SEX DIFFERENCES IN THE SUPPLEMENTAL EARNINGS OF COLLEGE AND UNIVERSITY FACULTY

Laura Walter Perna

....
....

Data from the 1993 National Study of Postsecondary Faculty are used to examine the characteristics of faculty who supplement their base institutional salaries with various other types of income, as well as the extent to which the likelihood of receiving various types of supplemental income, and the amount of various types of supplemental income received, vary between women and men after controlling for differences in human capital and structural characteristics. Descriptive, logistic regression, and ordinary least squares regression analyses are used to address the research questions.

....
....

KEY WORDS: faculty; sex differences; supplemental earnings; consulting.

Prior research has consistently shown that women faculty receive lower salaries than their male counterparts even after controlling for differences in education, experience, productivity, institutional characteristics, and academic discipline (e.g., Barbezat, 1988; Bellas, 1993; Nettles, Perna, Bradburn, and Zimbler, 2000; Toutkoushian, 1998; Weiler, 1990). Most examinations of sex differences in faculty salaries focus on the base salary received from the institution. While institutional base salary is an appropriate dependent variable for exploring the extent to which women and men faculty are compensated equally by their institutions for satisfying core responsibilities, institutional base salary is only one part of the total package of compensation that most faculty receive. In addition to such nonmonetary benefits as membership in the academic community, tenure, flexibility in the use of time, long vacations, subsidized sabbatical leaves, and access to college facilities and resources (Bowen and Schuster, 1986; Dillon and Marsh, 1981), many faculty also receive other monetary benefits including supplemental pay from their institution for special services rendered (e.g., sum-

Laura W. Perna, is an assistant professor of higher education in the Department of Education Policy and Leadership at the University of Maryland at College Park.

Address correspondence to: Laura Walter Perna, Ph.D., 2200 Benjamin Building, College Park, MD 20742; lperna@wam.umd.edu.

mer teaching) and supplemental pay from noninstitutional sources for consulting and other services (Bowen & Schuster, 1986).

The majority of faculty appear to receive supplemental earnings (Boyer and Lewis, 1985a; Kirschstein, Matheson, and Jing, 1997). In fall 1992, about one half (52%) of full-time faculty at 2-year and 4-year institutions received supplemental income from their institutions, one fourth (23%) received consulting income, and nearly one half (44%) received other outside income (Kirschstein et al., 1997). Despite the prevalence of supplemental earnings, however, little is known about the extent to which women and men full-time faculty receive comparable types and amounts of supplemental earnings. If women are less likely than men to receive supplemental earnings and/or if women tend to receive smaller amounts of these earnings than men, then the well-documented sex differences in base institutional salaries are only magnified. In an effort to improve our understanding of sex differences in the financial welfare of the nation's college and university faculty, this study explores differences in the types and amounts of supplemental earnings received by women and men faculty at different types of institutions and in different academic fields.

THEORETICAL FRAMEWORK

Some researchers (Boyer and Lewis, 1984, 1985a, 1985b; Marsh and Dillon, 1980) have explored the correlates of supplemental earnings. For example, among full-time faculty at 4-year institutions in 1975, Marsh and Dillon found that, after controlling for academic rank, institutional type, academic field, and academic contract length, the amount of supplemental income received and the likelihood of receiving various sources of supplemental income were positively related to research productivity, unrelated to institutional service, and negatively related to teaching. Using data from the 1981 Survey of Doctorate Recipients and controlling for other variables, Boyer and Lewis found that faculty who consult tend to be full professors, work at a university rather than a 4-year college, teach in science and engineering fields, earn higher salaries, and devote at least the same amount of time to research as other faculty. Descriptive analyses of the 1993 National Study of Postsecondary Faculty suggest that the percent of faculty receiving supplemental earnings varies by institutional type, with supplemental income from the institution appearing to be relatively more common among full-time faculty at private comprehensive and public 2-year institutions and relatively less common among full-time faculty at research universities. Consulting income appears to be relatively more common among faculty at research universities and relatively less common among faculty at private liberal arts and public 2-year institutions (Kirschstein et al., 1997). The likelihood of receiving supplemental income also appears to vary by academic field, as descriptive analyses of full-time faculty at 4-year institutions suggest that supplemental income

from the institution is relatively more common in business and education and consulting income is relatively more common in engineering (Kirschstein et al., 1997).

