

## **A NOTE ON GENDER DIVERSITY IN MANAGERIAL AND PROFESSIONAL OCCUPATIONS**

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### **ABSTRACT**

As the number of women in the U.S. labor force has increased dramatically over the last two decades, so has the significance of the issue of gender diversity for negotiators. This note has two objectives. First, using data from the Current Population Survey, it summarizes recent trends in sex segregation in managerial and professional occupations. Second, the note provides easy-to-compute and intuitive statistics that can help negotiators develop goals and track progress with respect to the extent of gender diversity in managerial and professional occupations in their organizations.

The most dramatic change in the U.S. labor force over the last 30 years has been the increase in the participation of women in paid employment. Currently, women make up approximately 47 percent the labor force, while men represent the remaining 53 percent [1]. A measure of progress regarding gender equity in the workplace is the relative representation of men and women in managerial and professional occupations. Indeed, such occupations are relatively desirable in terms of compensation, decision-making authority, and prestige. As the representation of women in managerial and professional occupations has increased in importance for most organizations in the United States, so has the significance of the issue of gender diversity for negotiators. Therefore, it is crucial for negotiators to be informed of recent trends in sex segregation in managerial and professional occupations.

This note has two objectives. First, using occupational data from the Current Population Survey, it summarizes trends in sex segregation in managerial and professional occupations between 1993 and 2002. Second, it provides easy-to-compute and intuitive statistics that can help negotiators develop goals and evaluate progress regarding gender diversity in their organizations. The remainder of the note is organized as follows. First, the data and methods used to analyze sex segregation in managerial and professional occupations are described. Then, the trends in the extent of gender diversity in such occupations are presented. Finally, implications for negotiators are discussed.

## DATA AND METHODS

This analysis is based on the most detailed and current comparable data available for managerial and professional occupations in the United States for the period 1993-2002. The data came from the Current Population Survey published by the Bureau of Labor Statistics [1]. It should be noted that the data used in this note do not capture gender differences in terms of pay, grade, and authority that may exist within a given managerial or professional occupation. As a result, the analysis hides some sex segregation within managerial and professional occupations. This is particularly true for managerial workers, since the classification for managerial occupations used by the Bureau of Labor Statistics is relatively wide. For example, the category “management-related occupations” includes a variety of occupations, such as accountants; construction inspectors; and personnel, training, and labor relations specialists.

Three indicators were used to investigate trends in sex segregation in managerial and professional occupations between 1993 and 2002: 1) an inequality index, the index of dissimilarity, that summarizes the tendency for men and women to be segregated into different jobs; 2) the proportion of women in an occupation, and 3) the representation ratio of women in an occupation. Occupational sex segregation is generally measured using the index of dissimilarity developed by Duncan and Duncan [2]. This index, denoted  $D$ , is defined as:

$$D = \frac{1}{2} \sum_i |m_i - w_i|$$

where  $m_i$  is the percentage of men in the labor force employed in occupation  $i$ , and  $w_i$  is the percentage of women in the labor force employed in occupation  $i$ . The index  $D$  can be interpreted as the percentage of women (or men) who would have to change occupations to have the same occupational distribution as men (or women). It can range from 0 to 100. If  $D = 0$ , men and women are evenly distributed across occupations. Put differently, there is no sex segregation. Conversely, if  $D = 100$ , all occupations are completely segregated by sex. Since the focus of this note is on managerial and professional occupations, the index of

dissimilarity is computed only for these occupations and not for all the occupations in the labor force.

Changes in the index  $D$  over time may result from changes in the sex composition of occupations and/or from changes in the structure of occupations [3]. For example,  $D$  can decrease even if occupational sex segregation remains the same if, all else being equal, female-dominated occupations grow faster than male-dominated occupations. As a result, to analyze the extent to which changes in  $D$  are due to changes in the sex composition of managerial and professional occupations ( $Sex$ ) or changes in the structure of managerial and professional occupations ( $Stru$ ), the following decomposition technique developed by Blau and Hendricks [4] is used.

