

# Occupational mobility of American women: Compositional and structural changes, 1980–2007

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## Abstract

In this paper, I document trends in women's occupational mobility between 1980 and 2007 in the U.S. labor market, and link these trends to two distinct sources: compositional and structural changes. In this context, compositional changes refers to the over time trends in the distributions of men and women in the occupational wage hierarchy, while structural changes are the trends in the relative standing of occupations in the wage hierarchy over time. The findings provide empirical evidence for both processes, indicating that the impressive upward occupational mobility of American women is a consequence not only of their increased access to highly paid occupations, but also of the higher wage increments in their typical occupational profiles relative to men's—a structural change not often acknowledged by sociologists.

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The uneven occupational distribution of men and women, and its implications on women's economic standing, is widely recognized within sociological research. Nevertheless, in contrast to the extensive scholarly attention given to the decline in gender wage gaps, relatively few studies have focused on trends in the occupational mobility of women (but see: Cotter, Hermsen, & Vanneman, 2004; Weeden, 2004). This bias characterizes the empirical research on wage inequality, which tends to neglect the significance of institutional explanations in general, and occupational structure in particular (DiPrete, 2007; Mouw & Kalleberg, 2010).

A comparison of the occupational distributions of men and women in the U.S. labor market over the last

four decades reveals a clear and systematic trend: the share of women in highly paid occupations has increased, while the share in low paid occupations has decreased (Cotter et al., 2004). The upward occupational mobility of women over time is potentially rooted in two different sources. The first possible source is the entry of women into highly paid occupations (or exit from low paid occupations), a process that requires not only an improvement in women's human capital relative to men, but also overcoming discriminatory practices against women in hiring. The sociological literature pays great attention to the latter, emphasizing the barriers enforced by employers or male workers that restrict women's access to attractive positions.

A different explanation for the improvement in women's occupational standing suggests that occupations with high proportions of women enjoyed higher

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wage premiums over the last decades than other occupations. This explanation does not assume any change in the gender composition of occupations over time. Rather, it assumes that the typical occupational profile of women was characterized by higher wage increments than men's.

In this study, I aim to document trends in women's occupational mobility and to examine its sources, using the census data from 1980 through 2000, and the ACS for 2007. Specifically, I document changes in the distributions of American men and women in the occupational wage hierarchy between 1980 and 2007, and then test two possible sources for these trends. *Compositional changes*, my term for the first source, refers to the occupational mobility of women caused either by the entry of women into highly paid occupations or their exit from low paid occupations. The second, which I refer to as *structural changes*, denotes the changes in the occupational wage structure that benefit women, such as wage increments in occupations with relatively large shares of women, or wage decrements in occupations with relatively large shares of men.

The findings provide empirical evidence for both processes. They show that the impressive upward occupational mobility of American women has been catalyzed not only by their growing access to highly paid occupations (particularly as professionals and managers), but also by the higher wage increments in their typical occupational profiles of women relative to men's—a structural change not often acknowledged by sociologists. Each process, however, occurs at a distinct segment of the occupational structure. While compositional changes are dominant at the upper end of the occupational distribution, it is structural changes that favor women more than men at the medium-low end.

### 1. Trends in the gender composition of occupations

In her book, *Understanding the Gender Gap: An Economic History of American Women*, Goldin (1990) documents the historical processes behind the deep gender segregation in today's labor market. She shows how the proliferation of education and white-collar jobs—trends that, in theory, could have narrowed occupational sex segregation—actually institutionalized it. Not only did organizations maintain most blue-collar work for men alone, but men and women were also explicitly led into distinct white-collar trajectories, the best jobs being reserved for men. Women were steered to positions such as secretaries, stenographers, and clerks of all types. Some of these jobs, which required a high

school degree and were thus considered skilled work, were characterized by upward career mobility when occupied by men in the beginning of the 19th century. However, with the expansion of white-collar occupations and the gradual entry of women into the labor force, these jobs were almost entirely filled by women and ceased to be part of the internal job ladder. These practices, however mitigated, are still at work today in many organizations (Reskin & Roos, 1990), and are most visible in the contemporary glass ceiling phenomenon.

Sociologists as well as economists invest much effort in explaining the obstruction to women's entry, or the facilitation of men's entry, into privileged occupations and jobs. The prevalent explanations point to exclusionary practices by either advantaged groups of workers or employers. For example, social closure refers to the desire of stronger groups of workers (usually white men) to prevent the loss of their economic and social advantages (Parkin, 1979; Weeden, 2002). Fearing that women's entry into an occupation signals a reduction in the skills required for that job (even if there has not actually been any such reduction), strong worker groups fight to prevent the prestige of their field from being "polluted" by women's entry (Goldin, 2002).

