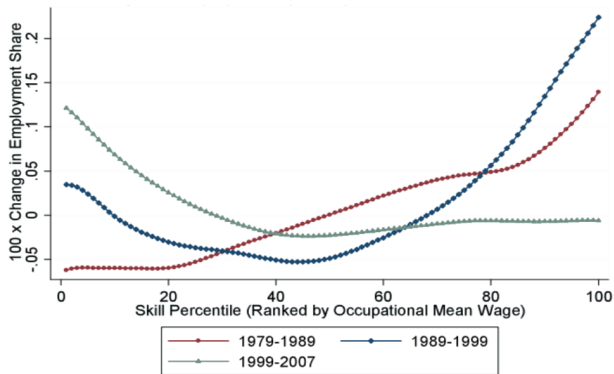
**Percent change**

1979-1989	-1.8%	-0.6%	-0.6 (ppt.)	0.8 (ppt.)
1989-1995	-2.1	-1.8	-0.1	-0.1
1995-2000	15.2	7.7	3.3	0.1
2000-2007	-6.2	2.6	-4.3	1.2
1979-2007	3.9	7.8	-1.8	2.0

\* Excluding public safety.

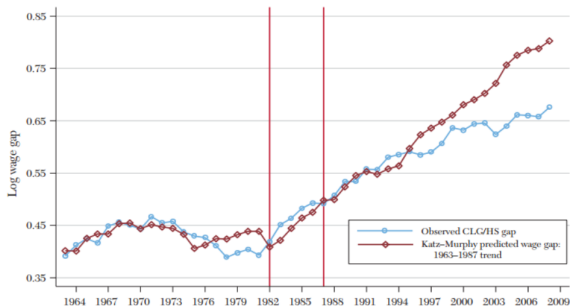
Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 15:** Changes in employment by occupational skill percentile, 1979-2007



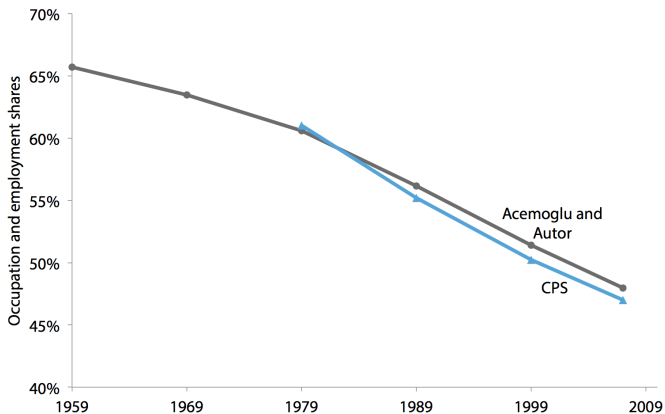
*Source:* Reproduced from Acemoglu and Autor (2011); Census IPUM 5 percent samples for years 1980, 1990, and 2000, and Census American Community Survey for 2008. All occupation and earnings measures in these samples refer to prior years employment. The figure plots log changes in employment shares by 1980 occupational skill percentile rank using a locally weighted smoothing regression (bandwidth 0.8 with 100 observations), where skill percentiles are measured as the employment-weighted percentile rank of an occupations mean log wage in the Census IPUMS 1980 5 percent extract. Mean education in each occupation is calculated using workers hours of annual labor supply times the Census sampling weights. Consistent occupation codes for Census years 1980, 1990, and 2000, and 2008 are from Autor and Dorn (2009).

**Figure 16:** Katz-Murphy prediction model for the college-high school wage gap



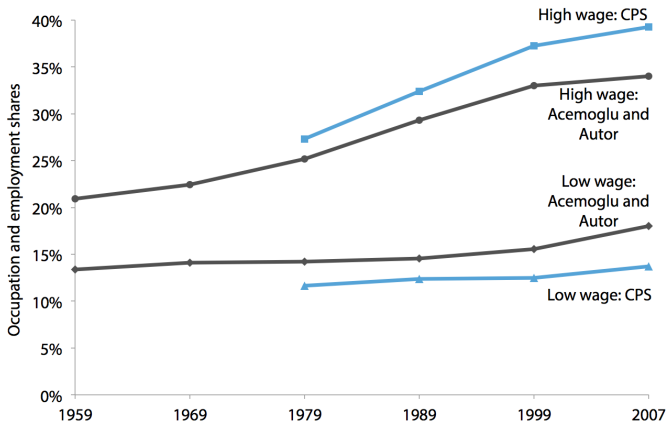
*Source:* Reproduced from Acemoglu and Autor (2012, Figure 1) March CPS data for earnings years 1963-2008. Log weekly wages for full-time, full-year workers are regressed in each year on four education dummies (high school dropout, some college, college graduate, greater than college), a quartic in experience, interactions of the education dummies and experience quartic and two race categories (black, nonwhite other). The composition-adjusted mean log wage is the predicted log wage evaluated for whites at the relevant experience level (5, 15, 25, 35, 45 years) and relevant education level (high school dropout, high school graduate, some college, college graduate, greater than college). The mean log wage for college and high school is the weighted average of the relevant composition adjusted cells using a fixed set of weights equal to the average employment share of each group. The ratio of mean log wages for college and high school graduates for each year is plotted. See Data Appendix for more details on treatment of March CPS data. The Katz-Murphy predicted wage gap are predicted values from a regression of the college/high-school wage gap on time trend term and log labor supply, as measured in efficiency units, for years 1963-1987.

**Figure 17:** Middlewage occupation shares of total employment, 1959-2007



Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata and Acemoglu and Autor (2011).

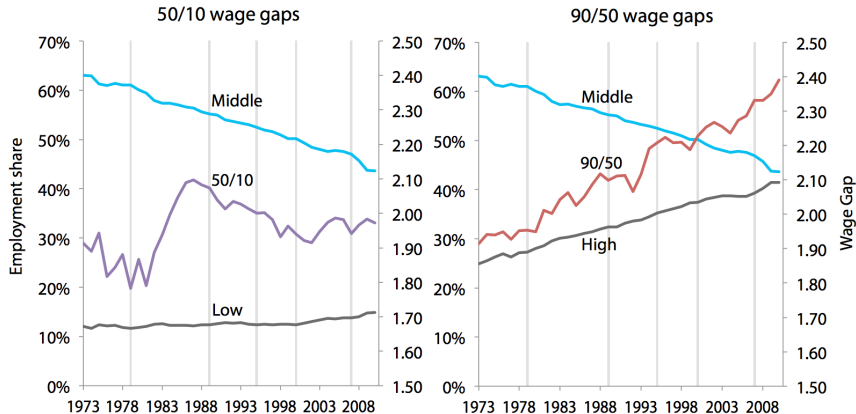
**Figure 18:** Low-wage and high-wage occupation shares of total employment, 1959-2007



Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata and Acemoglu and Autor (2011). OF

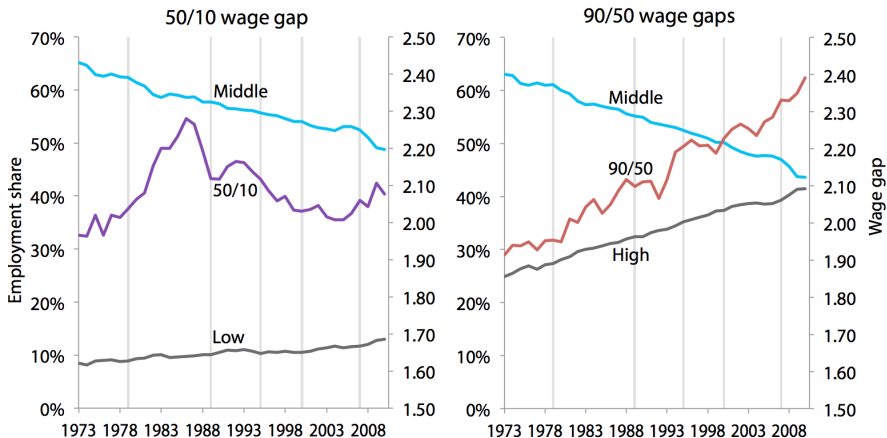


**Figure 19:** Occupational employment shares and wage gaps for all, 1973-2010



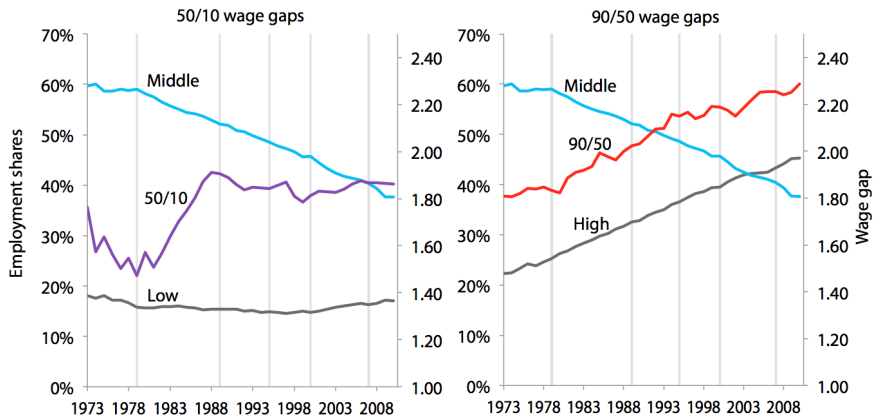
Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 20:** Occupational employment shares and wage gaps for men, 1973-2010



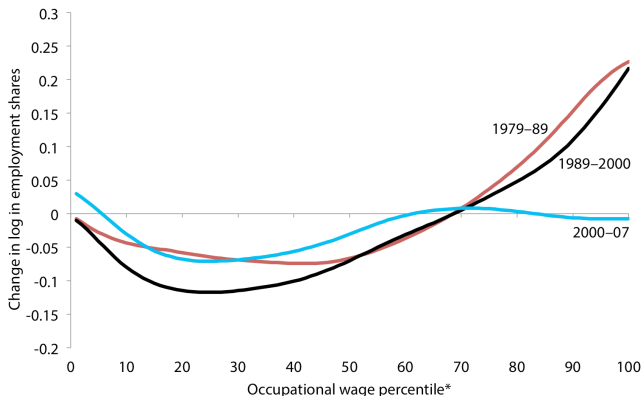
Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 21:** Occupational employment shares and wage gaps for women, 1973-2010



Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

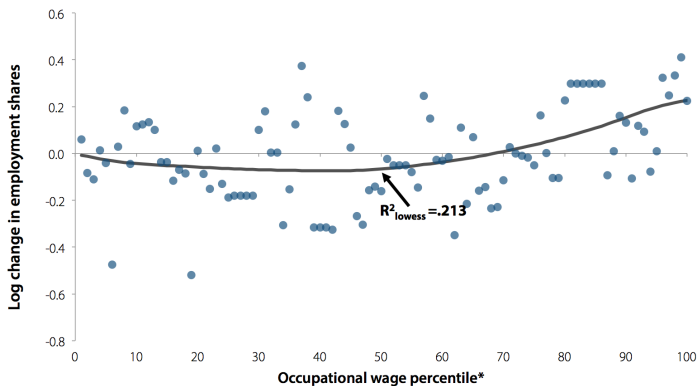
**Figure 22:** Replication of key job polarization figure using CPS-ORG data adjusted for occupation coding breaks in 1982/1983 and 2002/2003, 1979-89, 1989-2000, 2000-07



\*Ranked by 1979 occupational mean wage.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 23:** Change in log employment shares, by occupational wage percentile, 1979-1989

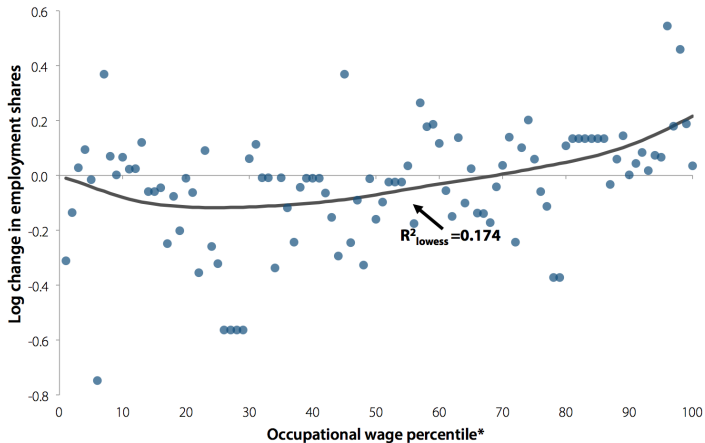


\*Ranked by 1979 occupational mean wage.