$$Sex = \frac{1}{2} [\sum_i (p_{i2} T_{i1} / \sum_i p_{i2} T_{i1}) - (q_{i2} T_{i1} / \sum_i q_{i2} T_{i1}) - \sum_i (p_{i1} T_{i1} / \sum_i p_{i1} T_{i1}) - (q_{i1} T_{i1} / \sum_i q_{i1} T_{i1})]$$

$$Stru = \frac{1}{2} [\sum_i (p_{i1} T_{i2} / \sum_i p_{i1} T_{i2}) - (q_{i1} T_{i2} / \sum_i q_{i1} T_{i2}) - \sum_i (p_{i1} T_{i1} / \sum_i p_{i1} T_{i1}) - (q_{i1} T_{i1} / \sum_i q_{i1} T_{i1})]$$

where  $p_{it}$  is the proportion of women in occupation  $i$  in year  $t$ ,  $q_{it}$  is the proportion of men in occupation  $i$  in year  $t$ , and  $T_{it}$  is the total employment in occupation  $i$  in year  $t$ . Since the components  $Sex$  and  $Stru$  do not add up to the actual observed change in  $D$ , a residual term, denoted  $Res$ , is computed as follows:

$$Res = D - Sex - Stru$$

The residual term may be interpreted as a result of the interaction between changes in the sex composition of jobs and changes in the occupational structure over the period [4].

Although useful to gauge the overall level of sex segregation, the index of dissimilarity, as any index number, is limited to fully capture the extent of sex segregation in managerial and professional occupations. To complement the index of dissimilarity, two other indicators of sex segregation are included in the analysis: 1) the proportion of women in an occupation and 2) the representation ratio of women in an occupation. The proportion of women in an occupation measures the extent to which this occupation is feminized and masculinized. It is defined as the number of women in an occupation divided by the total number of workers in that occupation. The representation ratio of women in an occupation describes the extent to which women are underrepresented (ratio < 1) or overrepresented (ratio > 1) relative to women's share in total employment. It is defined as the percentage of women in an occupation divided by the percentage of women in the whole labor force.

Both the proportion of women and the representation ratio of women can be used to determine whether an occupation is gender-dominated or gender-integrated. In the sex-segregation literature [5], it is typical to label an occupation as gender-dominated if the proportion of men or the proportion of women in this

occupation is greater than 80 percent, or if the representation ratio of men or women is greater than 1.5. Concomitantly, an occupation is considered gender-integrated if the proportion of women or that of men comprises between 20 percent and 80 percent, or if the representation ratio ranges from 0.5 and 1.5. Although related, the proportion of women and the representation ratio of women are two different indicators. Unlike the former, the latter is a relative concept that takes into account women's share in total employment. Therefore, the representation ratio of women is a more accurate indicator than the proportion of women to measure the feminization of occupations. However, since the proportion of women is simpler to compute and easier to interpret than the representation ratio of women, both indicators are included in the analysis.

## RESULTS

Unexpectedly, the index of dissimilarity for managerial and professional occupations increased by 4.9 points from 27.4 in 1993 to 32.3 in 2002, indicating an overall increase in sex segregation in managerial and professional occupations. Put differently, 32.3 percent of women (and men) would have to change occupations to have the same occupational distribution as men (or women) (see Table 1).

Table 2 decomposes the changes in  $D$  into three components: changes in the sex composition of occupations (*Sex*), changes in the structure of occupations (*Structure*) and a residual term (*Residual*). About 50 percent of the increase in sex segregation in managerial and professional occupations is due to changes in the sex composition of these occupations. Taken together, managerial and professional occupations became more feminized between 1993 and 2002. Changes in

Table 1. Index of Sex Segregation ( $D$ ) in Managerial and Professional Occupations, 1993-2002

1993	2002	Percentage change
27.4	32.3	4.9

Table 2. Changes in Sex Segregation in Managerial and Professional Occupations, 1993-2002

Actual change	Sex	Structure	Residual
4.9	2.4	0.3	2.2
100%	49%	6.1%	44.9%

the structure of managerial and professional occupations represent only 6.1 percent of the total increase in sex segregation. In other words, the influx of women into managerial and professional occupations explained only 6.1 percent of the increase in *D* for such occupations.