The explanations that implicate employers differ somewhat in their rationale—some contend that employers' considerations are rooted in social stigmas, while others claim that they are based on rational economic decisions. The former implies that employers' decisions are influenced by social stereotypes, which cause them to devalue women and, thus, prefer men for high-ranking jobs, or to employ men and women in occupations traditionally linked to their gender (Reskin & Roos, 1990). The latter, termed "statistical discrimination," justifies discrimination in hiring on the grounds of economic efficiency. That is, employers' imperfect information about job candidates leads them to base their recruitment decisions on the average levels of expected productivity of social groups. In the case of gender, women are considered less productive, on average, than men because they are less likely than men to work continuously, a consequence of their need to reconcile paid with unpaid work. Moreover, their domestic responsibilities may require unplanned interruptions during their working years. Although in the last few decades work continuity and the duration of work experience for women have grown substantially, women still take responsibility for most unpaid housework. As a result, their work continuity is lower than men's; this preserves employer preference for men, especially when recruiting for jobs with high training costs, which are usually characterized by higher social and economic rewards (Hayghe & Bianchi, 1994;

Raley, Mattingly, & Bianchi, 2006; Tomaskovic Devey & Skaggs, 2002). Whereas exclusionary practices were explicitly supported by company policies until the 1960s, the legislation of anti-discrimination laws and the wake of second wave feminism both contributed to mitigating these practices. This tempering was promoted by other changes as well, particularly the dramatic increase in women's work experience and educational attainment. During the 1970s alone, the share of young women (25–34) with a college education grew by 150%, much higher than the increase among men (Morris & Western, 1999: Fig. 3). This trend gained momentum during the 1980s and 1990s and, by the end of the 1990s, the percent of college graduates among women exceeded that among men (Cotter et al., 2004; Morris & Western, 1999). In addition, this proliferation was characterized by a considerable expansion in women's preferred fields of study, as their representation in fields such as agriculture and natural resources, business and management, and law and legal studies—traditionally the domain of men—increased significantly (Cotter et al., 2004; Weeden, 2002).

The rising educational levels of women and their growing access to previously male-dominated fields of study are expected to reduce exclusion-based discrimination by both employers and strong groups of workers. With the convergence of men and women's human capital attributes, statistical discrimination becomes less economically efficient because, from the employers' perspective, employees' level of education is a better predictor of productivity than gender. Also, women's growing access to academic fields such as business, management, and law, is expected to mitigate the influence of social stereotypes in hiring decisions, and reduce the tendency of employers to employ men and women in occupations traditionally linked to gender. For advantaged groups, the process of credentialing reduces the incentive to prevent women's entry to male-dominated jobs because it enables women to "prove" their skills and qualifications, and is therefore less threatening to an occupation's prestige (Goldin, 2002).

Indeed, the expansion of credentialing stimulated the entry of women into prestigious professions, previously closed to them, that require considerable training and licensing. Although some female-typed occupations that require certification, such as teaching and nursing, are not less segregated today than 50 years ago, others have become far more integrated. Most of the change resulted from women's entry to previously male occupations, rather than the other way around. Women's representation in traditionally male white-collar occupations grew rapidly whereas blue-collar occupations

were more resistant to changes in gender composition. Striking changes occurred in the classic professional occupations of medicine and law, but women's integration into management has been the most dramatic (Cotter et al., 2004; Jacobs, 1992; Weeden, 2004).

The entry of women into previously male, high level professional and managerial occupations has had a direct impact on women's overall standing on the occupational wage ladder. Nevertheless, in contrast to the widespread documentation of long-term trends in gender wage gaps in the U.S., only a few studies cover long-term changes in the gender composition of occupations. These changes have greatly improved women's representation in the occupational wage hierarchy, as my analysis will later show. Yet, however dominant, this process was not the only contributor to the upward occupational mobility of women over time, as will be elaborated in the following section.

## 2. Trends in the occupational wage structure

The extensive (mostly economic) study that documents trends in wage and gender wage inequality stresses the central role of education. As the most important determinant of wage, education has always been key in explaining wage inequality among individual workers and groups of workers, as well as in explaining changes in wage inequality over time. Nevertheless, the significance of education for wage inequality, or, as termed by economists, the education premium, has changed noticeably over time. This premium, commonly measured by the net educational wage differentials between workers, especially the relative earnings of college graduates, decreased substantially in the U.S. (as well as in almost all other advanced nations) during the 1970s. Since then, however, and especially during the 1980s and the 1990s, the education premium has greatly expanded (Goldin, 2002; Katz & Autor, 1999; Morris & Western, 1999).

The rise in the education premium, first and foremost in the college premium, has been a major factor in the dramatic increase in wage inequality in the U.S. since the 1980s. Nevertheless, in contrast to the overall expansion of wage inequality, wage inequality between men and women has been in sharp decline (Blau & Kahn, 1994, 1997; Katz & Autor, 1999; McCall, 2007). The consistent decline in the gender wage gap, at a time when overall wage inequality was on the rise, is surprising, even more so since the two trends were often diametrically opposed. For instance, the reduction in the gender wage gap began in the 1970s, the same decade in which the expansion of overall wage inequality began to gain ground. Moreover, the 1980s, the decade with the

most significant reduction in the gender gap, is also the decade with the most marked expansion of overall wage inequality.

Education, again, plays a major role in explaining these opposing trends. In contrast to the low earnings of women relative to men, their educational levels are quite similar to those of men. This was true ever since the massive entry of women into the labor market, which was, to a large extent, into white-collar occupations that usually required at least a high school diploma. As a result of the sharp increase in the education premium, the relatively high educational attainment of women contributed considerably to mitigating the gender wage gap in the 1980s.

