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Abstract

Annual salary increases for college and university faculty generally take the form of a percentage increase over base, rather than an actual dollar award. These percentage increases are typically determined without regard to the base dollar salary (Hearn, 1999). As a result, early advantages in salaries persist over time, even when the performance of lower-paid faculty is superior (Hearn, 1999). As Hearn (1999) has noted, sex differences in starting salaries are particularly problematic because of this annuity feature of faculty salaries. Specifically, initial inequities in the salaries of women and men faculty are very difficult to resolve through the annual process of awarding merit or across-the-board salary increases.

Prior research has consistently shown that female faculty receive lower salaries than their male counterparts even after controlling for differences in such characteristics as education, experience, productivity, institutional characteristics, and academic discipline (Barbezat, 1988; Bellas, 1993; Broder, 1993; Konrad & Pfeffer, 1990; Langton & Pfeffer, 1994; Nettles, Perna, & Bradburn, 2000; Toutkoushian, 1998a, 1998b; Weiler, 1990). Some research (Toutkoushian, 1998b) suggests that, after controlling for education, experience, publications, institutional characteristics, and academic field, the male-female salary gap is smaller among full-time faculty age 40 and under than among their older counterparts.

The results of research specifically examining the extent to which sex differences in faculty salaries are attributable to differences in starting salaries are inconclusive, with Hirsch and Leppel (1982), who conducted a single-institution study, concluding that differences in male and female earnings profiles were primarily due to differences in starting salaries, and Formby, Gunther, and Sakano (1993), who controlled for characteristics of the employing department and other characteristics, concluding that the starting salaries of women and men faculty were comparable. This study seeks to improve our understanding of sex differences in faculty salaries by examining differences among faculty with the same academic rank and comparable levels of experience.

Disciplines

Educational Administration and Supervision

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FOCUS ON FACULTY: CHALLENGES AND CHANGING ROLES

Sex Differences in Faculty Salaries: A Cohort Analysis

Laura Walter Perna

Annual salary increases for college and university faculty generally take the form of a percentage increase over base, rather than an actual dollar award. These percentage increases are typically determined without regard to the base dollar salary (Hearn, 1999). As a result, early advantages in salaries persist over time, even when the performance of lower-paid faculty is superior (Hearn, 1999). As Hearn (1999) has noted, sex differences in starting salaries are particularly problematic because of this annuity feature of faculty salaries. Specifically, initial inequities in the salaries of women and men faculty are very difficult to resolve through the annual process of awarding merit or across-the-board salary increases.

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1993; Konrad & Pfeffer, 1990; Langton & Pfeffer, 1994; Nettles, Perna, & Bradburn, 2000; Toutkoushian, 1998a, 1998b; Weiler, 1990). Some research (Toutkoushian, 1998b) suggests that, after controlling for education, experience, publications, institutional characteristics, and academic field, the male-female salary gap is smaller among full-time faculty age 40 and under than among their older counterparts.

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THEORETICAL FRAMEWORK

Two theoretical perspectives are appropriate for examining the sources of observed differences in faculty salaries: human capital theory and structural theory. Human capital theory focuses on the characteristics of individual workers, while structural approaches emphasize the attributes of the organizations to which individuals are connected (Youn, 1988).

According to the economic theory of human capital and neoclassical approaches to the labor market, employment status is determined by an individual's productivity, the investments an individual has made in his or her productivity, and the supply of and demand for workers with similar levels and types of training and expertise. Differences in productivity are expected to be attributable to differences in the investments that individuals have made in their personal development, such as the quantity and quality of their education, the amount of their on-the-job training, their geographic mobility, and their emotional and physical health (Becker, 1962; Schultz, 1961).

Despite the popularity of human capital theory for explaining labor market experiences, some economists and sociologists have noted the theory's limitations (England, 1982; DeYoung, 1989; Dreijmanis, 1991). Critics have argued that "focusing on the supply of human skills to explain economic inequality and lack of productivity is a theoretical mistake" (DeYoung, 1989, p. 155) and that "human capital theory has not generated an explanation of occupational sex segregation that fits the evidence" (p. 358). Among the limitations of human capital theory is its failure to ad-

equately explain the lower returns to educational investments for women and minorities (DeYoung, 1989).

Social scientists interested in issues of social inequality and poverty have responded to the inadequacies of human capital theory by developing structural or institutional approaches to labor markets (Youn, 1988). Structural approaches to academic labor markets focus on the influence of the characteristics of the colleges and universities in which faculty were trained and work, including financial resources, student enrollment, the tenure system, and collective bargaining agreements.

According to such approaches, labor market inequalities are attributable to organizational attributes including the tendency of organizations to structure positions, sort employees, and institutionalize rewards (Youn, 1992). Youn (1992) identified three forms of segmentation in the academic labor market: (a) academic discipline, (b) institutionalized job task (e.g., primarily research, primarily teaching), and (c) job status (e.g., full-time or part-time). Movement across segments (e.g., from mathematics to English, from a two-year institution to a research university, from part-time to full-time) is restricted. Because competition among faculty in different segments is limited, inequities among faculty in different segments may persist.

Structural models posit that sex differences in faculty salaries are attributable to the segregation of women in the types of institutions, academic fields, and work roles that have lower prestige and value (Smart, 1991). Some research supports this view. For example, Sorenson (1989) found that 20% of the national male-female wage difference in 1983 for all occupations, not just for faculty or higher education positions, was attributable to occupational segregation by sex after controlling for personal characteristics (e.g., tenure on the job, educational attainment, and full- or part-time status), characteristics of the occupation (e.g., education and training required to perform the job and working conditions), and attributes of the firm (e.g., geographic region, union status, size of firm, and major industry category). In higher education, the average salaries of faculty in institutions and disciplines with higher proportions of women have also been found to be lower than the average salaries of faculty in institutions and disciplines with smaller proportions of women (Barbezat, 1988; Bellas, 1994, 1997; Smart, 1991).

RESEARCH METHODS

Because research supports the contribution of both perspectives (Smart, 1991), this study draws upon both human capital and structural approaches to academic labor markets to explore the extent to which the male advantage in faculty salaries varies by academic rank and level of experience. This study addresses the following research questions:

1. How do the characteristics of women full-time faculty at four-year institutions compare with the characteristics of men full-time faculty of the same academic rank and level of experience?
2. How do the institutional base salaries received by women full-time faculty at four-year institutions compare with the institutional base salaries received by men full-time faculty after taking into account differences in human capital investment, productivity, and structural characteristics?
3. How do sex differences in institutional base salaries vary with academic rank and level of experience? To what extent do sex differences in faculty salaries appear to be related to differences in starting salaries?