At the most aggregate level, women are somewhat overrepresented in managerial and professional occupations, with a representation ratio of 1.08 in 2002. Women are slightly underrepresented in “executive, administrative, and managerial” occupations, with a representation ratio of 0.98 in 2002. Using the representation ratio, the occupation “managers, medicine and health” was the only female-dominated occupation in 2002. The rest of the “executive, administrative, and managerial” occupations were gender-integrated. In 2002, the most-feminized occupations were respectively: 1) managers in medicine and health, 2) personnel and labor relations managers, 3) administrators in education and related fields. It should be noted that, although being the least-feminized “executive, managerial, and administrative” occupations, “managers in marketing, advertising, and public relations” and “purchasing managers” experienced a significant increase in feminization between 1993 and 2002. The proportion of women in these two occupations increased, respectively, by 7.2 and 8.4 percentage points during that time period (see Table 3).

Overall, “executive, administrative, and managerial” occupations were more gender-integrated than “professional specialties” in 2002. During that year, women were overrepresented in “professional specialties,” with a representation ratio of 1.17 while, as previously indicated, women were slightly underrepresented in “executive, administrative, and managerial” occupations, with a representation ratio of 0.98. Using the representation ratio, 17 professional occupations out of 41 were gender-dominated and 23 were gender-integrated in 2002. The male-dominated occupations were, respectively: 1) mechanical engineers, 2) aerospace engineers, 3) electrical and electronic engineers, 4) civil engineers, 5) chemical engineers, 6) industrial engineers, and 7) dentists. It is noteworthy that even if these occupations remained male-dominated, they experienced a relatively significant increase in feminization.

Between 1993 and 2002, the proportion of women in the occupations: 1) “dentists”; 2) “chemical engineers”; 3) “electrical and electronic engineers”; and 4) “mechanical engineers” increased by, respectively, 1) 8.9 percentage points from 10.5 percent to 19.4 percent; 2) 6.5 percentage points from 10 percent to 16.5 percent; 3) 2.7 percentage points from 7.6 percent to 10.3 percent; and 4) 1.7 percentage points from 5.2 percent to 6.9 percent. Pharmacists experienced the most striking increase in feminization. The proportion of women in this occupation increased by 13.6 percentage points from 38.1 percent in 1993 to 51.7 percent in 2002.

Using the representation ratio, the female-dominated professional occupations were in 2002, respectively: 1) teachers, prekindergarten, 2) speech therapists, 3) registered nurses, 4) dietitians, 5) teachers, special education; 6) teachers,

Table 3. Proportion of Women (Prop) and Representation Ratio of Women (Ratio) in Managerial and Professional Occupations, 1993/2002

Occupations	1993		2002		Changes 1993/2002	
	Prop.	Ratio	Prop.	Ratio	Prop. (% points)	Ratio %
<b>Managerial and professional specialty</b>	<b>47.8</b>	<b>1.04</b>	<b>50.5</b>	<b>1.08</b>	<b>2.7</b>	<b>3.8</b>
<b>Executive, administrative, and managerial</b>	<b>42.0</b>	<b>0.92</b>	<b>45.9</b>	<b>0.98</b>	<b>3.9</b>	<b>7.4</b>
Officials and administrators, public	45.2	0.99	52.6	1.13	7.4	14.4
Financial managers	46.2	1.01	50.5	1.08	4.3	7.4
Personnel and labor relations managers	60.7	1.33	66.0	1.42	5.3	6.9
Purchasing managers	34.9	0.76	43.3	0.93	8.4	21.9
Managers, marketing, advertising, and public relations	31.2	0.68	38.4	0.82	7.2	21.0
Administrators, education, and related fields	59.9	1.31	64.6	1.39	4.7	6.0
Managers, medicine, and health	70.5	1.54	78.4	1.68	7.9	9.3
Managers, properties, and real estate	45.7	1.00	50.0	1.07	4.3	7.5
Management-related occupations	52.7	1.15	58.2	1.25	5.5	8.5
<b>Professional Specialty</b>	<b>53.2</b>	<b>1.16</b>	<b>54.7</b>	<b>1.17</b>	<b>1.5</b>	<b>1.1</b>
Architects	18.6	0.41	20.1	0.43	1.5	6.2
Aerospace engineers	7.5	0.16	8.1	0.17	0.6	6.1
Chemical engineers	10.0	0.22	16.5	0.35	6.5	62.2
Civil engineers	9.4	0.21	10.8	0.23	1.4	12.9
Electrical and electronic engineers	7.6	0.17	10.3	0.22	2.7	33.2
Industrial engineers	16.4	0.36	17.2	0.37	0.8	3.1
Mechanical engineers	5.2	0.11	6.9	0.15	1.7	30.4
Computer systems analysts, scientists	29.9	0.65	27.8	0.60	-2.1	-8.6
Operations and systems researchers and analysts	39.7	0.87	48.9	1.05	9.2	21.1
Chemists, except biochemists	28.8	0.63	29.8	0.64	1.0	1.7