*Note:* Due to discontinuities in employment shares caused by a major occupational coding change between 1982 and 1983, the change in log employment share between 1982 and 1983 was replaced by the average change of 1980-1981, 1981-1982, 1983-1984, and 1984-1985.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

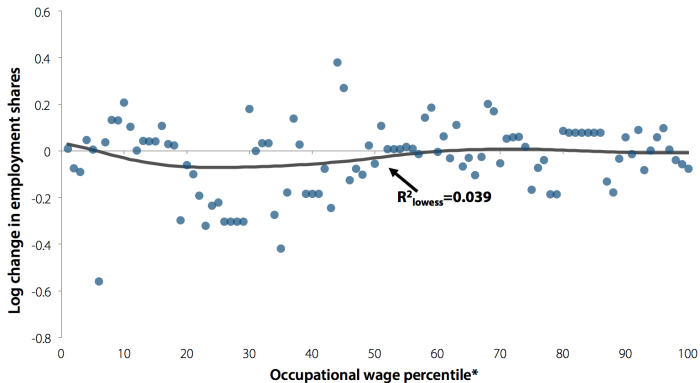
Figure 24: Change in log employment shares, by occupational wage percentile, 1989-2000



\*Ranked by 1979 occupational mean wage.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 25:** Change in log employment shares, by occupational wage percentile, 2000-2007

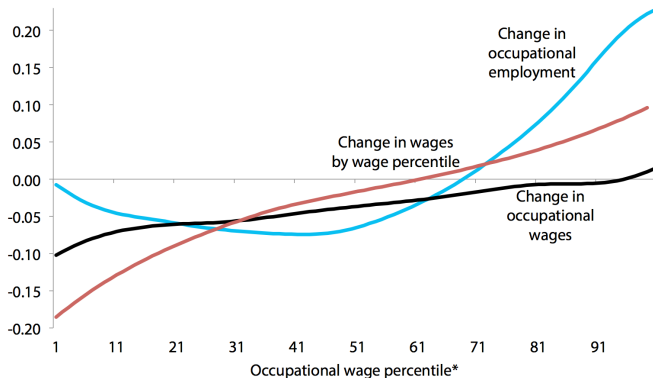


\*Ranked by 1979 occupational mean wage.

*Note:* Due to discontinuities in employment shares caused by a major occupational coding change between 2002 and 2003, the change in log employment share between 2002 and 2003 was replaced by the average change of 2000-2001, 2001-2002, 2003-2004, and 2004-2005.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 26:** Smoothed changes in log employment share and log wage by occupational wage percentile, and smoothed changes in log wage by wage percentile, 1979-1989

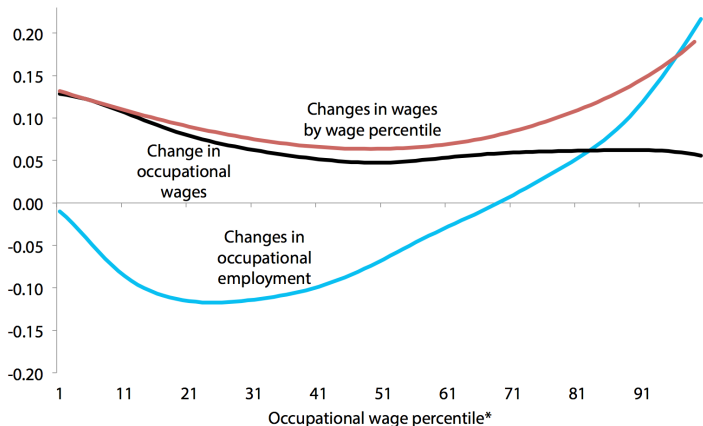


\*Ranked by 1979 occupational mean wage.

*Note:* Due to discontinuities in employment shares caused by a major occupational coding change between 2002 and 2003, the change in log employment share between 2002 and 2003 was replaced by the average change of 2000-2001, 2001-2002, 2003-2004, and 2004-2005.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

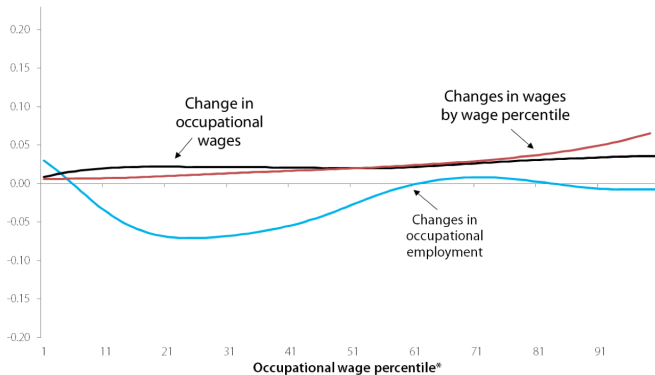
**Figure 27:** Smoothed changes in log employment share and log wage by occupational wage percentile, and smoothed changes in log wage by wage percentile, 1989-2000



\*Ranked by 1979 occupational mean wage.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 28:** Smoothed changes in log employment share and log wage by occupational wage percentile, and smoothed changes in log was by wage percentile, 2000-2007



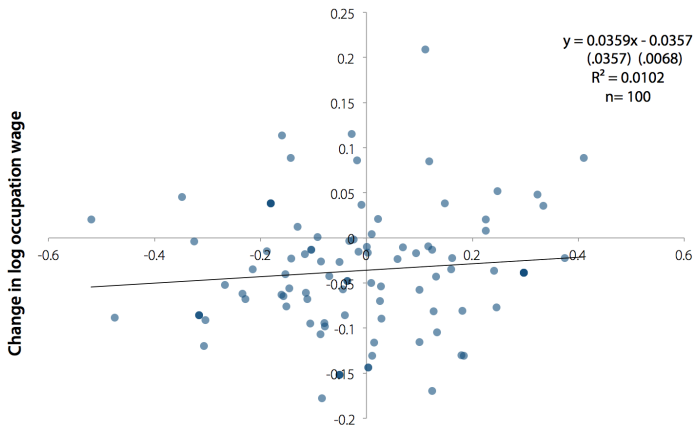
\*Ranked by 1979 occupational mean wage.

*Note:* Due to discontinuities in employment shares caused by a major occupational coding change between 2002 and 2003, the change in log employment share and log occupational wage between 2002 and 2003 was replaced by the average change of 2000-2001, 2001-2002, 2003-2004, and 2004-2005.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.