Based on their comprehensive review and synthesis of prior research, Boyer and Lewis (1985a) concluded that most research on faculty consulting has been conducted in the absence of a conceptual framework. The present study draws on two theoretical perspectives to explore sex differences in the supplemental earnings of college and university faculty: human capital and structural. Human capital theory focuses on the characteristics of individual workers, while structural approaches emphasize the attributes of the organizations with which individuals are connected (Youn, 1988).

According to the economic theory of human capital, employment outcomes are 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 (DeYoung, 1989; Dreijmanis, 1991; England, 1982). 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 adequately 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 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: segmentation by academic discipline, segmentation by institutionalized job task (e.g., primarily research, primarily teaching), and segmentation by job status (e.g., full time or part time). Movement across segments (e.g., from mathematics to English, from a 2-year institution to a research university, from part-time to full-time) is restricted.

Because competition among faculty in different segments is limited, differences among faculty in different segments may persist.

RESEARCH METHOD

Because research supports the use of both perspectives (Perna, 2001; Smart, 1991), this study draws upon human capital and structural approaches to academic labor markets to explore the following research questions:

1. To what extent are women and men college and university faculty supplementing their base institutional salaries with various other types of income?
2. How does the tendency to supplement the base institutional salary with other types of income vary between women and men faculty after controlling for differences in human capital and structural characteristics? How do sex differences in the likelihood of receiving various types of supplemental earnings vary by institutional type and academic field after controlling for other variables?
3. How does the amount of various types of supplemental earnings that are received vary between women and men faculty after controlling for differences in human capital and structural characteristics? How do sex differences in the amount of various types of supplemental earnings that are received vary by institutional type and academic field after controlling for other variables?
4. How do the predictors of receiving various types of supplemental earnings vary between women and men faculty?
5. How do sex differences in the financial welfare (as measured by total earnings) of faculty compare with sex differences in institutional base salaries?

Data and Sample

The 1993 National Study of Postsecondary Faculty (NSOPF:93) is used to address the 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 who were employed by public and private nonproprietary higher education institutions in fall 1992. The sample used in these analyses is limited to individuals with faculty status, who were employed full time at 4-year and 2-year institutions with a regular appointment and some instructional duties, whose principal activity was teaching, research, or administration, and who had at least a 9-month appointment. The NSOPF:93 weight (WEIGHT) is appropriate for approximating the population of faculty and correcting for the nonsimple random sample design. To minimize the influence of large sample sizes on standard errors, each

case is weighted by the NSOPF:93 weight divided by the average weight for the sample. The adjusted weighted sample used in these analyses numbers 13,359, representing 420,911 faculty nationwide.

Dependent Variables

In addition to institutional base salary, the NSOPF:93 includes a number of variables describing the institutional and external sources of earnings received by college and university faculty. As part of the NSOPF:93 data collection, faculty were asked to report the amount of annual earnings received from each of four institutional sources of supplemental compensation: other teaching not in base salary; supplements not in base salary; nonmonetary compensation from the institution; and other income from the institution. Faculty were also asked to report the amount of annual earnings from each of nine external sources of supplemental earnings: employment at another academic institution; legal and medical services or counseling; outside consulting and freelance work; self-owned business other than consulting; performances and exhibitions; speaking fees and honoraria; royalties and commissions; any other employment; and any other nonmonetary compensation.

Drawing on the discussion of supplemental earnings presented by Bowen and Schuster (1986), the thirteen categories of supplemental earnings are aggregated into the following five: (1) total supplemental earnings from all 13 sources; (2) total supplemental earnings from the four institutional sources; (3) supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria; (4) supplemental earnings from private consulting; and (5) supplemental earnings from employment at another academic or nonacademic institution. Bowen and Schuster suggested that the third category of supplemental earnings (royalties and commissions, performances and exhibitions, and speaking fees and honoraria) describes activities that are ultimately related to teaching. Although Bowen and Schuster included temporary teaching at another institution in this category, in the present study teaching at another institution is included in the fifth category, other employment, because of the difficulty associated with separating temporary from long-term teaching at another institution. The fourth category, private consulting, includes supplemental earnings from legal and medical services and counseling, other consulting and freelance work, and a self-owned business.