Furthermore, a look at the distributions of men and women's educational attainment over time reveals two different trends. While the share of women with higher education (college degree and some college) rose steadily and significantly between the middle and end of the 20th century, this was not the case for men. Among men, the share with higher education rose consistently from the very beginning of the 20th century, but reached its peak in the 1970s and then declined during most of the 1980s (Morris & Western, 1999). Thus, the sharp increase in the education premium has benefited women not only because of their initial relatively high educational attainment, but also because of the continuous increase in this attainment relative to men. In other words, although college graduates—men and women alike—enjoyed substantial wage increases, the share of college graduate men and women in the labor market has been consistently changing in favor of women.

Though much scholarly attention has been directed to these trends, it has focused on the narrowing of the gender wage gap, with empirical analyses based on the individual level. Nevertheless, when viewed through the prism of occupations, those trends are expected to improve the relative position of women on the occupational structure in two ways: by affecting the relative location of female-dominated occupations on the occupational structure (i.e., white-collar occupations vs. blue-collar occupations), and by improving the occupational standing of highly rewarded occupations, in which women's representation is growing rapidly. In other words, due to women's superior educational achievements, the growing returns to education are expected to benefit traditional female occupations more than male occupations. Additionally, the rapid expansion of college education among women, which boosts their entry into professional, managerial and other highly skilled occupations, is doubly beneficial for women because these very occupations are not only relatively lucrative, but

also enjoy the highest wage premiums. In this respect, the compositional changes discussed earlier are reinforced by the structural changes. The combined trends of rising premiums for education and changes in the gender distribution in higher education are, therefore, parallel processes that are expected to improve women's representation on the occupational wage ladder.

### 3. Data and variables

The unit of analysis in the study is occupations. The data at the occupational level were computed by aggregation of individual-level data from the 5% sample censuses of 1980, 1990 and 2000, and the American Community Survey (ACS) sample for 2007, integrated and organized by the Integrated Public Use Microdata Series (IPUMS). A notable advantage of the census data is the size of the samples.<sup>1</sup> Such large samples make it possible to generate reliable measures even at the three-digit occupational level, while providing thousands of cases for most occupations. After selection for age (18–65) and labor market participation, the average number of cases in an occupation varies from more than 4000 in the smallest sample (2007) to almost 19,000 in the largest one (2000). Small occupations (less than 30 cases) were integrated with similar occupations in order to arrive at a sufficient minimum.

In order to perform reliable over-time analyses of occupations, IPUMS reconciled the occupational classifications based on how the occupational coding scheme for each census year differed from the previous scheme. The variable OCC1990 is recommended as preferable for analyses of samples from 1980 onward, and is therefore used here.<sup>2</sup> Although harmonized across census years, not all occupations in OCC1990 appear across all decades. I therefore selected the 329 occupations that appear in all 4 samples.<sup>3</sup>

The criterion for occupational mobility is based on occupational pay levels. In order to neutralize the occupational rank from its gender composition, I relate to the average pay of *males* in occupations. The specific variable is the average weekly wage of *men* in occupations,

<sup>1</sup> Effective sample sizes range from more than one million cases in the smallest sample (2007) to over 6 million cases in the largest (2000).

<sup>2</sup> For more details on occupational coding, see: <http://usa.ipums.org/usa-action/variableDescription.do?mnemonic=OCC1990>.

<sup>3</sup> Due to this selection, 52 occupations were omitted from the analysis. Estimations without this restriction yielded very similar results.

Table 1  
Percent of women in occupations by occupational wages, 1980–2007.<sup>a</sup>

Wage decile	1980	1990	2000	2007	Wage percentile	1980	1990	2000	2007
<b>1</b>	0.55	0.53	0.52	0.53	<b>1–5</b>	0.60	0.59	0.52	0.53
<b>2</b>	0.56	0.53	0.49	0.50	<b>6–10</b>	0.52	0.47	0.53	0.56
<b>3</b>	0.43	0.43	0.39	0.40	<b>11–15</b>	0.69	0.59	0.57	0.50
<b>4</b>	0.48	0.35	0.33	0.30	<b>16–20</b>	0.42	0.49	0.44	0.49
<b>5</b>	0.34	0.32	0.32	0.26	<b>21–25</b>	0.45	0.43	0.39	0.36
<b>6</b>	0.32	0.34	0.30	0.34	<b>26–30</b>	0.43	0.43	0.40	0.41
<b>7</b>	0.28	0.33	0.34	0.33	<b>31–35</b>	0.51	0.44	0.35	0.33
<b>8</b>	0.31	0.29	0.31	0.30	<b>36–40</b>	0.42	0.25	0.32	0.25
<b>9</b>	0.19	0.36	0.36	0.41	<b>41–45</b>	0.43	0.34	0.24	0.32
<b>10</b>	0.17	0.20	0.27	0.30	<b>46–50</b>	0.31	0.32	0.39	0.25
<b>Average</b>	<b>0.34</b>	<b>0.37</b>	<b>0.38</b>	<b>0.38</b>	<b>51–55</b>	0.29	0.38	0.34	0.36
					<b>56–60</b>	0.38	0.34	0.24	0.31
					<b>61–65</b>	0.22	0.17	0.29	0.33
					<b>66–70</b>	0.33	0.42	0.40	0.30
					<b>71–75</b>	0.26	0.28	0.36	0.27
					<b>76–80</b>	0.34	0.34	0.28	0.33
					<b>80–85</b>	0.24	0.36	0.37	0.46
					<b>86–90</b>	0.17	0.32	0.36	0.36
					<b>91–95</b>	0.21	0.21	0.29	0.33
					<b>96–100</b>	0.13	0.19	0.26	0.27
						<b>0.34</b>	<b>0.37</b>	<b>0.38</b>	<b>0.38</b>

Light gray: Decrease; dark gray: Increase.