I used the 1993 National Study of Postsecondary Faculty (NSOPF-93) to address these research questions. Sponsored by the U.S. Department of Education's National Center for Education Statistics, the NSOPF-93 is a nationally representative sample of college and university faculty and instructional staff at public and private non-proprietary higher education institutions in the fall of 1992. The sample I used in these analyses consists of faculty members employed full-time at four-year colleges and universities with a regular appointment of at least nine months, who had some instructional duties, and whose principal activity was teaching, research, or administration. To correct for the non-simple random sample design and to minimize the influence of large sample sizes on standard errors, I weighted each case by the NSOPF-93 weight divided by the average weight for the sample. The adjusted weighted sample used in these analyses consists of 9,636 faculty members, representing the 329,220 faculty nationwide.

The NSOPF-93 has several advantages for examining the research questions, not the least of which are the high response rate and large nationally representative sample. Nonetheless, like all secondary data analyses, my research is limited to some extent by the data. One limitation is that the NSOPF-93 is a cross-sectional rather than a longitudinal survey. As a result, the NSOPF-93 does not track the salary history for each participating faculty member. In other words, the NSOPF-93 survey asked faculty to report only their current salary, not their starting salary or salary at the time of promotion or tenure. Therefore, my research explores sex differences among faculty of the same "cohort." I define six cohorts according to their academic rank and the number of years spent working full-time in a teaching, research, or administrative position at a two-year or four-year college or university.¹ Table 1 shows the distribution of full-time faculty in the

¹The NSOPF-93 does not contain a variable indicating the total number of years an individual has been employed in higher education. This study grouped faculty into cohorts based on an analysis of the number of years they were employed at their current and previous three positions. This technique may understate the amount of experience for faculty who have held more than four positions.

TABLE 1
DISTRIBUTION OF FULL-TIME FACULTY¹ AT FOUR-YEAR COLLEGES
AND UNIVERSITIES BY ACADEMIC RANK AND NUMBER OF YEARS
EXPERIENCE²: FALL 1992

<i>Rank</i>		<i>Total</i>	<i>1-2</i>	<i>3-6</i>	<i>7-12</i>	<i>13-20</i>	<i>20+</i>
			<i>Years</i>	<i>Years</i>	<i>Years</i>	<i>Years</i>	<i>Years</i>
Total	Row %	100.0	9.1	19.5	20.7	24.4	26.3
	Adjusted weighted n	9,528	868	1,861	1,975	2,322	2,502
Full Professor	Row %	100.0	3.0	6.2	10.2	30.0	50.5
	Adjusted weighted n	3,519	107	218	360	1,056	1,778
Associate Prof.	Row %	100.0	4.0	11.9	31.4	33.0	19.7
	Adjusted weighted n	2,656	105	316	834	877	524
Assistant Prof.	Row %	100.0	18.6	41.8	24.3	10.1	5.2
	Adjusted weighted n	2,415	448	1,009	587	245	126
Instructor	Row %	100.0	23.0	41.4	20.7	9.5	5.4
	Adjusted weighted n	517	119	214	107	49	28
Lecturer	Row %	100.0	25.7	22.8	21.4	22.8	7.3
	Adjusted weighted n	206	53	47	44	47	15
Other Rank	Row %	100.0	20.6	30.9	20.6	18.4	9.6
	Adjusted weighted n	136	28	42	28	25	13
No Rank	Row %	100.0	10.1	19.0	19.0	29.1	22.8
	Adjusted weighted n	79	8	15	15	23	18

¹The sample is limited to individuals with faculty status, who are employed full-time at four-year institutions with regular appointments and at least some instructional duties, whose principal activity is teaching, research, or administration, and who have at least a nine-month appointment.

²Experience = years spent working full-time in a teaching, research, or administrative position at a two-year or four-year college or university.

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF-93)

subsample by rank and experience. The six cohorts that are the focus of the analyses are: assistant professors with one or two years of experience (19% of all assistant professors); assistant professors with three to six years of experience (42% of all assistant professors); associate professors with seven to 12 years of experience (31% of all associate professors); associate professors with 13 to 20 years of experience (33% of all associate professors); full professors with 13 to 20 years of experience (30% of all full professors); and full professors with more than 20 years of experience (51% of all full professors). Together, these six cohorts represent 62% of all full-time faculty at four-year institutions with regular appointments and at least some instructional duties, whose principal activity is teaching, research, or administration, and who have at least a nine-month appointment.

I used both descriptive and regression analyses to address the research questions. At the descriptive level, I conducted variance and cross tabulations to compare the characteristics of women and men faculty in each of the six rank/experience cohorts. For the sample overall, and then for each rank/experience cohort separately, I used ordinary least squares regression analyses to isolate the effects of sex on faculty salaries, holding constant all other variables in the model.

Variables

The dependent variable in this study is the base salary received from the institution. Base salary is expressed as a natural logarithm so that the unstandardized regression coefficients reflect the percentage change in salary associated with a one-unit change in each independent variable. I eliminated about 2% of the cases ($n = 237$) from the analyses because of "extreme" annual base salaries, defined as less than \$12,000 or greater than \$175,000.

We may reasonably expect faculty salaries to be determined by a combination of human capital investment, productivity, and structural characteristics. The level of human capital investment emerges from the quantity and quality of education attained, the amount of on-the-job training, and geographic mobility (Becker, 1962; Schultz, 1961). Researchers have consistently found that earnings increase with educational attainment (Becker, 1962; Fox, 1981; Smart, 1991; Fairweather, 1995). I measured the level of investment in formal education by whether the highest degree is a doctoral degree, first-professional degree, or less than a doctoral or first-professional degree (reference category). The best available proxy for mobility in the NSOPF:93 database is whether the individual is holding the first or only job since earning the highest degree.

One measure of on-the-job training is whether the individual held a teaching assistantship and/or a research assistantship during graduate school. Another is the faculty member's amount of experience. Prior research has shown that earnings increase with experience but at a decreasing rate (Becker, 1962; Fairweather, 1995; Fox, 1981). In other words, each additional year of experience is associated with a higher salary, but the dollar amount of the increase declines with each additional year of experience. By including both experience and experience squared in the model, I controlled for the observed decline over time in the return to investments in education and training. Several measures of experience are available in the NSOPF-93 database, with correlations ranging from 0.60 to 0.76. I used factor analysis to construct a less redundant composite measure of experience from four variables: age, number of years since receiving the highest degree, number of years in the current position, and number of years at the current rank. The alpha reliability coefficient for this factor is 0.88. I include the experience composite only in the overall model, not in the separate analyses for each cohort, since experience is part of the definition of the cohorts.