Biological and life scientists	40.4	0.88	44.0	0.94	3.6	7.0
Physicians	21.8	0.48	30.6	0.66	8.8	38.0
Dentists	10.5	0.23	19.4	0.42	8.9	81.6
Registered nurses	94.4	2.06	92.9	1.99	-1.5	-3.3
Pharmacists	38.1	0.83	51.7	1.11	13.6	33.4
Dietitians	92.8	2.03	90.2	1.94	-2.6	-4.5
Respiratory therapists	58.4	1.28	58.4	1.25	0.0	-1.7
Physical therapists	72.5	1.58	70.2	1.51	-2.3	-4.8
Speech therapists	91.8	2.00	94.3	2.02	2.5	1.0
Teachers, college, and university	42.5	0.93	42.7	0.92	0.2	-1.3
Teachers, prekindergarten and kindergarten	97.7	2.13	97.7	2.10	0.0	-1.7
Teachers, elementary school	85.9	1.88	83.0	1.78	-2.9	-5.0
Teachers, secondary school	57.5	1.26	58.1	1.25	0.6	-0.7
Teachers, special education	84.0	1.83	85.4	1.83	1.4	-0.1
Counselors, educational and vocational	67.6	1.48	74.3	1.59	6.7	8.0
Librarians, archivists, and curators	83.5	1.82	78.8	1.69	-4.7	-7.2
Economists	47.6	1.04	55.5	1.18	7.4	13.6
Psychologists	64.1	1.40	65.9	1.41	1.8	1.0
Social workers	68.9	1.50	74.0	1.59	5.1	5.6
Recreation workers	75.1	1.64	74.2	1.59	-0.9	-2.9
Lawyers and judges	22.8	0.50	29.3	0.63	6.5	26.3
Authors	57.2	1.25	54.7	1.17	-2.5	-6.0
Technical writers	47.2	1.15	61.5	1.32	8.7	14.5
Designers	52.6	1.15	56.4	1.21	3.8	5.4
Musicians and composers	32.8	0.72	36.4	0.82	3.6	9.1
Actors and directors	38.3	0.84	38.2	0.78	-0.1	-2.0
Painters, sculptors, craft-artists, and printmakers	48.0	1.05	47.9	1.03	-0.1	-1.9
Photographers	26.2	0.57	33.2	0.71	7.0	24.5
Editors and reporters	48.5	1.06	48.5	1.04	0.0	-1.7
Public relations specialists	59.6	1.30	68.2	1.46	8.6	12.5
Athletes	23.9	0.52	25.8	0.55	1.9	6.1

elementary school, 7) librarians, archivists, and curators, 8) counselors, educational and vocational, 9) recreation workers, and 10) social workers. Unlike male-dominated occupations that became more feminized, female-dominated occupations experienced little or no increase in masculinization between 1993 and 2002.

### IMPLICATIONS

This article has two important practical implications for negotiators. First, it provides information regarding the extent to which managerial and professional occupations in the United States are gender-integrated or gender-dominated. Negotiators can use this information to set up goals and track progress with respect to the gender makeup of managerial and professional occupations in their organizations. Second, this article describes easy-to-understand statistical indicators to investigate changes in the extent of sex segregation within occupations. Negotiators can easily adapt such statistical indicators to analyze gender diversity in their organizations or bargaining units.

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