<sup>a</sup> Adjusted for women's labor force participation rates.

in each decade, adjusted for inflation, and converted to natural logarithms.<sup>4</sup>

#### 4. Findings

To begin with, the first analysis displays trends in women's occupational mobility over time. Table 1 shows the distribution of women in the occupational hierarchy in both 10 and 20 wage categories. Each cell displays the average percentage of women within the wage category, adjusted for the different average percentages of females across all occupations in each year, which are displayed in the bottom rows of the table.<sup>5</sup> The two parts of the table display a clear trend in the occupational mobility

<sup>4</sup> To evaluate the relative standing of occupations, I used weekly, rather than hourly, wages because I believe that their social standing is better reflected by their absolute pay levels than pay relative to time. Time-demanding occupations (e.g., managers and high-tech workers) are sometimes more socially appreciated because, and not despite, of their long work hours. On the other hand, the social evaluation of occupations with relatively modest weekly working hours (e.g., teachers and librarians) is more closely linked to their low absolute pay than their high hourly pay.

<sup>5</sup> Note that these are not the simple participation rates of women in the labor market, but the average occupational-based percentages of women. Because women are concentrated in relatively limited occupa-

of women: the representation of women has decreased in occupations at the bottom of the wage hierarchy (colored light gray), and increased in occupations at the top (colored dark gray). For example, among the 16 occupations with the lowest average male wage (percentiles 1–5), the share of women declined from 60% in 1980 to 53% in 2007. In contrast, among the 16 top wage occupations (percentiles 96–100), their representation has doubled from 13 to 27%.

Overall, women's representation has declined among occupations at the lower pole of the occupational hierarchy (i.e., below the median wage), while it has improved impressively in occupations ranked in the top two wage deciles. As seen in the tables, systematic changes have occurred mostly at the poles of the occupational distributions. Among occupational groups at the high-middle end of the wage ladder (i.e., between 45th and 80th percentiles), there is no clear pattern of changes.

As noted in the theoretical sections, the impressive upward occupational mobility shown in the table is caused by either gender compositional changes or structural changes, or both. While the former indicates a real

tions, these figures are lower than women's actual rates of participation, which are: 0.42 in 1980, 0.46 in 1990, 0.47 in 2000, and 0.48 in 2007.

upward movement of women in the occupational wage hierarchy, the latter merely reflects changes in the occupational wage structure that favor women. The following analyses will examine each of these processes, starting with the latter.

#### 4.1. *Changes in the occupational structure that favor women*

To follow changes in the relative pay of occupations over time, I divided occupations into six groups according to the direction of change in their average male wages: occupations with dramatic upward and downward wage changes between 1980 and 2007 (i.e., moved at least two wage deciles up or down), occupations with less dramatic wage changes (i.e., moved one decile up or down), and those that stayed within the same wage decile for the entire period. Occupations whose occupational deciles moved up or down during the years studied but returned to their original decile by the end of the period (i.e., located in the same decile in 1980 and 2007) constitute a different category, labeled inconsistent change.

The left panel of [Table 2](#) shows the average proportion of females in occupations (absolute and relative) within each of the six categories. As shown by the distributions of occupations across the categories (*N*'s), changes in the wage structure across occupations are, in general, not dramatic. More than a quarter of the occupations (90) remained in the same wage decile for the entire period, and more than 80% of the occupations (269) did not experience a dramatic wage change (more than one decile up or down). In addition, changes in the occupational structure are only partly related to gender. In four of the six categories, the percentage of females is close to the overall female representation across occupations, indicating that women are neither over nor underrepresented. Significant differences in female representation, however, do appear in two categories, but in opposite directions. Among occupations with moderate wage reductions (colored light gray), women are significantly underrepresented (their relative representation is about three quarters of their overall representation). In sharp contrast, among the 32 occupations that made the highest wage improvement between 1980 and 2007, women are overrepresented by about 40% (see also significance values in parentheses).

The under and overrepresentation of women in occupations with moderate wage reductions and high wage improvements, respectively, confirm the claim that changes in occupational rewards over this period favor women. As noted earlier, scholars that study trends in wage differentials at the individual level indicate the

decreasing weight of a high school diploma and the increasing weight of an academic diploma in accounting for the narrowing of the gender wage gap since the 1980s (Katz & Autor, 1999; Morris & Western, 1999). Because women enjoy relatively high educational levels, and because these levels proceeded to climb consistently during the period studied, the rising education premium is potentially a major determinant of why changes in the occupational wage structure have favored women.