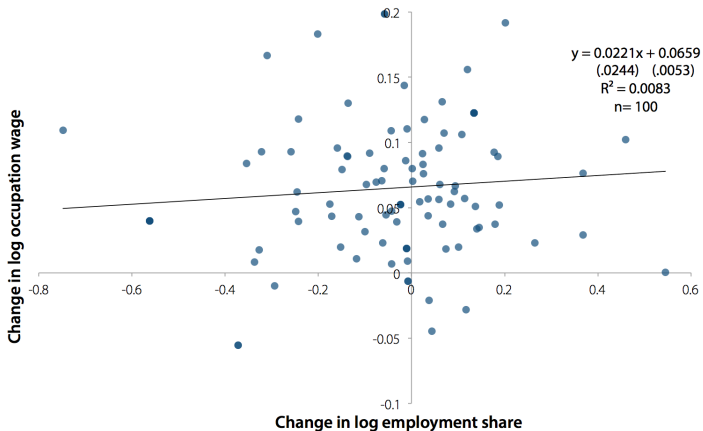
**Figure 29:** Change in log occupation wage by change in log employment share, 1979-1989



*Note:* The regression line is from a simple linear regression of change in log occupation wage on change in log employment share. Observations are the 100 occupation percentiles. Standard errors are in parentheses.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

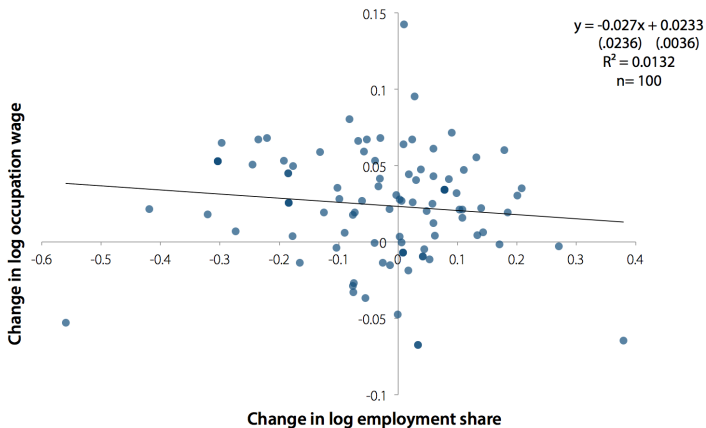
**Figure 30:** Change in log occupation wage by change in log employment share, 1989-2000



*Note:* The regression line is from a simple linear regression of change in log occupation wage on change in log employment share. Observations are the 100 occupation percentiles. Standard errors are in parentheses.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

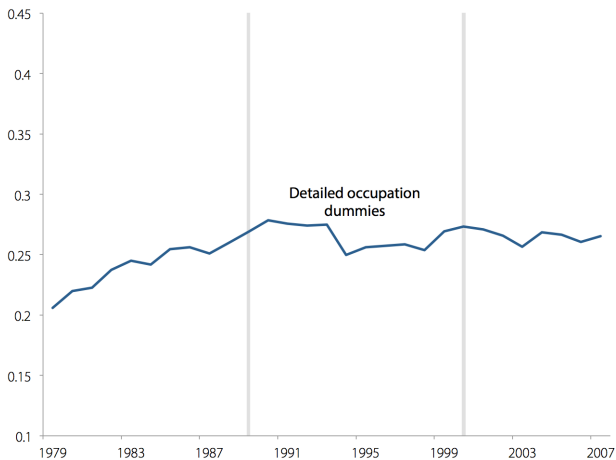
**Figure 31:** Change in log occupation wage by change in log employment share, 2000-2007



*Note:* The regression line is from a simple linear regression of change in log occupation wage on change in log employment share. Observations are the 100 occupation percentiles. Standard errors are in parentheses.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

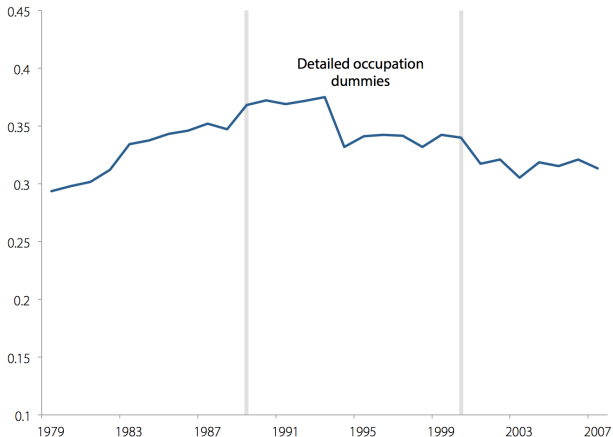
**Figure 32:** Partial R-squared of education and occupation dummies for men, 1979-2007



Note: See Table 4a note for further explanation.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

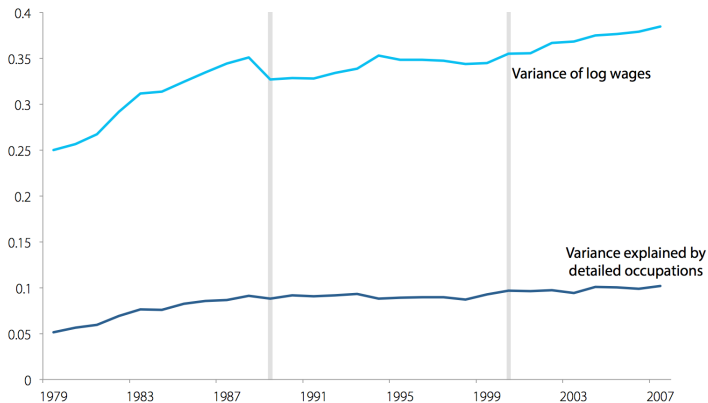
**Figure 33:** Partial R-squared of education and occupation dummies for women, 1979-2007



*Note:* See Table 4a note for further explanation.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

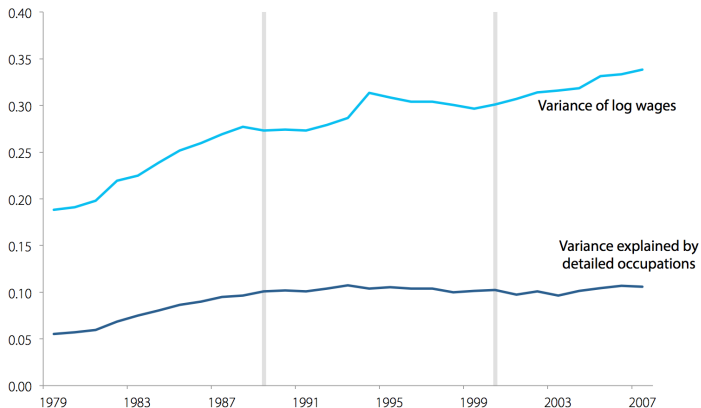
**Figure 34:** Wage variance explained by detailed occupations for men, 1979-2007



*Note:* See note to Table 4b.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

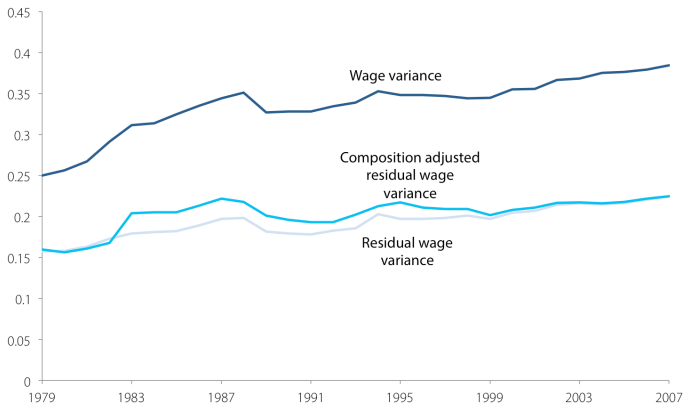
**Figure 35:** Wage variance explained by detailed occupations for women, 1979-2007



*Note:* See note to Table 4b.