As the primary measure of research productivity, I used the total number of articles in refereed journals, books, book reviews, chapters in edited books, and monographs (Fairweather, 1993) over the course of the career, standardized by academic field and institutional type. Thus, I measured the number of refereed publications relative to the average number of refereed publications for faculty who work in the same academic field and same type of institution.

Some evidence suggests diminishing marginal returns to publishing (Tuckman, 1979; Tuckman & Hagemann, 1976; Tuckman & Tuckman, 1976), regardless of the type of institution in which faculty work (Fairweather, 1995). In other words, faculty salaries increase with each additional publication, but the increment in salary associated with each additional publication declines as the total number of publications increases. To control for a possible nonlinear relationship between refereed publications and faculty salaries, I also include the standardized number of refereed publications squared in the regression analyses.

Other measures of research productivity are whether the faculty member serves as a principal or coprincipal investigator on at least one funded research project and the percentage of time spent on research rather than teaching. The correlation between time spent on research and time spent on teaching is -0.58 . Following Fairweather (1993), I used factor analysis to construct a less redundant measure of the percentage of time spent on research relative to the percentage of time spent on teaching. The alpha reliability coefficient for this factor is 0.71 .

Although several observers (e.g., Bowen & Schuster, 1986; Hansen, 1988; Glassick, Huber, & Maeroff, 1997; Lewis, 1998) have concluded that faculty reward systems emphasize research over other activities, this study examines the role, if any, that teaching, service, and administration play among faculty with different ranks and levels of experience. I measure teaching productivity by teaching level and committee work. Teaching level reflects whether an individual teaches only graduate students, only undergraduates, or both undergraduate and graduate students. For committee work, I use three groupings: serving on no thesis or dissertation committees, serving on one to four committees, or serving on five or more. I calculated service and administrative productivity by the percentage of time allocated to each of these activities. Chairing the department is an additional measure of administrative productivity.

Structural approaches to academic labor markets posit that structural characteristics influence labor market status by constraining employment experiences. I used the Carnegie classification of the faculty member's institution to control for such structural characteristics as institutional resources, size, and mission. I also use institutional control (public or private) as an additional measure of institutional resources. A dichotomous vari-

able reflecting unionization is included since some research (Ashraf, 1994) suggests that unionization is associated with both higher wages and a smaller African American-White salary gap (Ashraf, 1994). An additional institutional attribute is whether the individual holds a tenure-track position, a non-tenure-track position, or a position at an institution without a tenure system rather than a tenured position. I include geographic region to control for regional variations.

Prior research has shown that faculty reward systems vary by academic discipline (e.g., Marshall & Perrucci, 1982; Pfeffer & Langton, 1988; Smart & McLaughlin, 1978; Tuckman, 1979; Tuckman & Hagemann, 1976) and that these differences can be understood in terms of Biglan's (1973) categorization of academic fields (Smart & McLaughlin, 1978). Therefore, using Biglan's dimensions, I categorize each academic field as "hard" vs. "soft," "pure" vs. "applied," and whether concerned with life systems. To minimize the amount of missing data, I included a fourth variable: unknown academic field.

To control for the possible relationship between salaries and the segregation of women in particular academic fields, I included three additional dichotomous variables in the model: work in a field with the lowest quartile representation of women (e.g., engineering, political science), work in a field with the second quartile representation of women (e.g., mathematics, biological sciences), and work in a field with the third quartile representation of women (e.g., communications, fine arts). Working in an academic field with the highest quartile of representation of women is the reference category (e.g., education, nursing).

The analyses consider six non-overlapping racial/ethnic/citizenship groups: White, African American, Hispanic American, Asian American, American Indian/Alaskan Native, and non-U.S. citizen. Considering non-U.S. citizens in a separate category is important because the proportion of full-time faculty at four-year institutions who are not citizens of the United States varies by racial/ethnic group, ranging from 4% of Whites and 8% of African Americans to 22% of Hispanics and 43% of Asians.

FINDINGS

Characteristics of Faculty of Different Cohorts

The descriptive analyses reveal that the representation of women is higher among full-time faculty with lower rank and less experience than among full-time faculty with higher rank and more experience. Table 2 shows that about half (48%) of all assistant professors with one or two years of experience are women, compared with only 39% of assistant professors with three to six years of experience, 28% of associate professors with seven to 20 years

of experience, 17% of full professors with 13 to 20 years of experience, and just 10% of full professors with more than 20 years of experience.

America's college and university faculty are also somewhat more racially and ethnically diverse at the lower academic ranks and experience levels. Table 2 shows that the representation of African American women is about twice as great among assistant professors with fewer than seven years of experience than among full professors with more than 20 years of experience (about 7% vs. 3.4%). About 1.9% of women and 3.4% of men new assistant professors are Hispanic, compared with only 1.1% of women and 1.1% of men full professors with more than 20 years of experience. Faculty who are not U.S. citizens represent a substantially higher share of male than female faculty among both new assistant professors (16.7% vs. 5.6%) and assistant professors with three to six years of experience (22.9% vs. 5.9%). Only 2.2% of men and 1.1% of women full professors with more than 20 years of experience are not U.S. citizens. While Asian American women represent a higher share of assistant professors with fewer than seven years' experience than of full professors with more than 20 years of experience (2.8% vs. 1.1%), Asian American men apparently represent a smaller share of assistant professors (about 1%) than of full professors with 13 to 20 years of experience (5.1%) and full professors with more than 20 years of experience (3.5%).

The descriptive data in Table 2 also show that women have generally accumulated lower levels of human capital than men of the same rank/experience cohort. In most cohorts, a higher proportion of women faculty than men hold less than a doctoral or professional degree. Smaller proportions of women than men held a teaching or research assistantship during graduate school. Women also appear to be less mobile than men, particularly among the most junior (i.e., new assistant professors) and the most senior (i.e., full professors with more than 20 years of experience) faculty, as evidenced by the higher proportion of women in their first or only job since attaining their highest degree.

The descriptive analyses also show that research productivity is lower for women than men of the same rank and level of experience. Compared to men, women have fewer refereed publications over the course of their careers after controlling for academic field and institutional type, spend less time on research relative to teaching, and are less likely to be the principal or coprincipal investigator on at least one funded research project. Regardless of cohort, women seem more likely than men to spend at least some time on service.