Independent Variables

Supplemental earnings are expected to be determined by measures of human capital and structural characteristics. The level of human capital investment is reflected by the quantity and quality of education attained, the amount of on-

the-job training, and geographic mobility (Becker, 1962; Schultz, 1961). In this study, the level of investment in formal education is measured by whether the highest degree is a doctoral degree, first-professional degree, or less than a doctoral or first-professional degree (reference category). Whether the individual holds the first or only job since earning the highest degree is the best available proxy for mobility.

One measure of on-the-job training is experience. Factor analysis is used to construct a more parsimonious, and less redundant, measure of experience using four variables in the NSOPF:93 database: age, number of years since receiving the highest degree, number of years in the current position, and number of years at the current rank. Factor analysis assumes that the observed correlations among these variables, which range from 0.57 to 0.72, are attributable to an underlying common factor (e.g., experience) rather than to one variable being the cause of another (Kim and Mueller, 1978). The alpha reliability coefficient for this factor is 0.86. Because prior research has shown that earnings increase with experience but at a decreasing rate (Becker, 1962; Fairweather, 1995; Perna, 2001), experience, squared is also included in the analyses.

Human capital investment is also reflected by productivity. One measure of research productivity is the cumulative number of refereed publications over the course of the career, standardized by academic field and institutional type. Following the example of Fairweather (1993), the cumulative number of refereed publications is the sum of the number of articles in refereed journals, books, book reviews, chapters in edited books, and monographs. By standardizing the sum by academic field and institutional type, the number of refereed publications is measured relative to the average number of refereed publications for faculty who work in the same academic field and Carnegie classification of institution. Other measures of research productivity are whether the faculty member serves as a principal or co-principal investigator on at least one funded research project and the percent of time spent on research and research-related activities.

Although several observers (e.g., Bowen and Schuster, 1986; Glassick, Huber, and Maeroff, 1997; Hansen, 1988) have concluded that faculty reward systems emphasize research over other activities, teaching, service, and administration may also be related to supplemental earnings. Teaching productivity is measured by the percent of time spent on teaching and teaching-related activities and the level of students taught. Teaching level reflects whether an individual teaches only graduate students or only undergraduates relative to teaching both undergraduate and graduate students. Service and administrative productivity are measured by the percent of time allocated to each of these activities. Chairing the department is an additional measure of administrative productivity.

One limitation of the NSOPF:93 is the absence of variables reflecting a faculty member's preference, taste, or motivation for various types of supplemental earnings. Therefore, this research uses two proxies: family responsibilities and base institutional salary. According to human capital theory, family responsibili-

ties, responsibilities that are borne primarily by women, may influence the level of investment in human capital, continuity of labor force participation, types of employment sought, and level of job commitment (Becker, 1985; Polachek, 1977). This study controls for the possible interaction between marital and parental status by including the dichotomous variables married with dependent children, married with no dependent children, and not married with dependent children. Being unmarried with no dependent children is the reference category. Base institutional salary is assumed to be a measure of economic preference, taste, or motivation for supplemental earnings. About 3 percent of the cases ($n = 346$) have "extreme" base institutional salaries, defined as less than $12,000 or more than $175,000; these values have been recoded as missing.

Structural approaches to academic labor markets posit that structural or institutional characteristics constrain employment experiences. One structural attribute is whether a faculty member holds an 11- or 12-month contract rather than a 9- or 10-month contract. The Carnegie classification of the institution at which the faculty member works is used to control for such structural characteristics as institutional resources, size, and mission. The categories included in the analyses are: research university, doctoral university, private liberal arts college, public 2-year institution, and other institution (e.g., private 2-year, specialized). Comprehensive institution is the reference category. Institutional control (public or private) and institutional race (predominantly Black college or university, yes or no) are additional measures of institutional resources.[1] A dichotomous variable reflecting unionization is also included since unionization has been shown to be associated with both higher wages and a smaller African American-White salary gap (Ashraf, 1994).