The right panel of the table displays the average proportion of college graduate workers (completed at least 4 years of college) within each category. The evidence is clear: occupations with decreased relative wages are, on average, those with the lowest required levels of education, while those with improved relative wages have the highest proportions of college graduate workers. Moreover, because the overall level of education in society increased over the four decades (see the bottom row), the absolute proportion of educated workers has also increased across all groups of occupations. However, the relative proportion of educated workers has increased over time (from 1.26 to 1.42 times the average proportion across occupations) only among the 32 occupations whose relative wages improved by at least two wage deciles. Therefore, the wage growth in these occupations was catalyzed not only by their originally high education requirements, but also by the increase in these requirements over time.

Integrating the findings in the two panels of [Table 2](#) indicates that changes in occupational wages are partly related to the proportion of women, as well as to the average level of education and changing educational requirements. This pattern is most evident in occupations with the highest wage growth, in which women are overrepresented. [Table 3](#) lists this group of occupations and provides information on each of them: percentage of female at each time point, percentage of college-educated workers in 1980 and 2007, and wage deciles in 1980 and 2007. Again, occupations with an overrepresentation of women are colored dark gray, while those with an underrepresentation are light gray.

Some occupations in this group are obviously male dominated (e.g., chief executives and public administrators, religious workers, cartographers, farm managers), but these are relatively few. In most of the occupations the percentage of females is much higher than the average percentage of females across occupations (displayed in the bottom rows of [Tables 1 and 2](#)). In some occupations (i.e., dental hygienists, radiologic tech specialists, licensed practical and registered nurses, paralegals, interviewers, occupational therapists, librarians, welfare service aides and clerks), women's

Table 2  
 Proportion of women (left panel) and college graduates (right panel) in occupations, by the direction of changes in their relative wages, 1980–2007.

		Female				College graduates			
		1980	1990	2000	2007	1980	1990	2000	2007
Moved at least two wage deciles down	Proportion	0.36	0.40	0.41	0.39	0.09	0.10	0.09	0.11
	Relative representation	1.05	1.07	1.07	1.03	0.41	0.42	0.33	0.39
	<i>T</i> -test (Sig.)	0.36 (0.73)	0.50 (0.62)	0.51 (0.61)	0.22 (0.82)	−6.07 (0.00)	−6.53 (0.00)	−11.64 (0.00)	−9.81 (0.00)
	<i>N</i>	28	28	28	28	28	28	28	28
Moved one wage decile down	Proportion	0.25	0.28	0.30	0.30	0.16	0.17	0.17	0.20
	Relative representation	0.74	0.77	0.78	0.79	0.73	0.71	0.68	0.71
	<i>T</i> -test (Sig.)	−2.92 (0.00)	−2.73 (0.01)	−2.71 (0.01)	−2.51 (0.02)	−2.07 (0.04)	−2.40 (0.02)	−2.94 (0.00)	−2.74 (0.00)
	<i>N</i>	72	72	72	72	72	72	72	72
Remained in the same wage decile	Proportion	0.33	0.35	0.37	0.38	0.27	0.29	0.30	0.33
	Relative representation	0.98	0.96	0.97	0.99	1.22	1.22	1.18	1.15
	<i>T</i> -test (Sig.)	−0.22 (0.82)	−0.49 (0.62)	−0.34 (0.73)	−0.18 (0.85)	1.44 (0.15)	1.45 (0.14)	1.28 (0.20)	1.17 (0.24)
	<i>N</i>	90	90	90	90	90	90	90	90
Inconsistent change	Proportion	0.38	0.41	0.43	0.43	0.22	0.24	0.27	0.30
	Relative representation	1.11	1.11	1.13	1.12	1.02	1.02	1.04	1.04
	<i>T</i> -test (Sig.)	0.71 (0.49)	0.84 (0.40)	1.00 (0.32)	0.98 (0.33)	0.09 (0.93)	0.09 (0.93)	0.23 (0.82)	0.22 (0.82)
	<i>N</i>	41	41	41	41	41	41	41	41
Moved one wage decile up	Proportion	0.33	0.36	0.37	0.38	0.24	0.27	0.30	0.33
	Relative representation	0.97	0.97	0.97	0.99	1.11	1.14	1.17	1.16
	<i>T</i> -test (Sig.)	−0.34 (0.74)	−0.38 (0.70)	−0.32 (0.74)	−0.10 (0.91)	0.72 (0.47)	0.92 (0.36)	1.15 (0.25)	1.17 (0.24)
	<i>N</i>	66	66	66	66	66	66	66	66
Moved at least two wage deciles up	Proportion	0.52	0.56	0.51	0.52	0.27	0.30	0.37	0.41
	Relative representation	1.54	1.51	1.34	1.36	1.26	1.26	1.44	1.42
	<i>T</i> -test (Sig.)	3.68 (0.00)	3.98 (0.00)	2.72 (0.01)	2.83 (0.01)	1.43 (0.16)	1.53 (0.13)	2.65 (0.01)	2.77 (0.00)
	<i>N</i>	32	32	32	32	32	32	32	32
Average proportion	0.34	0.37	0.38	0.38	0.22	0.24	0.26	0.28	
<i>N</i>	329	329	329	329	329	329	329	329	

Light gray: Underrepresentation; dark gray: Overrepresentation.

Table 3  
 Characteristics of occupations whose relative wage standing improved by at least two wage deciles, 1980–2007.