In terms of structural characteristics, women appear to be relatively underrepresented among faculty at research universities and relatively overrepresented among faculty at comprehensive institutions after controlling for rank and experience. One exception is that similar proportions of women

TABLE 2
CHARACTERISTICS OF MEN AND WOMEN FULL-TIME FACULTY AT FOUR-YEAR INSTITUTIONS
BY RANK AND EXPERIENCE COHORT: FALL 1992

Characteristic	Assistant 1-2 years		Assistant 3-6 years		Associate 7-12 years		Associate 13-20 years		Full professor 13-20 years		Full professor More than 20	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Adjusted weighted sample size	233	215	619	390	604	230	624	253	878	178	1,605	173
Sex distribution within cohort	52.0%	48.0%	61.3%	38.7%	72.4%	27.6%	71.2%	28.8%	83.1%	16.9%	90.3%	9.7%
Base salary - mean	\$40,259	\$36,517	\$44,465	\$36,655	\$49,198	\$44,836	\$49,821	\$43,254	\$62,056	\$55,881	\$63,550	\$55,731
RACE/ETHNICITY/CITIZENSHIP												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White	76.4	82.7	71.2	82.1	81.3	86.5	85.3	85.0	86.3	89.9	91.1	93.1
African American	2.6	6.5	2.9	6.9	3.1	5.7	3.5	5.9	3.2	6.2	1.9	3.4
Hispanic	3.4	1.9	1.6	2.1	1.8	1.7	1.0	1.6	1.7	0.6	1.1	1.1
Asian American	0.9	2.8	1.3	2.8	4.1	0.9	2.2	3.2	5.1	1.7	3.5	1.1
Non-US citizen	16.7	5.6	22.9	5.9	8.9	4.8	8.0	4.0	3.5	1.7	2.2	1.1
HIGHEST DEGREE												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Doctoral degree	64.7	56.7	73.1	64.8	76.9	76.4	74.0	73.9	81.3	77.0	83.9	87.3
Professional degree	20.6	11.2	12.3	9.5	14.4	8.3	14.7	7.1	14.9	16.9	9.1	4.6
Other	14.7	32.1	14.6	25.7	8.7	15.3	11.3	19.0	3.8	6.1	7.0	8.1
Teaching assistantship	60.9	57.2	62.7	57.7	59.6	58.9	59.4	51.4	59.0	44.9	56.6	46.2
Research assistantship	45.1	34.4	50.3	37.4	42.9	38.7	37.7	26.5	41.6	29.8	35.0	30.1
First/only job	23.2	30.7	27.1	26.7	19.1	25.7	29.8	30.4	35.8	39.3	45.3	55.5
Refereed publications (stdized)	0.605	0.497	0.689	0.589	0.830	0.815	0.827	0.803	0.981	0.867	0.951	0.928
Research/teaching tradeoff	-0.027	-0.289	0.321	-0.163	0.285	0.007	-0.011	-0.129	0.213	-0.064	0.093	-0.130
Principal investigator	30.9	16.3	42.4	30.5	43.7	26.8	33.5	31.6	37.8	24.7	32.1	24.7
Department chair	2.1	5.6	7.3	9.2	16.6	17.0	15.7	14.6	20.8	24.7	17.6	23.1

TABLE 2 (CONTINUED)

TEACHING LEVEL

Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Undergraduate	60.8	63.5	54.2	67.8	51.1	54.1	58.1	56.3	50.8	54.1	58.3	64.6	64.6
Both	25.8	12.5	26.6	15.4	22.5	19.3	19.7	24.6	23.2	20.0	20.3	22.4	22.4
Graduate	13.4	24.0	19.2	16.8	26.4	26.6	22.2	19.2	26.0	25.9	21.3	13.0	13.0

THESIS/DISSERTATION COMMITTEES

Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No committees	56.2	62.8	42.0	50.5	37.0	40.9	44.5	43.8	36.5	39.4	32.4	42.2	42.2
1 - 4 committees	28.3	24.2	30.9	28.5	28.2	26.5	19.6	28.1	30.2	27.5	31.3	24.3	24.3
5 or more committees	15.5	13.0	27.1	21.0	34.8	32.6	35.9	28.1	33.3	33.1	36.3	33.5	33.5

TIME ON SERVICE

Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No time	51.3	37.2	43.8	38.2	41.6	35.2	45.7	32.0	39.7	34.6	46.9	39.9	39.9
1% to 5%	26.1	34.0	29.9	32.1	28.8	30.9	25.6	33.2	31.0	31.3	27.5	34.7	34.7
6% to 10%	8.5	10.7	13.1	15.6	17.4	15.7	15.9	18.6	14.5	21.2	14.1	16.8	16.8
More than 10%	14.1	18.1	13.2	14.1	12.3	18.3	12.8	16.2	14.8	12.8	11.5	8.7	8.7

TIME ON ADMINISTRATION

Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No time	39.2	51.6	40.5	35.9	28.5	34.3	33.5	29.8	29.8	32.0	37.3	44.5	44.5
1% to 5%	26.3	17.7	20.5	22.3	19.5	16.1	16.3	13.8	16.0	9.6	18.0	12.7	12.7
6% to 20%	27.2	19.5	28.2	28.5	31.5	29.6	32.9	32.3	30.6	30.3	25.9	19.7	19.7
More than 20%	7.3	11.2	10.8	13.3	20.5	20.0	17.3	20.5	23.5	28.1	18.8	23.1	23.1

TABLE 2 (CONTINUED)