Academic discipline is another structural characteristic. Prior research has shown that faculty reward systems vary by academic discipline (e.g., Marshall and Perrucci, 1982; Pfeffer and Langton, 1988; Smart and McLaughlin, 1978; Tuckman, 1979). The following academic field groupings are included in the analyses: agriculture/home economics, education, engineering and computer science, fine arts, health sciences, humanities, natural and physical sciences, social sciences, and other academic field. Business is the reference category.

In addition to measures of human capital and structural characteristics, the analyses also include the racial/ethnic groups African American, Hispanic, and Asian. White is the reference group. A dichotomous variable measuring U.S. citizenship is also included.

Analyses

Descriptive statistics, including chi-square and analysis of variance, are first used to examine the research questions. Then, logistic regression analyses are used to isolate the effects of sex on the probability of receiving supplemental

earnings, a dichotomous variable, holding constant differences in human capital and structural characteristics. The logistic regression model can be written as:

$$P(\text{supplemental earnings} = 1) = \frac{e^{\alpha + \beta_1 X_x + \beta_2 X_2 + \ldots + \beta_k X_k}}{1 + e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k}}$$

where β_k are coefficients estimated from the data and X_k are the independent variables in the model (Menard, 1995). To facilitate the interpretation of the logistic regression coefficients, the delta-p statistic is used to estimate the change in the probability of receiving supplemental earnings associated with a one-unit change in each independent variable (Cabrera, 1994; Petersen, 1985).

Among faculty who have received supplemental earnings, ordinary least squares (OLS) regression analyses are used to isolate the effects of sex on the amount of supplemental earnings received after controlling for human capital and structural characteristics.[2] For the OLS regression analyses, earnings are expressed as a natural logarithm so that the unstandardized regression coefficients reflect the percentage change in earnings associated with a one-unit change in each independent variable.

Since little is known about the predictors of supplemental earnings in general, let alone the predictors of particular types of supplemental earnings, the logistic and OLS regression analyses are repeated for each of the five categories of supplemental earnings using the same set of predictor variables. Because of differences in mission and structure, the logistic and OLS regression analyses are also conducted separately for faculty at 4-year and public 2-year institutions. The analyses for faculty at public 2-year institutions do not include the following variables: teaching level, Carnegie classification, institutional control, or institutional race. Separate analyses are then conducted for faculty at 4-year institutions in each of four academic field groupings: arts and humanities, social sciences, natural and physical sciences, and professional fields. Arts and humanities include English, foreign languages, fine arts, history, and philosophy. Social sciences include communications, education, economics, political science, psychology, sociology, and other social sciences. Natural and physical sciences include engineering, biology, physics, mathematics, and computer science. Professional fields include business, health, and law.

Several additional analyses are conducted in an effort to paint a more complete picture of sex differences in supplemental earnings. To examine sex differences in the predictors of receiving each type of supplemental earnings, separate logistic analyses are conducted for women and men using the overall model. OLS regression analyses are used to compare the unexplained sex difference in total earnings with the unexplained sex difference in institutional base salary. Total earnings are defined as the sum of the institutional base salary and total supplemental earnings.

Limitations

This research offers a much-needed exploration of differences in supplemental earnings between women and men college and university faculty. The NSOPF:93 has several advantages for examining this topic, including a high response rate and large sample size. Nonetheless, like all secondary data analyses, several limitations are associated with the data. As mentioned previously, preference, taste, and motivation for supplemental earnings cannot be directly measured by the variables in the NSOPF:93. As a result, the analyses include the best available proxies: family responsibilities and institutional base salary. A second limitation pertains to the uncertain accuracy of the data describing the amounts of different types of supplemental earnings received. This limitation is minimized by examining not only the amount of various types of supplemental earnings received, but also the probability of receiving any amount of each type of earnings.

FINDINGS

Observed Sex Differences in Supplemental Earnings

About three fourths (75%) of all full-time faculty in fall 1992 received some type and amount of income to supplement their base salaries. The most common source of supplemental earnings was the institution, reported by 53% of all full-time faculty. Table 1 shows that 31% of all full-time faculty in fall 1992 received supplemental earnings from private consulting, 26% received supplemental earnings from royalties, performances, and speaking fees, and 10% received supplemental earnings from employment at another academic or nonacademic institution.