*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

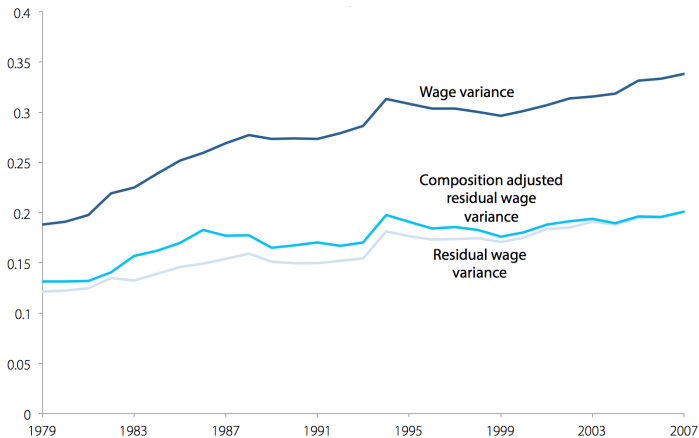
**Figure 36:** Wage variance, residual wage variance, and composition-adjusted residual wage variance for men, 1979-2007



*Note:* The values in the composition-adjusted series from 1979-1982 are not directly comparable to the later years in this series because of the major expansion of occupations that occurred between 1982 and 1983. See Table 5A for further explanation.

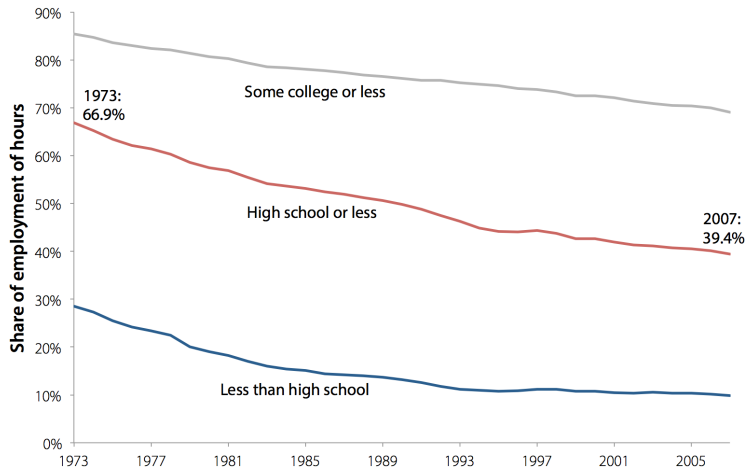
*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 37:** Wage variance, residual wage variance, and composition adjusted residual wage variance for women, 1979-2007



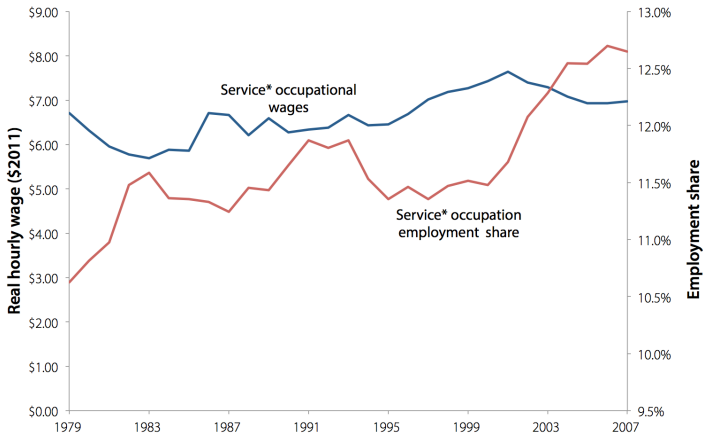
*Note:* The values in the composition-adjusted series from 1979-1982 are not directly comparable to the later years in this series because of the major expansion of occupations that occurred between 1982 and 1983. See Table 5A for further explanation.  
*Source:* Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 38:** Educational upgrading of the workforce, 1973-2007



Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

Figure 39: Service\* occupation wage and employment share, 1979-2007



\*Service occupations exclude firefighters and policemen.

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

**Figure 40:** Changes of occupational employment shares in 1982-1983 and 2002-2003, adjusted and unadjusted series

<b>Unadjusted data</b>	<b>1982-83</b>			<b>2002-03</b>		
	1982	1983	Change	2002	2003	Change
<i>Managers</i>	12.6%	11.1%	-1.4%	16.0%	16.1%	0.1%
<i>Professionals</i>	13.3	13.0	-0.3	16.5	16.4	-0.1
<i>Technicians</i>	3.3	3.6	0.3	3.6	3.8	0.2
<i>Sales</i>	7.5	9.9	2.5	10.8	10.4	-0.4
<i>Office and admin</i>	18.1	17.3	-0.8	14.0	14.4	0.4
<i>Production, craft and repair</i>	12.8	12.9	0.1	10.7	11.0	0.2
<i>Operators, fabricators and laborers</i>	18.7	18.1	-0.6	14.3	12.6	-1.6
<i>Protective service</i>	1.9	2.1	0.2	2.3	2.3	0.0
<i>Food prep, buildings and grounds, cleaning</i>	5.7	6.4	0.8	6.5	6.9	0.4
<i>Personal care and personal services</i>	4.7	4.1	-0.6	4.3	5.1	0.8
<i>Agriculture</i>	1.4	1.4	0.0	0.9	1.0	0.0
<i>High</i>	29.1%	27.7%	-1.4%	36.1%	36.3%	0.2%
<i>Middle</i>	58.5	59.7	1.1	50.7	49.3	-1.4
<i>Low: service occupations</i>	12.3	12.6	0.3	13.2	14.4	1.2

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata. Data are hours weighted.