Characteristic	Assistant 1 - 2 years		Assistant 3 - 6 years		Associate 7 - 12 years		Associate 13 - 20 years		Full professor 13 - 20 years		Full professor More than 20	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
INSTITUTIONAL TYPE												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Research university	32.9	31.6	42.6	32.8	43.7	30.0	42.9	32.1	40.3	33.5	45.3	29.5
Doctoral university	24.4	16.7	20.2	20.3	15.1	17.8	18.4	18.3	19.8	16.2	15.2	10.4
Comprehensive	26.5	35.8	24.1	29.0	25.5	30.0	26.0	31.7	25.5	35.8	26.7	45.1
Private liberal arts	8.1	9.8	7.4	12.6	7.8	13.5	7.9	11.9	6.9	10.6	8.2	11.0
Other	8.1	6.0	5.7	5.4	7.9	8.7	4.8	6.0	7.5	3.9	4.7	4.0
TENURE STATUS												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tenured	3.9	2.8	2.9	3.3	78.3	78.4	83.8	83.3	91.5	94.9	96.8	92.5
Tenure track	83.7	75.5	83.7	79.9	13.4	13.4	7.2	7.9	3.6	1.1	1.4	3.4
Not tenure track	8.2	14.8	8.6	10.8	3.1	2.2	3.5	4.0	0.9	0.6	0.5	0.6
No tenure system	4.3	6.9	4.8	5.9	5.1	6.1	5.4	4.8	4.0	3.4	1.3	3.4
ACADEMIC FIELD												
Hard not soft	31.5	7.0	34.2	16.4	32.8	14.8	30.9	13.0	33.0	18.4	36.3	21.4
Pure not applied	32.2	31.2	37.3	38.2	33.3	43.5	39.4	36.8	44.8	44.4	54.8	50.3
Life systems orientation	36.5	49.3	37.7	46.9	36.8	54.3	42.8	52.6	36.1	50.0	37.4	53.8
PERCENT WOMEN IN FIELD												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Lowest quartile	47.0	14.0	39.5	17.2	33.0	13.9	30.0	10.7	35.6	12.9	32.8	14.5
2nd quartile	20.7	19.1	30.0	22.6	33.0	25.5	32.7	26.5	32.3	24.2	34.5	25.4
3rd quartile	18.5	27.0	18.5	26.5	21.1	19.5	20.0	18.6	19.4	25.8	17.6	17.3
Highest quartile	13.8	40.0	11.9	33.7	12.9	41.1	17.3	44.3	12.6	37.1	15.0	42.8

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF-93)

and men who are new assistant professors are working at research universities. The distribution of faculty by tenure status is similar for women and men of the same cohort except among new assistant professors, where a higher share of women than men are non tenure track (15% vs. 8%). A smaller proportion of women than men work in hard rather than soft academic fields, while a higher proportion of women than men work in fields with a life systems orientation. Women appear to be somewhat segregated by academic field, with about 40% of all women working in the 25% of academic fields with the highest representation of women. The segregation of men by academic field seems somewhat greater among assistant professors; nearly one-half (47%) of male new assistant professors, but only about one-third of male associate and full professors, work in the 25% of academic fields with the lowest representation of women.

The descriptive statistics also show that average salaries are higher for men than for women with the same rank and comparable levels of experience. Among women, average base salaries range from about \$36,500 for assistant professors, to about \$44,000 for associate professors, to about \$56,000 for full professors. Among men, average base salaries range from about \$40,000 for new assistant professors, to about \$49,000 for associate professors, to about \$62,000 for full professors.

Relationship between Sex and Faculty Salaries

Overall, these data show that women full-time faculty at four-year institutions receive institutional base salaries that are about 26% lower than the base salaries men receive as full-time faculty at four-year institutions. Table 3 shows that the overall male-female salary differential is reduced to 13% when differences in human capital are taken into account. Controlling also for differences in productivity and structural characteristics further reduces the male-female salary gap to 8%. This finding is consistent with the 8% to 10% sex difference found by Toutkoushian (1998a), who used the same database but focused more specifically on the effects of race and marital status on faculty salaries.

Experience is clearly an important predictor of the base salaries that full-time faculty receive. Table 4 shows that, among full-time faculty overall, base salaries increase with experience but at a decreasing rate. To further understand sex differences in base salaries among faculty with the same academic rank and similar levels of experience, I conducted separate regression analyses for each of the six rank/experience cohorts.

Table 3 shows that disaggregating faculty into rank/experience cohorts substantially reduces the magnitude of the observed sex difference in faculty salaries. While female faculty overall average salaries 26% lower than those of male faculty, the observed male-female salary gap is only about 9-10% among assistant professors with one to two years of experience, asso-

TABLE 3
MALE-FEMALE DIFFERENTIAL IN BASE SALARIES ASSOCIATED
WITH ADDING BLOCKS OF VARIABLES TO THE MODEL FOR FACULTY¹
OF DIFFERENT RANK AND EXPERIENCE COHORTS

(unstandardized regression coefficients)

<i>Variables Controlled</i>	<i>Total</i>	<i>Assistant 1 – 2 years</i>	<i>Assistant 3 – 6 years</i>	<i>Associate 7 – 12 years</i>	<i>Associate 13 – 20 years</i>	<i>Full professor 13 – 20 years</i>	<i>Full professor More than 20</i>
UNSTANDARDIZED REGRESSION COEFFICIENTS							
Sex	-0.263***	-0.104**	-0.169***	-0.094***	-0.128***	-0.092**	-0.122***
+ Race/ethnicity & citizenship	-0.261***	-0.109**	-0.166***	-0.092***	-0.125***	-0.087**	-0.120***
+ Human capital investment	-0.134***	-0.083**	-0.137***	-0.066**	-0.096***	-0.089**	-0.098***
+ Productivity	-0.109***	-0.068*	-0.106***	-0.052*	-0.103***	-0.042	-0.081***
+ Structural characteristics	-0.081***	-0.033	-0.081***	-0.014	-0.087***	-0.029	-0.058**
CHANGE IN R²							
Sex	0.096***	0.026**	0.068***	0.018***	0.038**	0.010**	0.013***
+ Race/ethnicity & citizenship	0.006***	0.024	0.014*	0.004	0.011	0.010	0.002
+ Human capital investment	0.240***	0.160***	0.196***	0.124***	0.100***	0.064***	0.125***
+ Productivity	0.120***	0.107***	0.130***	0.162***	0.114***	0.181***	0.201***
+ Structural characteristics	0.066***	0.121***	0.138***	0.145***	0.099***	0.127***	0.078***

¹ Sample is limited to individuals with faculty status, who are employed full-time at four-year institutions with regular appointments and at least some instructional duties, whose principal activity is teaching, research, or administration, and who have at least a nine-month appointment.
Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF-93)

ciate professors with seven to 12 years of experience, and full professors with 13 to 20 years of experience. The largest observed sex difference in base salaries is among assistant professors with three to six years of experience (17%).