As reported by Kirschstein and associates (1997), the descriptive data in Table 1 suggest that the likelihood of receiving different types of supplemental earnings varies by institutional level and academic field. For example, supplemental earnings from the institution appear to be relatively more common among faculty at public 2-year institutions than among faculty at 4-year institutions (60% versus 51%) while supplemental earnings from royalties, performances, and speaking fees appear to be relatively more common among faculty at 4-year institutions than among faculty at public 2-year institutions (30% versus 12%). Royalties, performances, and speaking fees appear to be relatively more common among faculty in arts and humanities and less common among faculty in natural and physical sciences (40% versus 22%).

Table 1 also shows that, at both public 2-year institutions and 4-year institutions and in most academic field groupings, a higher share of men than women are observed to receive all types of supplemental earnings except supplemental earnings from other employment. Overall, 78% of men, but only 69% of women,

**TABLE 1. Percent of Men and Women Full-Time Faculty
Who Received Supplemental Earnings by Institutional Level
and Academic Field Grouping: Fall 1992**

Institution & Field	Any Supplemental	Institutional	Royalties, Speaking Fees	Private Consulting	Other Employment
All faculty	p < .001	p < .001	p < .001	p < .001	
Total	75.3	52.8	25.8	30.6	10.4
Men	78.1	55.2	28.0	34.2	10.1
Women	69.3	47.7	21.1	22.9	11.2
Public 2-year	p < .001	p < .001	p < .01	p < .001	
Total	74.5	60.1	12.1	24.7	14.6
Men	79.1	64.0	14.0	30.3	15.6
Women	68.7	55.3	9.9	17.7	13.4
Four-year	p < .001	p < .001	p < .001	p < .001	
Total	75.5	50.8	29.5	32.3	9.2
Men	77.9	53.3	30.9	35.2	8.9
Women	69.6	44.8	26.1	25.1	10.0
Arts & humanities	p < .001	p < .05	p < .001	p < .001	
Total	76.1	49.6	39.8	23.5	11.0
Men	79.8	51.4	43.5	26.2	11.9
Women	69.2	46.4	33.0	18.7	9.3
Social sciences	p < .001	p < .001	p < .01	p < .001	
Total	81.2	58.2	32.0	37.0	9.3
Men	83.6	61.0	34.2	40.8	9.4
Women	76.4	52.4	27.4	29.2	9.1
Natural & physical sciences	p < .001	p < .01	p < .001		
Total	71.3	50.2	21.7	30.0	8.0
Men	72.8	51.5	22.1	31.8	8.2
Women	61.9	41.8	19.1	18.8	6.7
Professional fields	p < .001	p < .001	p < .001	p < .001	p < .001
Total	77.4	48.0	28.8	38.1	9.2
Men	81.3	52.8	31.3	42.1	6.8
Women	70.6	39.3	24.3	30.8	13.4

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

are observed to receive some type of supplemental earnings. More than one fourth (28%) of men, but only one fifth (21%) of women reported earnings from royalties, performances, and speaking fees. Only 23% of women received income from private consulting, compared with 34% of men. At both public 2-year and 4-year institutions, and in all academic field groupings except professional fields, comparable proportions of men and women reported earnings from other employment (about 10% overall). Among faculty employed at 4-year institutions in professional fields, a higher share of women than men are observed to receive supplemental earnings from other employment (13% versus 7%).

Among the 75% of faculty who received at least some amount of supplemental earnings in fall 1992, the average total amount received was about $13,500. Table 2 shows that men averaged substantially higher amounts of supplemental earnings than women overall ($15,004 versus $9,809), from institutional sources ($8,743 versus $6,155), and from private consulting ($13,284 versus $7,777). Men and women averaged comparable amounts of supplemental earnings from royalties, performances, and speaking fees (about $4,200) and from other employment (about $11,000). This pattern of sex differences occurs among faculty at both public 2-year institutions and 4-year institutions.