**Figure 41:** Impact of coding changes on period trends

	Change 1982-1983			Change 1979-1989		
	Unadjusted	Adjusted	Coding change impact	Unadjusted	Adjusted	Coding change impact
<b>1982-83</b>						
<i>High</i>	-1.4%	0.5%	-1.9 (ppt)	3.2%	5.1%	-1.9 (ppt)
<i>Middle</i>	1.1	-0.6	1.7	-3.9	-5.6	1.7
<i>Low</i>	0.3	0.1	0.2	1.0	0.8	0.2
	Change 2002-2003			Change 2000-2007		
	Unadjusted	Adjusted	Coding change impact	Unadjusted	Adjusted	Coding change impact
<i>High</i>	0.2%	0.3%	-0.1 (ppt)	1.9%	1.9%	-0.1 (ppt)
<i>Middle</i>	-1.4	-0.5	-0.9	-4.0	-3.1	-0.9
<i>Low</i>	1.2	0.2	1.0	2.3	1.3	1.0

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata. Data are hours weighted.

**Figure 42:** Effect of coding change on 1982-1983 and 2002-2003 trends

	Employment weighted					
	Change 1982-1983			Change 2002-2003		
	Unadjusted	Adjusted	Coding change impact	Unadjusted	Adjusted	Coding change impact
<i>High</i>	-2.1%	0.5%	-2.6 (ppt)	0.1%	0.3%	-0.2 (ppt)
<i>Middle</i>	1.9	-0.5	-2.4	-1.5	-0.5	-1.0
<i>Low</i>	0.2	0.1	0.2	1.4	0.2	1.2

	Hours weighted					
	Change 1982-1983			Change 2002-2003		
	Unadjusted	Adjusted	Coding change impact	Unadjusted	Adjusted	Coding change impact
<i>High</i>	-1.4%	0.5%	-1.9 (ppt)	0.2%	0.3%	-0.1 (ppt)
<i>Middle</i>	1.1	-0.6	1.7	-1.4	-0.5	-0.9
<i>Low</i>	0.3	0.1	0.2	1.2	0.2	1.0

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata. Data are hours weighted.

**Figure 43:** The impact on the occupational distribution of adding 60+ new occupations in the 1983 occupational recode

Occupational distribution of employment in 1983			
	Distribution in occupations that do exist in 1982	Distribution in occupations that do not exist in 1982	Difference
<i>Food prep, buildings and grounds, cleaning</i>	7.8%	7.2%	0.6 (ppt.)
<i>Personal care and personal services</i>	5.2	0.9	4.3
<i>Protective service</i>	2.1	1.1	1.0
<i>Office and administration</i>	18.6	15.9	2.7
<i>Operators, fabricators and laborers</i>	18.6	9.9	8.7
<i>Production</i>	11.6	19.4	-7.8
<i>Sales</i>	9.0	23.1	-14.1
<i>Managers</i>	9.6	15.7	-6.1
<i>Professionals</i>	13.7	5.1	8.5
<i>Technicians</i>	3.8	1.6	2.2
<i>Total</i>	100%	100%	

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata.

Figure 44: Occupational shares for all workers, 1973-2010

	High-wage			Middle-wage					Low-wage		
	Managers	Professionals	Technicians	Sales	Office and administration	Production, craft and repair	Operators, fabricators and laborers	Agriculture	Protective service	Food preparation, buildings and grounds, cleaning	Personal care and personal services
1973	10.8%	11.3%	2.4%	6.4%	16.3%	14.5%	24.9%	1.6%	1.8%	5.2%	4.8%
1974	11.0	11.5	2.6	6.5	16.5	14.2	24.5	1.6	1.8	5.0	4.7
1975	11.3	12.0	2.6	6.7	17.0	14.0	22.6	1.6	1.7	5.4	5.0
1976	11.5	12.3	2.6	6.4	17.3	13.8	22.7	1.5	1.8	5.4	4.7
1977	11.5	11.8	2.6	6.8	16.8	13.7	23.1	1.7	1.8	5.6	4.6
1978	11.6	12.2	3.0	6.5	17.1	13.9	22.5	1.7	1.7	5.4	4.5
1979	11.8	12.3	2.9	7.0	17.6	13.8	21.8	1.3	1.8	5.1	4.6
1980	12.1	12.6	3.1	7.0	18.2	13.3	20.7	1.3	1.8	5.3	4.7
1981	12.2	12.8	3.2	7.2	18.0	13.2	20.2	1.4	1.8	5.4	4.7
1982	12.6	13.3	3.3	7.5	18.1	12.8	18.7	1.4	1.9	5.7	4.7
1983	12.9	13.5	3.3	7.7	18.0	12.7	18.2	1.4	1.9	5.7	4.8
1984	13.3	13.3	3.2	7.9	17.6	12.8	18.4	1.3	1.8	5.6	4.7
1985	13.7	13.4	3.2	8.0	17.7	12.8	17.9	1.2	1.7	5.7	4.7
1986	14.0	13.5	3.3	8.1	17.7	12.4	17.8	1.1	1.8	5.6	4.7
1987	14.2	13.6	3.2	8.1	17.7	12.3	17.7	1.1	1.9	5.6	4.6
1988	14.5	13.8	3.3	8.0	17.4	12.2	17.4	1.1	1.9	5.5	4.8
1989	14.9	13.9	3.3	8.1	17.0	12.1	17.5	1.0	1.9	5.6	4.8
1990	14.6	14.1	3.5	8.3	17.1	11.8	17.2	1.1	1.9	5.8	4.8
1991	15.0	14.4	3.5	8.1	17.0	11.4	16.9	1.0	2.0	5.8	5.0
1992	14.9	14.5	3.9	8.1	17.6	11.1	16.4	1.0	1.9	5.8	4.8
1993	15.1	14.7	3.6%	8.1	17.4	10.9	16.3	1.0	2.0	5.8	4.9
1994	15.6	15.2	3.3	8.3	16.6	11.0	16.6	1.0	2.0	5.6	4.8
1995	16.1	15.4	3.3	8.4	16.1	10.9	16.5	1.0	2.0	5.5	4.7

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata; data are hours weighted.