Occupation		Percent female				Percentage of college graduate workers		Wage deciles <sup>a</sup>	
Code	Title	1980	1990	2000	2007	1980	2007	1980	2007
4	Chief executives and public administrators	0.24	0.28	0.19	0.22	0.30	0.65	8	10
18	Managers of properties and real estate	0.42	0.47	0.53	0.52	0.25	0.39	6 (7)	9
95	Registered nurses	0.96	0.95	0.93	0.91	0.34	0.55	6	9
98	Respiratory therapists	0.56	0.62	0.62	0.65	0.19	0.28	4	8
99	Occupational therapists	0.93	0.89	0.90	0.91	0.74	0.80	5	9
105	Therapists, n.e.c.	0.68	0.74	0.76	0.79	0.56	0.77	4	7
106	Physicians' assistants	0.37	0.48	0.64	0.66	0.21	0.67	6	10 (9)
164	Librarians	0.83	0.82	0.84	0.84	0.65	0.84	3 (4)	6 (7)
169	Social scientists, n.e.c.	0.40	0.46	0.50	0.52	0.80	0.89	7	9
176	Clergy and religious workers	0.13	0.20	0.26	0.29	0.72	0.71	3	5
188	Art makers: painters, sculptors, craft-artists, and print-makers	0.49	0.54	0.48	0.44	0.39	0.54	5	7
198	Announcers	0.19	0.21	0.23	0.22	0.28	0.35	2	5 (4)
204	Dental hygienists	0.99	0.98	0.98	0.96	0.37	0.35	4	6
206	Radiologic tech specialists	0.72	0.73	0.73	0.73	0.11	0.24	6	8
207	Licensed practical nurses	0.97	0.94	0.93	0.93	0.03	0.07	3	5
208	Health technologists and technicians, n.e.c.	0.64	0.72	0.44	0.44	0.24	0.28	4	7
218	Surveyors, cartographers, mapping scientists.	0.07	0.09	0.11	0.12	0.12	0.29	5	7 (6)
225	Other science technicians	0.32	0.33	0.21	0.31	0.21	0.26	5	9
229	Computer software developers	0.30	0.33	0.27	0.23	0.48	0.77	8	10
234	Legal assistants, paralegals, legal support, etc.	0.70	0.77	0.82	0.81	0.38	0.40	5	7
274	Salespersons, n.e.c.	0.43	0.43	0.35	0.34	0.17	0.43	6	8
316	Interviewers, enumerators, and surveyors	0.79	0.79	0.77	0.79	0.18	0.20	2	4
346	Mail and paper handlers	0.62	0.57	0.51	0.50	0.03	0.18	3	7
357	Messengers	0.27	0.28	0.24	0.19	0.06	0.12	1	4
377	Eligibility clerks for government programs; social welfare	0.83	0.91	0.82	0.83	0.30	0.41	3	7 (6)
465	Welfare service aides	0.89	0.85	0.65	0.69	0.11	0.52	2	6
475	Farm managers, except for horticultural farms	0.09	0.13	0.14	0.17	0.17	0.27	3	5
489	Inspectors of agricultural products	0.19	0.46	0.31	0.36	0.16	0.30	1	6
535	Precision makers, repairers, and smiths	0.23	0.28	0.20	0.22	0.10	0.17	4	6
658	Furniture and wood finishers	0.31	0.28	0.24	0.22	0.06	0.10	1	3
765	Paper folding machine operators	0.61	0.67	0.26	0.28	0.01	0.04	3	5
799	Graders and sorters in manufacturing	0.62	0.60	0.47	0.41	0.02	0.12	2	6

Light gray: Underrepresentation; dark gray: Overrepresentation.

<sup>a</sup> The wage deciles presented in the table are calculated for each time point only for occupations that appear in all four periods. In general, this selection did not change the results. In the sole cases in which the two calculations did not match, the wage deciles in parentheses represent the calculation without the selection.



representation is double, or even triple, their expected gender-even representation. Moreover, seven of the nine occupations (the exceptions are science technicians and sorters in manufacturing) with the most impressive wage growth (4 or 5 deciles) either are female dominated (occupational therapists, clerks for government programs, welfare service aides, respiratory therapists, mail and paper handlers) or have become feminized over time (physicians' assistants, inspectors of agricultural products).

Table 3 also shows that although the 32 occupations had, on average, either relatively high original shares of college graduate workers or considerable growth in educational levels during this period, their initial wage levels were relatively low. Three quarters did not exceed the median wage (5th decile) in 1980, and almost 60% were below the median wage. By 2007, only one quarter of these occupations did not exceed the median wage, and less than 10% were below it. Still, although all the occupations in this group had substantially improved wages, only one quarter ranked in the top two wage deciles in 2007.

It seems then that the typical occupational profile of women—their overrepresentation in white-collar occupations, and underrepresentation in blue-collar occupations—contributed to their improved standing on the occupational wage ladder during the period studied. Nevertheless, the structural change in occupational rewards cannot explain the impressive increase in women's representation in the top two wage deciles, shown in Table 1, since most of the occupations with the highest pay increments rank in the middle of the occupational wage structure. The question that remains, therefore, is whether these structural changes were accompanied by other changes that further explain the occupational mobility of women.