The average amount of supplemental earnings received appears to vary by academic field, with full-time faculty at 4-year institutions in professional fields reporting the highest average amount ($18,835) and full-time faculty at 4-year institutions in arts and humanities averaging the lowest amount ($9,995). Table 2 shows that while the observed sex difference in the total amount of supplemental earnings is not statistically significant among recipients of supplemental earnings in the arts and humanities or the natural or physical sciences, women are observed to average substantially lower amounts of supplemental earnings than men in the social sciences and professional fields.

Sex Differences in the Probability of Receiving Supplemental Earnings

The logistic regression analyses reveal that, after controlling for differences in human capital and structural characteristics, women are about 9% less likely than men to receive some type of supplemental earnings, 11% less likely than men to receive supplemental earnings from institutional sources, 8% less likely than men to receive supplemental earnings from private consulting, and 2% less likely than men to receive supplemental earnings from other employment. Table 3 shows that, after controlling for other variables, women are as likely as men to receive supplemental earnings from royalties, performances, and speaking fees.

The logistic regression analyses suggest that the magnitude of the unexplained sex difference in supplemental earnings varies by institutional level and academic field. Table 3 shows that the unexplained sex differences in the probability of receiving any type of supplemental earnings, supplemental earnings from private consulting, and supplemental earnings from other employment appear to be smaller among faculty at 4-year institutions than among faculty at public 2-year institutions. For example, women at 4-year institutions are 8% less likely than their male counterparts to receive some type of supplemental earnings, compared with a 12% sex difference among faculty at public 2-year institutions. The unexplained sex difference in institutional sources of supplemental earnings appears to be greater among faculty in professional fields (15%) than among faculty in arts and humanities and natural and physical sciences (7%), while the

TABLE 2. Average Amount of Supplemental Earnings Received by Men and Women Full-Time Faculty Receiving the Type of Earnings by Institutional Level and Academic Field Grouping: Fall 1992

Institution & Field	Base Salary	Total Earnings	Total Supplemental Earnings	Institutional	Royalties, Speaking Fees	Private Consulting	Other Employment
All faculty	$p < .001$	$p < .001$	$p < .001$	$p < .001$		$p < .001$	
Total	49,815	59,949	13,467	7,991	4,212	11,957	11,032
Male	54,646	66,364	15,004	8,743	4,222	13,284	11,358
Female	39,622	46,414	9,809	6,155	4,185	7,777	10,414
Gap	−27%	−30%	−35%	−30%		−41%	
Public 2-year	$p < .001$	$p < .001$	$p < .001$	$p < .01$		$p < .05$	
Total	39,903	48,669	11,771	6,412	4,237	13,050	7,998
Male	41,885	53,442	14,608	7,317	5,513	15,860	8,240
Female	37,451	42,764	7,730	5,116	1,992	7,100	7,650
Gap	−11%	−20%	−47%	−30%		−55%	
Four-year	$p < .001$	$p < .001$	$p < .001$	$p < .001$		$p < .001$	
Total	52,649	63,206	13,983	8,534	4,202	11,784	12,470
Male	57,465	69,255	15,144	9,143	4,084	12,855	12,571
Female	40,634	48,114	10,744	6,730	4,551	8,045	12,245
Gap	−29%	−31%	−29%	−26%		−37%	
Arts & humanities	$p < .001$	$p < .001$					
Total	42,960	50,565	9,995	5,511	4,725	8,035	9,606
Male	46,558	55,089	10,694	5,604	4,355	9,023	11,531
Female	36,244	42,116	8,490	5,320	5,635	5,443	4,969
Gap	−22%	−24%					