Figure 44: Occupational shares for all workers, 1973-2010 Cont'd

	High-wage			Middle-wage					Low-wage		
	Managers	Professionals	Technicians	Sales	Office and administration	Production, craft and repair	Operators, fabricators and laborers	Agriculture	Protective service	Food preparation, buildings and grounds, cleaning	Personal care and personal services
1996	16.2	15.8	3.2	8.5	15.9	10.8	16.3	1.0	1.9	5.6	4.8
1997	16.6	15.8	3.4	8.5	15.5	11.0	16.1	1.0	1.9	5.6	4.7
1998	16.8	16.0	3.4	8.6	15.4	10.9	15.6	0.9	2.0	5.6	4.8
1999	17.1	16.5	3.3	8.4	15.2	10.9	15.4	0.8	2.0	5.6	4.8
2000	17.1	16.5	3.4	8.4	15.2	10.9	15.3	0.9	1.9	5.6	4.7
2001	17.5	16.8	3.5	8.5	14.9	10.9	14.6	0.8	2.0	5.7	4.9
2002	17.8	17.0	3.4	8.5	14.7	10.5	14.3	0.9	2.1	5.9	5.0
2003	17.9	17.0	3.4	8.5	14.5	10.5	14.1	0.9	2.2	5.9	5.1
2004	18.0	16.9	3.5	8.5	14.2	10.4	14.1	0.8	2.3	6.1	5.2
2005	17.8	17.0	3.6	8.4	14.1	10.8	14.2	0.8	2.2	6.0	5.3
2006	17.9	16.9	3.5	8.4	13.9	10.8	14.2	0.8	2.3	6.0	5.4
2007	18.1	17.4	3.5	8.4	13.6	10.6	14.0	0.7	2.3	5.9	5.4
2008	18.6	17.7	3.6	8.1	13.6	10.0	13.6	0.8	2.3	6.1	5.5
2009	19.0	18.3	3.8	8.3	13.4	9.2	12.6	0.8	2.5	6.3	5.9
2010	18.8	18.5	3.8	8.0	13.4	9.1	12.7	0.8	2.6	6.3	5.8

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata; data are hours weighted.

## Figure 45: Occupational shares for men, 1973-2010

	High-wage			Middle-wage					Low-wage		
	Managers	Professionals	Technicians	Sales	Office and administration	Production, craft and repair	Operators, fabricators and laborers	Agriculture	Protective service	Food preparation, buildings and grounds, cleaning	Personal care and personal services
1973	13.8%	9.7%	2.3%	5.5%	6.9%	21.9%	29.4%	2.2%	2.7%	4.1%	1.5%
1974	14.2	10.0	2.5	5.6	6.7	21.6	29.2	2.3	2.7	3.9	1.4
1975	14.7	10.4	2.5	5.8	7.1	21.2	27.4	2.3	2.6	4.4	1.7
1976	14.8	10.6	2.5	5.5	7.0	21.2	27.5	2.1	2.8	4.5	1.5
1977	14.5	10.3	2.4	5.9	6.5	21.2	27.8	2.4	2.8	4.4	1.7
1978	14.4	10.7	3.0	5.6	6.7	21.6	27.1	2.4	2.5	4.4	1.6
1979	14.5	10.8	2.9	6.0	6.7	21.6	26.8	1.9	2.7	4.3	1.7
1980	14.6	11.1	3.1	6.1	7.0	21.3	25.8	1.9	2.7	4.5	1.8
1981	14.6	11.5	3.1	6.3	6.7	21.1	25.3	2.0	2.8	4.7	1.8
1982	15.0	12.0	3.2	6.6	6.9	20.6	23.8	2.1	3.0	5.1	1.8
1983	15.2	12.2	3.3	6.7	6.8	20.5	23.3	2.1	3.0	5.2	1.7
1984	15.5	12.0	3.2	6.9	6.7	20.7	23.8	2.0	2.8	5.0	1.6
1985	15.5	11.9	3.3	6.9	6.7	20.7	23.5	1.8	2.7	5.2	1.6
1986	15.7	12.0	3.3	7.1	6.6	20.3	23.5	1.7	2.9	5.1	1.6
1987	15.8	12.0	3.2	7.4	6.7	20.3	23.4	1.6	3.0	5.2	1.6
1988	15.8	12.5	3.4	7.0	6.6	20.1	23.2	1.6	3.0	5.3	1.7
1989	16.1	12.3	3.3	7.0	6.5	20.0	23.4	1.5	2.9	5.3	1.6
1990	15.7	12.4	3.5	7.1	6.7	19.5	23.2	1.6	2.9	5.7	1.7
1991	16.0	12.6	3.5	7.2	6.6	19.0	22.9	1.6	3.1	5.8	1.8
1992	15.9	12.4	3.9	7.4	6.9	18.6	22.6	1.6	3.0	6.0	1.7
1993	16.2	12.5	3.5	7.3	7.1	18.4	22.6	1.5	3.1	5.9	1.9
1994	16.3	13.1	3.2	7.4	6.7	18.2	23.1	1.4	3.1	5.6	1.9
1995	16.9	13.4	3.2	7.4	6.4	18.2	22.9	1.4	3.0	5.4	1.7

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata; data are hours weighted

Figure 45: Occupational shares for men, 1973-2010 Cont'd

	High-wage			Middle-wage					Low-wage		
	Managers	Professionals	Technicians	Sales	Office and administration	Production, craft and repair	Operators, fabricators and laborers	Agriculture	Protective service	Food preparation, buildings and grounds, cleaning	Personal care and personal services
1996	16.8	13.7	3.1	7.5	6.4	18.0	22.7	1.5	2.9	5.8	1.8
1997	17.0	13.6	3.3	7.3	6.4	18.4	22.3	1.5	2.9	5.7	1.8
1998	17.3	13.8	3.2	7.4	6.4	18.4	21.7	1.3	3.1	5.7	1.8
1999	17.5	14.3	3.2	7.4	6.2	18.3	21.6	1.2	3.0	5.6	1.8
2000	17.4	14.3	3.3	7.4	6.2	18.2	21.5	1.3	2.9	5.7	1.8
2001	17.7	14.6	3.3	7.5	6.1	18.4	20.7	1.2	3.0	5.8	1.8
2002	17.9	14.4	3.1	7.8	6.1	17.8	20.6	1.2	3.2	6.1	1.9
2003	18.0	14.4	3.1	7.8	6.0	17.7	20.5	1.2	3.2	6.1	1.9
2004	18.0	14.3	3.2	7.7	5.9	17.6	20.7	1.1	3.3	6.3	2.0
2005	17.5	14.3	3.3	7.5	6.0	18.1	21.0	1.0	3.2	6.1	2.0
2006	17.8	14.1	3.2	7.6	5.9	18.1	21.0	1.0	3.3	6.2	2.0
2007	17.8	14.5	3.2	7.5	5.8	17.9	20.8	0.9	3.4	6.1	2.1
2008	18.3	14.8	3.4	7.2	5.9	17.0	20.4	1.0	3.3	6.4	2.2
2009	18.9	15.3	3.5	7.5	5.9	16.0	19.2	1.1	3.7	6.7	2.3
2010	18.9	15.3	3.6	7.2	6.1	15.7	19.3	1.1	3.9	6.7	2.3

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata; data are hours weighted.