Controlling for differences in human capital investment, productivity, and structural characteristics reduces the observed sex difference in salaries regardless of rank/experience cohort. In fact, among new assistant professors, associate professors with seven to 12 years of experience, and full professors with 13 to 20 years of experience, the observed difference in the salaries of women and men faculty is eliminated when sex differences in human capital investment, productivity, and structural characteristics are taken into account. For assistant professors with three to six years of experience, associate professors with 13 to 20 years of experience, and full professors with more than 20 years of experience, however, sex differences in human capital, productivity, and structural characteristics only partially explain the observed sex differences in salaries. Table 3 shows that, even after controlling for other variables, average salaries are 8% lower for women than for men assistant professors with three to six years of experience, 9% lower for associate professors with 13 to 20 years of experience, and 6% lower for full professors with more than 20 years of experience.

The relationship between race/ethnicity and base salaries varies across the six cohorts but does not appear to follow a pattern. Table 4 shows that, among assistant professors with three to six years of experience, base salaries are about 11% higher for Asian Americans than for other faculty even after controlling for other differences. Hispanics appear to fare worse among associate professors with seven to 12 years of experience (with 18% lower salaries) and better among full professors with more than 20 years of experience (with 13% higher salaries) than their counterparts of other racial/ethnic groups.

Disaggregating faculty by rank and experience reveals not only that the male-female salary gap varies based on academic rank and level of experience but also that the salary determination process varies across the six groups. Table 4 suggests that the salary determination process is relatively less predictable among associate professors with 13 to 20 years of experience (adjusted $R^2 = 0.33$) and relatively more predictable among assistant professors with three to six years of experience (adjusted $R^2 = 0.52$) than among the other rank/experience cohorts. A comparison of the change in R^2 statistics in Table 3 suggests that measures of human capital are relatively more important determinants of faculty salaries for assistant professors, while measures of productivity are relatively more important for full professors.

Because the magnitude of the unstandardized regression coefficients for women declines when human capital variables are added to the model

TABLE 4

PREDICTORS OF BASE SALARIES AMONG FULL-TIME FACULTY¹ AT FOUR-YEAR INSTITUTIONS IN DIFFERENT RANK AND EXPERIENCE COHORTS: FALL 1992
(unstandardized regression coefficients)²

<i>Independent Variables</i>	<i>Assistant 1-2 years</i>	<i>Assistant 3-6 years</i>	<i>Associate 7-12 years</i>	<i>Associate 13-20 years</i>	<i>Full professor 13-20 years</i>	<i>Full professor More than 20</i>
<i>Total</i>	-0.081***	-0.081***	-0.014	-0.086***	-0.029	-0.058**
Female	0.019	-0.006	0.012	0.045	-0.049	0.003
African American	0.002	-0.020	-0.182**	0.070	-0.026	0.130*
Hispanic American	0.140	0.106*	-0.032	0.088	-0.053	-0.001
Asian American	0.121	-0.139	-0.127	-0.177	-0.151	-0.004
American Indian	-0.037	0.026	-0.057	0.048	0.083	-0.043
Non-US citizen	0.083*	0.010	0.100**	0.050	-0.058	0.147***
Doctoral degree	0.250***	0.231***	0.194***	0.162***	0.047	0.251***
Professional degree	-0.045	-0.008	-0.032	0.021	0.008	0.030*
Teaching assistantship	-0.039	-0.015	0.010	0.004	-0.005	0.012
Research assistantship	0.109***					
Experience, squared	-0.019***					
First/only job	0.040	0.036*	-0.003	0.053**	0.041*	-0.050***
Refereed publications (stndized)	0.289*	0.022	0.042	0.052	0.076	-0.127**
Refereed publications, squared	-0.240*	0.043	0.036	-0.013	0.011	0.144***
PI or co-PI for any grants	0.120**	0.035*	0.002	0.087***	0.016	0.043**
Research/teaching tradeoff	0.046*	0.024**	0.046***	0.014	0.061***	0.052***
Teach only grad students	0.001	0.018	0.071**	0.093***	0.109***	0.036
Teach only undergraduates	-0.061	-0.088***	0.031	-0.004	-0.046	-0.043**
Serve on 1-4 committees	0.022	-0.015	-0.009	-0.009	-0.018	-0.044**
Serve on 5+ committees	-0.077	-0.054*	-0.004	-0.048*	-0.071**	-0.042*
1% to 10% of time on service	-0.013	0.006	-0.068**	-0.032	-0.012	0.021
More than 10% time service	0.040	0.039	0.008	-0.030	-0.041	0.038
1% to 10% time administration	0.029	-0.010	0.020	0.012	0.025	0.038**

TABLE 4 (CONT.)

<i>Independent variables</i>	<i>Assistant 1 – 2 years</i>	<i>Assistant 3 – 6 years</i>	<i>Associate 7 – 12 years</i>	<i>Associate 13 – 20 years</i>	<i>Full professor 13 – 20 years</i>	<i>Full professor More than 20</i>
<i>Total</i>	0.104***	0.103***	0.097**	0.075**	0.099**	0.065**
More than 10% time admin.	-0.067	0.016	-0.008	-0.004	-0.015	0.034
Department chair	0.009	0.139***	0.159***	0.165***	0.167***	0.162***
Research university	0.002	0.140***	0.176***	0.104*	0.123**	0.079*
Doctoral university	0.043	0.036	0.032	0.051	0.032	0.042
Comprehensive college	-0.008	-0.025	0.034	-0.043	-0.072	0.027
Private liberal arts	-0.060	-0.054**	0.036	-0.048*	-0.048	0.026
Public	-0.019*	-0.017	-0.019	0.021	0.015	0.006
Unionized	0.002	-0.017	-0.005	-0.024	-0.014	-0.044
Tenure track	0.052	-0.083	0.182**	0.044	0.065	-0.045
Not tenure track	0.075	-0.112*	0.014	-0.077	-0.286***	0.022
No tenure system	0.088	-0.114*	-0.010	-0.033	0.018	0.008
Hard field	-0.042	-0.017	-0.163***	-0.117***	-0.102***	-0.085***
Pure field	-0.193***	-0.155***	0.061**	0.041	0.040	0.001
Life systems field	-0.014	0.029	-0.029	0.014	-0.081	-0.076*
Unknown field	-0.128*	-0.086*	0.157***	0.095**	0.081*	0.100***
Lowest quartile women in field	0.211***	0.128***	0.128***	0.115***	0.020	0.070**
2nd quartile women in field	0.192***	0.130***	0.006	-0.063*	-0.028	0.048*
3rd quartile women in field	0.057	0.009	0.101***	0.070**	0.088**	0.135***
East	0.010	0.112***	-0.017	0.021	0.019	0.009
Midwest	-0.006	-0.022	0.071*	0.070*	0.161***	0.090***
West & US service schools	0.012	0.110***				
Cases in the analyses	423	993	811	861	1,024	1,735
R ²	0.438	0.543	0.452	0.363	0.392	0.418
Adjusted R ²	0.374	0.523	0.422	0.329	0.365	0.403

¹The sample is limited to individuals with faculty status, who are employed full-time at four-year institutions with regular appointments and at least some instructional duties, whose principal activity is teaching, research, or administration, and who have at least a nine-month appointment.