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Social science	$p < .001$	$p < .001$	$p < .001$	$p > .05$		$p < .001$	
Total	46,831	57,643	13,313	7,927	3,000	12,097	8,079
Male	50,390	63,751	15,986	8,992	3,150	14,646	8,628
Female	39,515	45,010	7,300	5,381	2,613	4,805	6,903
Gap	−22%	−29%	−54%	−40%		−67%	
Natural/physical science	$p < .001$	$p < .001$	$p < .001$	$p < .01$		$p < .001$	
Total	53,539	62,651	12,776	8,690	4,659	9,527	11,025
Male	55,454	65,029	13,144	8,982	4,082	9,683	11,712
Female	41,722	47,982	10,107	6,468	8,778	7,892	5,849
Gap	−25%	−26%	−23%	−28%		−18%	
Professional	$p < .001$	$p < .001$	$p < .001$	$p < .05$	$p < .01$	$p < .01$	$p < .05$
Total	69,016	83,601	18,835	12,536	4,666	15,064	15,785
Male	81,997	99,561	21,618	13,387	5,570	16,730	24,515
Female	45,860	55,130	13,125	10,496	2,588	10,999	7,944
Gap	−44%	−45%	−39%	−22%	−54%	−34%	−68%

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

TABLE 3. Estimated Delta-p Statistics for Female by Institutional Level and Academic Field Controlling for Human Capital and Structural Characteristics: Fall 1992 (dependent variable is whether received various types of supplemental earnings)

Type of Earnings	Total	Public 2-Year	4-Year	Arts & Humanities	Social Sciences	Natural & Physical Science	Professional Fields
Total							
Female	-0.091***	-0.124***	-0.084***	-0.101***	-0.071**	-0.074*	-0.119***
Pseudo R^2	0.086	0.078	0.100	0.074	0.094	0.123	0.096
Number cases in analyses	12,452	3,017	9,318	2,341	2,178	2,142	1,762
Institutional							
Female	-0.105***	-0.093***	-0.106***	-0.072**	-0.134***	-0.072*	-0.152***
Pseudo R^2	0.098	0.064	0.112	0.056	0.117	0.156	0.146
Number cases in analyses	12,452	3,017	9,318	2,341	2,178	2,142	1,762
Royalties, speaking fees							
Female	-0.004	-0.029	0.006	-0.054*	-0.016	0.030	0.058
Pseudo R^2	0.136	0.057	0.139	0.111	0.148	0.106	0.162
Number cases in analyses	12,452	3,017	9,318	2,341	2,178	2,142	1,762
Private consulting							
Female	-0.079***	-0.104***	-0.069***	-0.069**	-0.103***	-0.076*	-0.092***
Pseudo R^2	0.117	0.103	0.124	0.067	0.161	0.164	0.135
Number cases in analyses	12,452	3,017	9,318	2,341	2,178	2,142	1,762
Other employment							
Female	-0.018**	-0.048**	-0.014*	-0.028	-0.018	-0.025	0.011
Pseudo R^2	0.043	0.057	0.040	0.070	0.035	0.055	0.098
Number cases in analyses	12,452	3,017	9,318	2,341	2,178	2,142	1,762

Notes: The delta-p is used to represent the change in the probability of receiving supplemental earnings associated with a one-unit change in each independent variable (Cabrera, 1994; Petersen, 1985). Delta-$p = \exp(L_1)/[1 + \exp(L_1)] - P_0$. Pseudo $R^2 = \chi^2/(N + \chi^2)$.
Coefficients and standard errors for all independent variables in each model are available from the author on request.
***$p < .001$, **$p < .01$, *$p < .05$.
Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93).

unexplained sex difference in private consulting appears to be greater among faculty in social sciences (10%) than among faculty in arts and humanities (7%).

Sex Differences in the Amount of Supplemental Earnings Received

Among recipients of most types of supplemental earnings, women also average lower amounts than men even after controlling for differences in human capital and structural characteristics. Table 4 shows that among recipients, women average lower amounts than men of supplemental earnings overall (40% lower), supplemental earnings from institutional sources (30% lower), supplemental earnings from private consulting (39% lower), and supplemental earnings from other employment (27% lower) even after controlling for other differences. The amount of supplemental earnings received from royalties, performances, and speaking fees appears to be comparable for women and men after controlling for human capital and structural characteristics.

Table 4 also shows that women average lower amounts of supplemental earnings overall, from institutional sources, and from private consulting at both 4-year and public 2-year institutions. The amount of supplemental earnings from other employment appears to be lower for women than for men recipients at public 2-year institutions, 4-year institutions in arts and humanities, and 4-year institutions in natural and physical sciences. Women and men appear to average comparable amounts of earnings from royalties, performances, and speaking fees after controlling for human capital and structural characteristics overall and at public 2-year institutions and 4-year institutions. Disaggregating by academic field, however, suggests that women average lower amounts than men of supplemental earnings from royalties, performances, and speaking fees among recipients at 4-year institutions in arts and humanities.