## Figure 46: Occupational shares for women, 1973-2010

	High-wage			Middle-wage					Low-wage		
	Managers	Professionals	Technicians	Sales	Office and administration	Production, craft and repair	Operators, fabricators and laborers	Agriculture	Protective service	Food preparation, buildings and grounds, cleaning	Personal care and personal services
1973	5.5%	13.9%	2.7%	8.0%	32.8%	1.5%	17.0%	0.5%	0.2%	7.2%	10.6%
1974	5.5	14.1	2.6	8.1	33.4	1.6	16.5	0.5	0.2	6.9	10.4
1975	5.7	14.7	2.7	8.2	33.7	1.7	14.7	0.5	0.2	7.2	10.5
1976	6.2	15.1	2.9	7.9	34.0	1.7	14.8	0.5	0.2	7.0	9.9
1977	6.6	14.2	2.9	8.2	33.3	1.6	15.5	0.6	0.3	7.5	9.3
1978	7.1	14.4	2.9	8.0	33.7	1.7	15.1	0.6	0.3	7.1	9.1
1979	7.7	14.5	2.9	8.6	34.4	1.7	14.1	0.4	0.3	6.4	9.0
1980	8.4	14.7	3.0	8.4	34.7	1.7	13.2	0.5	0.3	6.3	8.9
1981	8.8	14.6	3.2	8.6	34.2	1.7	12.7	0.4	0.4	6.4	8.8
1982	9.2	15.1	3.3	8.7	33.9	1.9	11.7	0.4	0.4	6.5	8.9
1983	9.7	15.2	3.3	8.9	33.5	1.9	11.2	0.4	0.4	6.5	8.9
1984	10.3	15.2	3.3	9.3	32.6	1.8	11.1	0.4	0.4	6.5	9.1
1985	11.1	15.4	3.2	9.4	32.6	2.0	10.3	0.4	0.4	6.3	9.0
1986	11.6	15.4	3.2	9.5	32.6	1.9	10.1	0.3	0.4	6.3	8.9
1987	12.2	15.7	3.2	9.2	32.3	1.8	10.1	0.4	0.5	6.1	8.7
1988	12.9	15.5	3.2	9.4	31.6	1.9	9.9	0.4	0.5	5.9	9.0
1989	13.3	15.8	3.2	9.5	30.7	1.9	9.8	0.4	0.5	5.9	8.9
1990	13.1	16.2	3.4	9.8	30.7	1.8	9.4	0.4	0.5	5.9	8.9
1991	13.6	16.6	3.4	9.4	30.4	1.7	9.1	0.4	0.5	5.7	9.1
1992	13.4	17.2	3.8	9.0	31.1	1.6	8.6	0.4	0.6	5.7	8.6
1993	13.7	17.5	3.7	9.2	30.3	1.6	8.4	0.4	0.7	5.7	8.7
1994	14.6	17.8	3.5	9.5	29.2	1.8	8.5	0.4	0.6	5.6	8.5
1995	15.0	18.1	3.4	9.8	28.4	1.7	8.4	0.4	0.6	5.6	8.6

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata; data are hours weighted.

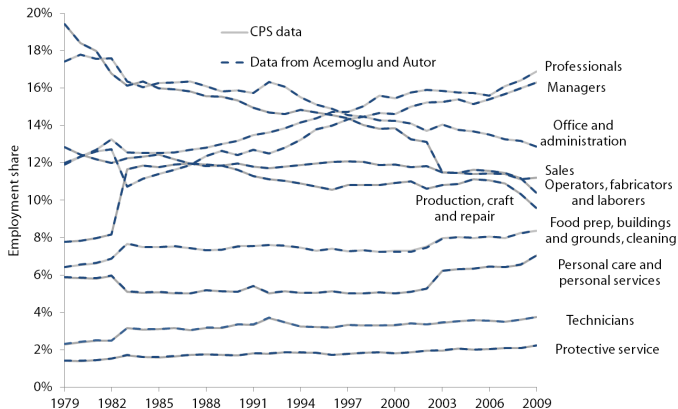
Figure 46: Occupational shares for women, 1973-2010 Cont'd

	High-wage			Middle-wage					Low-wage		
	Managers	Professionals	Technicians	Sales	Office and administration	Production, craft and repair	Operators, fabricators and laborers	Agriculture	Protective service	Food preparation, buildings and grounds, cleaning	Personal care and personal services
1996	15.4	18.5	3.4	9.8	27.9	1.7	8.2	0.4	0.6	5.4	8.6
1997	16.0	18.5	3.6	10.0	27.0	1.7	8.3	0.4	0.7	5.5	8.4
1998	16.2	18.6	3.6	10.1	26.8	1.6	8.0	0.4	0.7	5.5	8.5
1999	16.5	19.3	3.5	9.7	26.3	1.8	7.7	0.4	0.7	5.6	8.6
2000	16.6	19.3	3.5	9.7	26.3	1.8	7.7	0.4	0.7	5.6	8.4
2001	17.1	19.5	3.7	9.7	25.9	1.7	7.0	0.4	0.8	5.6	8.6
2002	17.4	20.1	3.6	9.5	25.3	1.6	6.6	0.5	0.8	5.6	8.9
2003	17.7	20.3	3.7	9.5	24.9	1.6	6.2	0.5	0.9	5.7	9.1
2004	17.9	20.2	3.8	9.6	24.5	1.6	6.0	0.5	1.0	5.8	9.3
2005	17.9	20.3	3.8	9.5	24.2	1.6	5.8	0.6	1.0	5.9	9.4
2006	17.9	20.4	3.9	9.5	23.9	1.7	5.7	0.5	1.0	5.9	9.6
2007	18.5	20.9	3.7	9.6	23.3	1.6	5.6	0.5	1.0	5.7	9.4
2008	18.8	21.3	3.8	9.3	23.1	1.4	5.3	0.5	1.0	5.8	9.6
2009	18.9	21.8	4.1	9.3	22.2	1.3	4.6	0.5	1.1	5.9	10.2
2010	18.6	22.3	4.1	9.2	22.2	1.4	4.7	0.5	1.1	5.9	10.0

Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata; data are hours weighted.

## Figure 47: Replication of the occupation coding crosswalk

Occupation employment share comparison between Acemoglu and Autor (2011) and our data, 1979–2009



Source: Authors analysis of Current Population Survey Outgoing Rotation Group microdata and Acemoglu/Autor data provided on David Autor's website among the files used to create Figure 12 for Acemoglu/Autor (2011), located here: <http://economics.mit.edu/~dautor/hole-vol4/figs/fig-12-rev.zip>.