²Standard errors available from the author upon request.

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF-93)

among all faculty except full professors with 13 to 20 years of experience (Table 3), the analyses suggest that sex differences in human capital investment are one source of the observed sex differences in salaries except among full professors with 13 to 20 years of experience. Table 4 shows that, except among full professors with 13 to 20 years of experience, faculty who hold first-professional degrees (e.g., MBA, M.D., J.D.) receive substantially higher salaries than faculty who have earned less than a doctorate. Holding the first or only job since receiving the highest degree, the best available measure of mobility, is associated with higher salaries for assistant professors with three to six years of experience and associate and full professors with 13 to 20 years of experience, but lower salaries for full professors with more than 20 years of experience.

Except among associate professors with 13 to 20 years of experience, sex differences in productivity are another source of the observed male-female salary gap, as shown by the decline in the unstandardized regression coefficients for women when productivity variables are added to the model. (See Table 3.) Table 4 shows that, among new assistant professors but not among faculty of other rank/experience cohorts, base salaries increase at a decreasing rate as the number of refereed publications increases over the career, relative to the average number of publications for others in the same academic field and type of institution. Contrary to expectations, salaries appear to decline at an increasing rate with each additional publication among full professors with more than 20 years of experience. Faculty who serve as the principal or coprincipal investigator on at least one funded research project average higher salaries, except among associate professors with seven to 12 years of experience and full professors with 13 to 20 years of experience. Spending more time on research relative to teaching is associated with higher salaries, net of other differences, except among associate professors with 13 to 20 years of experience. Teaching only undergraduates is associated with lower salaries among assistant professors with three to six years of experience and full professors with more than 20 years of experience, while teaching only graduate students is associated with higher salaries among associate professors with seven to 20 years of experience and full professors with 13 to 20 years of experience. After controlling for other variables, serving on five or more thesis or dissertation committees is associated with lower base salaries among all cohorts except new assistant professors and associate professors with seven to 12 years of experience. Spending more than 10% of time on administration is associated with higher salaries for all but new assistant professors.

Sex differences in structural characteristics also contribute to the observed gap in salaries for men and women faculty, as indicated by the further reduction in the unstandardized regression coefficients for women when structural characteristics are added to the model. (See Table 3.) Table 4 shows

that working at a research or doctoral university is associated with higher salaries, net of other differences, among all cohorts except new assistant professors. After controlling for other variables, non-tenure-track faculty earn lower salaries among assistant professors with three to six years of experience but higher salaries among associate professors with seven to 12 years of experience. Faculty who work in pure academic fields average lower salaries than their counterparts in applied academic fields regardless of rank/experience cohort. Among all six rank/experience cohorts, average salaries are higher for faculty who work in the academic fields with the smallest proportion of women than for faculty who work in the academic fields with the highest proportion of women even after taking into account differences in human capital, productivity, and structural characteristics.

DISCUSSION

Disaggregating faculty into cohorts based on their academic rank and level of experience reveals an interesting pattern of sex differences in faculty salaries. Among the “younger” faculty at each of the three ranks, the lower salaries for women appear to be entirely attributed to other differences between women and men faculty, particularly their levels of human capital investment, their levels of research productivity, and their relative representation in particular types of institutions and academic fields. Among the “older” faculty at each rank, however, salaries are lower for women only in part because women have fewer of the attributes and characteristics associated with higher salaries. The unexplained sex differences range from 6% among full professors with more than 20 years of experience, to 8% among assistant professors with three to six years of experience, to 9% among associate professors with 13 to 20 years of experience.

One interpretation of this pattern of sex differences is that the more experienced women at each academic rank are averaging lower salaries than their male counterparts because these women started their careers at times characterized by greater levels of sex inequality. This interpretation suggests that the absence of unexplained sex differences in salaries among the “younger” faculty at each academic rank is a sign of progress. This interpretation appears to be consistent with some prior research. For example, Toutkoushian (1998b), using data from the NSOPF-93 and its predecessor, the NSOPF-88, compared the unexplained sex differences in salaries for faculty in three artificial age cohorts at two points in time. After controlling for education, experience, publications, institutional characteristics, and academic field, Toutkoushian found a smaller male-female salary gap among “younger” than “older” faculty in fall 1992 and found no evidence that the magnitude of the unexplained sex differences in salaries increases as faculty age.

A second interpretation of the pattern of sex differences found in this study suggests that hiring and promotion are associated with an "equalization" of salaries between women and men faculty but that unexplained sex differences creep into the process in the years following hiring and promotion. Perhaps salaries are more equitable among the "younger" women and men faculty at each of the three ranks because hiring and promotion decisions involve a rigorous assessment of an individual's qualifications. Such an assessment likely involves comparing a faculty member's education, experience, and productivity with other faculty members in the same academic field and type of institution. These comparisons may involve identifying a peer group that is used not only for making a hiring or promotion decision but also for determining the appropriate salary. Because annual salary increases are generally based on a much less rigorous assessment of an individual's qualifications and performance, the likelihood that nonlegitimate criteria influence the annual salary determination process increases with the number of years following a hiring or promotion decision.

The absence of a longitudinal database tracking the salaries and experiences of the same faculty over time limits our ability to determine which of these two interpretations is correct. Support for the first interpretation is weakened by the design of this study, however, since two of the six cohorts had comparable levels of experience: associate professors with 13 to 20 years of experience and full professors with 13 to 20 years of experience. If more experienced women at each academic rank were averaging lower salaries than their male counterparts because these women had started their careers at times characterized by sex inequality, then we would expect the unexplained salary gap to be similar for faculty with comparable levels of experience regardless of academic rank. However, the analyses presented in this study showed unexplained sex differences in faculty salaries among associate professors with 13 to 20 years of experience but not among full professors with the same number of years of experience.