#### 4.2. Gender compositional changes

The analysis so far overlooked changes in the gender composition of occupations. The previous section demonstrated that at least some of the occupational mobility of women shown in Table 1 is due to *structural changes*, that is, wage changes in occupations with high female representation. Now I ask whether a simultaneous process of *changes in women's representation* in occupations also contributed to their upward occupational mobility. To test net changes in the gender composition of occupations over time, I stabilized changes in the relative wages of occupations over time, presented in Table 2. To do so, I placed occupations in deciles according to their average male wage in 1980, and kept this rank constant

across decades. I then computed the odds of women in each occupational wage decile in each year relative to the odds of men. A comparison between decades, presented in the left panel of Table 4, displays trends in the gender composition of occupations by wage decile in 1980.

The results resemble those shown in Table 1. The relative representation of women in low wage occupations (below the median) is consistently in decline, while the opposite is true for occupations with average wages above the median. Again, the changes are most impressive in the top wage occupations: among occupations in the upper decile in 1980, the gender odds ratio is 0.31, meaning that the representation of women is only 30% that of men. Although women are still underrepresented in this group by 2007, their representation rose to almost 70%. In contrast, in the two lowest deciles, the odds ratios decreased from 2.2 and 2.4 to less than 2.

To ensure that the results are not influenced by the year, I recomputed the data by standardizing occupations according to the wage structure in 2007. In this analysis, occupations were ranked according to their wage deciles in 2007, while the gender composition of occupations varied by year. The results, shown in the right panel of the table, indicate a very similar trend: a growing process of feminization at the upper rungs of the occupational ladder, and defeminization at the lower end. It seems that the impressive upward occupational mobility of women—especially their increased representation in the top wage deciles—is primarily due to real changes in the gender composition of occupations.

Some of the differences between the two parts of the table reinforce the importance of structural changes (shown in Table 2). The most prominent are the differences in the relative representations of men and women in the top two deciles. Although both point to increments in women's representation over time, the representation of women in occupations, which were ranked in the 9th and 10th deciles in 2007, was already relatively high in 1980—0.95 (9th decile) and 0.43 (10th decile)—and over time changes were relatively moderate. In contrast, among occupations ranked in the 9th and 10th deciles in 1980, women were significantly underrepresented—0.46 (9th decile) and 0.31 (10th decile)—but their representation dramatically improved by 2007. These differences indicate that the structural changes previously shown were simultaneous with compositional changes: at the same time that women were entering highly rewarded occupations, occupations with initial high representations of women moved up into the 9th or 10th deciles (e.g., managers of properties and real estate, registered nurses, occupational therapists, physicians' assistants, and social scientists). Therefore, under

Table 4

Odds ratio of women to men in occupations by occupational wage deciles, adjusted for the occupational wage structure in 1980 (left) and 2007 (right).

Deciles	Based on wage deciles in 1980				Based on wage deciles in 2007			
	1980	1990	2000	2007	1980	1990	2000	2007
1	2.20	1.94	2.04	1.99	2.32	1.98	1.95	1.89
2	2.40	2.10	1.83	1.84	1.94	1.85	1.62	1.59
3	0.99	0.81	0.87	0.80	2.29	1.80	1.73	1.67
4	2.22	1.87	1.57	1.65	0.75	0.66	0.63	0.57
5	0.69	0.72	1.07	1.19	0.37	0.38	0.40	0.43
6	0.70	0.70	0.62	0.68	0.70	0.75	0.74	0.75
7	0.50	0.72	0.84	0.85	0.44	0.66	0.65	0.67
8	1.03	1.11	0.91	0.92	0.87	0.91	0.94	0.96
9	0.46	0.61	0.64	0.65	0.95	1.31	1.30	1.37
10	0.31	0.51	0.66	0.69	0.43	0.55	0.53	0.55
Index of Net Differences	0.30	0.21	0.18	0.17	0.27	0.18	0.18	0.17

Light gray: Decrease; dark gray: Increase.

the 2007 wage structure, the initial representation of women in these two wage deciles improved.<sup>6</sup>

To sum up the gender compositional changes over time, I use the summary Index of Net Differences developed by Lieberman (1976). The Index of Net Differences is used to compare groups in terms of certain ordered characteristics. In this case, I compare the distribution of men and women across the occupational wage deciles in Table 4. The index ranges from plus 1 to minus 1. A value of zero indicates equal distributions (i.e., that women and men are randomly distributed across the occupational wage hierarchy). A value of 1 indicates full inequality in favor of men (i.e., that all men are located higher than all women on the occupational wage hierarchy), and a value of  $-1$  indicates the opposite.<sup>7</sup>

The index's values are presented in Fig. 1 and the bottom row of Table 4. Most evident is the dramatic decrease in inequality between 1980 and 1990, indi-

cating that the superior position of men (or inferior position of women) on the occupational wage hierarchy has substantially weakened over this decade. This trend continues throughout the entire period, albeit to a much more moderate extent. Furthermore, Fig. 1 demonstrates that the trends under the wage structures of 1980 and 2007 are identical, making the case that the compositional changes during this period are independent of structural changes. Again, the small gap that does exist between the two measures indicates that changes in the wage structure between the decades favored women, confirming the results in Tables 2 and 3.