Regardless of which interpretation is correct, several conclusions may be drawn from this study. First, controlling for human capital, productivity, and structural characteristics eliminates the observed male-female gap in salaries among new assistant professors, suggesting that the commonly found sex difference in faculty salaries (e.g., Barbezat, 1988; Bellas, 1993; Broder, 1993; Konrad & Pfeffer, 1990; Langton & Pfeffer, 1994; Nettles, Perna, & Bradburn, 2000; Toutkoushian, 1998a, 1998b; Weiler, 1990) is not attributable to sex differences in starting salaries. Nonetheless, women's lower salaries among the "older" faculty at each of the three ranks (even with periodic "corrections") is problematic, given the annuity feature of faculty salaries. As Hearn (1999) has noted, every year of inequity contributes to a lower

total accumulation over the course of the career of such indicators of financial security as savings, contributions to pension funds, interest accumulations to pension funds, institutional matching contributions to pension funds, and retirement benefits. Given the possibility that women are receiving lower annual salary increases than their male counterparts (as suggested by the second interpretation) and the financial consequences of horizontal inequity, individual colleges and universities should use the findings from this study to critically review their own policies and procedures for determining annual salary increases to ensure that they reflect only legitimate criteria (e.g., human capital, productivity, and structural characteristics).

The results of this study also illustrate the benefits of considering variations in the salary determination process across different groups of faculty. While Toutkoushian (1998b) showed that the unexplained male-female gap in faculty salaries varies across different types of four-year institutions, academic fields, and age cohorts, this study found that the unexplained sex difference varies across groups defined by academic rank and level of experience. The results of this study also suggest that the salary determination process varies across different rank/experience cohorts. For example, this study showed not only that human capital, productivity, and structural characteristics are important predictors of salaries and important sources of sex differences in salaries, but also that the relative contribution of human capital, productivity, and structural characteristics to faculty salaries varies among faculty with different levels of academic rank and experience. Although defining cohorts based on academic rank ignores prior research showing that women faculty hold lower ranks than men faculty, even after taking into account differences in such variables as educational attainment, experience, productivity, institutional characteristics, and academic discipline (e.g., Marshall & Perucci, 1982; Weiler, 1990; Smart, 1991; Broder, 1993; Toutkoushian, 1999), defining cohorts based on rank controls for the "bumps" in salary profiles that are likely to occur after promotion and allows for a more in-depth examination of the experiences of women and men faculty of the same rank.

Finally, the descriptive analyses suggest that substantial progress has been made in increasing the representation of women among full-time faculty. About half of new full-time assistant professors at four-year institutions are women, compared with only 10% of full-time full professors with more than 20 years of experience. Because these data are from a cross-sectional rather than a longitudinal database, however, the extent to which the greater representation of women at the lower ranks is due to greater success in recruiting women faculty rather than to slower rates of promotion for women is unclear. The finding that a higher proportion of women who are new assistant professors have non-tenure-track status may also be a cause for concern, given that many non-tenure-track faculty may be considered

marginal “in the sense that they hope for full integration into academe” (Bowen & Schuster, 1986, p. 65) and because they represent a lower rung on the hierarchy of academic labor markets (Youn, 1992). Moreover, the descriptive analyses suggest that substantially less progress has been made in correcting the severe underrepresentation of African Americans and Hispanics among full-time faculty.

IMPLICATIONS

This study has several implications for those interested in eliminating observed sex differences in faculty salaries. First, if the critical review of sex differences in faculty salaries on individual campuses already suggested shows that some portion of those differences cannot be explained by legitimate criteria, then the institution should search for sources of the unexplained differences. In this study, a possible explanation for unexplained sex difference in salaries among “older” faculty at each of the three ranks is that women’s lower salaries reflect differences between women and men in variables that are related to salaries but omitted from the model.

A second possible source of unexplained sex differences in faculty salaries may be related to the use of practices that are unrelated to merit, achievement, or supply and demand. In this study, part of the unexplained gap in the salaries of the “older” women and men faculty at each rank may be attributable to a greater tendency of men than women to solicit employment offers from another college or university, a practice that was associated with higher faculty salaries at one research university (Kasten, 1984). West (1995) argued that women may be disadvantaged by this practice if they are less geographically mobile than men or if they are less comfortable than men with this type of behavior. My findings suggest that mobility is associated with a salary “penalty” for associate professors and full professors with 13 to 20 years of experience but a salary “premium” for the most senior faculty. While women are less mobile than men regardless of rank and experience, the greatest male-female gap in mobility appears among the most senior faculty—full professors with more than 20 years of experience.

Eliminating observed sex differences in faculty salaries also requires attention to sex differences in the variables that determine faculty salaries. One source of male advantage is the relationship between productivity and faculty salaries. Like other research (Fairweather, 1993, 1995), this study shows that the salary premiums associated with research are greater than those associated with other activities regardless of rank/experience cohort. After controlling for other variables, faculty who spend more time on research relative to teaching and who are the principal or coprincipal investigator on at least one funded research project generally receive higher base

salaries than other faculty. But regardless of rank or experience, women spend less time on research relative to teaching and are less likely to be principal or coprincipal investigators on at least one funded research project. Therefore, if an individual college or university concludes that research performance is an appropriate criterion to emphasize in the salary determination process, then the institution must ensure that all faculty have equal access to the experiences and opportunities that promote research productivity. These factors include time available for research, teaching load, teaching level, support available for securing funded research projects, advising and service responsibilities, and support available to facilitate completion of the doctoral degree. Institutions must eliminate external barriers to research productivity, including a lack of graduate assistants and inadequate work space, and ensure that faculty members acquire effective research behaviors so that time spent on research more readily translates into valued research products.

A second way in which the salary determination process apparently favors men over women pertains to the premiums associated with working at different types of institutions and academic fields. The regression analyses reveal that, except among new assistant professors, faculty at research and doctoral universities receive higher salaries than faculty at other types of institutions holding constant other variables. Nonetheless, the descriptive analyses show that, except among new assistant professors, women are relatively underrepresented among faculty employed at research universities. The regression analyses also suggest that salaries are higher, on average, for faculty who work in fields with the smallest proportions of women. These findings support the conclusion of others (e.g., Smart, 1991) that women continue to be concentrated in the types of work roles (e.g., nonresearch), institutions, and academic fields that have lower prestige and value. Therefore, these analyses suggest that, to close the overall observed sex gap in faculty salaries, institutions must make greater efforts to increase the number of women faculty who are doing the most "valued" types of work and who are employed at the nation's most "valued" institutions, in the most "valued" academic fields. While research universities should certainly be able to take action to increase their own representation of women, efforts to increase the representation of women in the most "valued" academic fields will likely need to begin much earlier in the educational pipeline.

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