## 5. Discussion and conclusions

In this paper I document trends in women's occupational mobility between 1980 and 2007 in the U.S. labor market, and link them to two different sources. The first source, compositional changes, refers to changes in the distributions of men and women in the occupational wage hierarchy over time. The second, structural changes, relates to trends in the relative standing of

<sup>6</sup> The case of the physicians' assistant is a good example of an occupation that underwent both compositional and structural changes. Not only has women's representation in this occupation, in which women were already overrepresented initially, grown dramatically (from 37 to 66%), but this occupation also experienced dramatic growth in wages, paving its way into the two top wage deciles (see Table 2). When occupations were standardized according to the 1980 wage structure (left side of Table 4), physicians' assistants were not ranked in the top two wage deciles, but in 2007 they were (right side of the table). Thus, although each side of the table reflects pure compositional changes, the differences between the two sides reflect the simultaneous structural changes.

<sup>7</sup> In the formula below,  $M$  and  $F$  represent male and female distributions, respectively, and  $i$  and  $j$  are the counters used to add their relative frequencies across the occupational wage hierarchy:

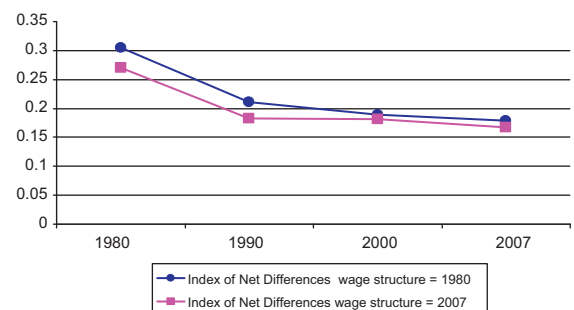
$$ND = \sum_{i=1}^n M_i \left( \sum_{j=1}^{n-i-1} F_j \right) - \sum_{i=2}^n F_i \left( \sum_{j=1}^{n-i-1} M_j \right).$$


Fig. 1. Trends in the value of the Index of Net Differences, 1980–2007.

occupations in the wage hierarchy over time. The findings indicate that both factors account for the impressive upward occupational mobility of women. Over the period studied, and especially between 1980 and 1990, American women increased their relative representation in highly rewarded occupations (particularly in the top two wage deciles), and reduced their representation in low wage occupations (below the median wage). Parallel to this process, the typical occupational profiles of women have benefited from higher wage premiums than men's.

Both processes are strongly linked to education. First, the expansion of credentialing, together with the rapid increase of college education among women, promoted women's entry into professional and other previously male occupations at the higher end of the wage hierarchy. Second, the sharp rise in the premium for education has benefited not only the occupations at the top of the wage distribution, but also the female-dominated ones in the middle. Thus, occupations characterized by relatively high education credentials (such as therapists, librarians, dental hygienists, nurses, and health service providers) have significantly improved their standing on the occupational wage structure since 1980.

The two processes are also clearly linked to occupational positions, since it appears that a different one prevailed at each pole of the occupational structure. Compositional changes occurred mainly in previously male white-collar occupations, whereas blue-collar occupations were quite resistant to gender compositional changes (Cotter et al., 2004). In contrast, in low paid occupations, "women's gains" were, for the most part the result of "men's losses" (Bernhardt, Morris, & Handcock, 1995), probably because the rise in the education premium damaged the relative pay of male-dominated manual occupations.<sup>8</sup>

Previous findings, based on individual level analyses, indeed show that the trends in gender wage inequality differ at the two poles of the wage structure. Whereas at the upper pole of the wage distribution women have enjoyed an impressive increase in absolute wages since 1970, at the lower pole women's wages have improved in relative, but not absolute, terms (Katz & Autor, 1999; McCall, 2007). Reinterpreting these findings according to occupational-level processes, this paper suggests that the absolute improvement at the upper pole is tied to a compositional process that resulted

from women's entry into highly rewarded occupations, in which they were previously absent. However, because men in those occupations also enjoy high wage premiums, this improvement has not been translated into relative terms. At the other pole, this study suggests that the relative improvement in women's wages is linked to structural changes. Women succeeded in avoiding the absolute decline in wages that hit men at the bottom of the wage distribution (Katz & Autor, 1999; McCall, 2007) mainly because female-dominated occupations at the middle-low end of the wage distribution were more protected by their higher educational levels.

The direct implications of these two processes for the relative wages of men and women have yet to be analyzed. As much as the study of trends in gender pay gaps is saturated, the role of occupations is almost completely absent. Bringing occupations into this line of research not only raises new questions, but also points to new answers. For example, studies of the decline in gender wage gaps pay great attention to structural changes at the individual-level, such as returns to education. This paper reveals the importance of education from a different angle, by exposing its implications for the gender composition of occupations as well as their location in the occupational structure. Yet the findings of this study, which are mostly descriptive, are only a first step. This paper specifically calls for further empirical estimations of the magnitude of each of the two processes in relation to gender wage inequality, and a deeper examination of the distinctive mechanisms that operate at the two poles of the occupational hierarchy.

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<sup>8</sup> Table 2 demonstrates that occupations dominated by men had wage reductions of one decile. Nonetheless, among occupations that declined more than two wage deciles, the gender composition is relatively even.

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