Sex Differences in the Predictors of Receiving Supplemental Earnings

Conducting separate logistic regression analyses for women and men for each source of supplemental earnings suggests that the supplemental earnings determination process is different for women than for men. For example, the analyses suggest that the relationship between supplemental earnings and base institutional salary not only depends on the source of supplemental earnings but also varies between women and men. Table 5 shows that among both women and men the probability of receiving supplemental earnings from royalties, performances, and speaking fees is positively related to base institutional salary, while the probability of receiving supplemental earnings from other employment is negatively related to base institutional salary after controlling for human capital and structural characteristics. Among men, the probability of receiving supplemental earnings from institutional sources declines as base salary increases,

TABLE 4. Estimated Unstandardized Regression Coefficients for Female by Institutional Level and Academic Field Controlling for Human Capital and Structural Characteristics: Fall 1992 (dependent variable is logarithm of various types of earnings)

Type of Earnings	Total	Public 2-Year	4-Year	Arts & Humanities	Social Sciences	Natural & Physical Sciences	Professional Fields
Base Salary							
Female	−0.095***	−0.055***	−0.101***	−0.087***	−0.084***	−0.083***	−0.165***
Adjusted R^2	0.519	0.401	0.523	0.477	0.508	0.508	0.518
Number cases in analyses	12,531	2,348	10,067	2,013	2,257	2,596	2,196
Total earnings							
Female	−0.134***	−0.130***	−0.130***	−0.116***	−0.146***	−0.113***	−0.188***
Adjusted R^2	0.452	0.324	0.462	0.366	0.431	0.418	0.493
Number cases in analyses	12,531	2,348	10,067	2,013	2,257	2,596	2,196
Total supplemental							
Female	−0.403***	−0.577***	−0.352***	−0.337***	−0.476***	−0.411***	−0.418***
Adjusted R^2	0.132	0.133	0.138	0.085	0.170	0.157	0.149
Number cases in analyses	9,396	1,748	7,567	1,531	1,828	1,839	1,686
Institutional							
Female	−0.302***	−0.410***	−0.263***	−0.169*	−0.209**	−0.288**	−0.453***
Adjusted R^2	0.132	0.133	0.138	0.085	0.170	0.157	0.149
Number cases in analyses	6,559	1,405	5,100	998	1,314	1,292	1,046

Royalties, speaking fees							
Female	−0.098	−0.261	−0.090	−0.375**	−0.099	0.085	−0.286
Adjusted R^2	0.141	0.135	0.146	0.116	0.191	0.181	0.235
Number cases in analyses	3,266	286	2,964	806	724	563	610
Private consulting							
Female	−0.385***	−0.456**	−0.351***	−0.345	−0.421***	−0.591**	−0.285*
Adjusted R^2	0.173	0.213	0.173	0.167	0.231	0.145	0.155
Number cases in analyses	3,872	588	3,260	477	832	784	837
Other employment							
Female	−0.274**	−0.510**	−0.190	−0.478*	−0.088	−0.612*	−0.328
Adjusted R^2	0.084	0.100	0.096	0.148	0.126	0.215	0.169
Number cases in analyses	1,287	347	917	219	209	207	198

Notes: Total earnings is the sum of base institutional salary and total supplemental earnings. The model for total earnings does not include base salary as an independent variable. Coefficients and standard errors for all independent variables in each model are available from the author upon request.

***$p < .001$, **$p < .01$, *$p < .05$.

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

TABLE 5. Increase in the Probability of Receiving Various Types of Supplemental Earnings Associated with a One-Unit Increase in Each Independent Variable (delta-p statistics) Among Women and Men Faculty: Fall 1992

Independent Variable	Total		Institution		Royalties		Consulting		Other Employment	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
African American	-0.063	-0.035	-0.034	-0.029	-0.026	0.004	-0.023	-0.005	0.002	0.019
Hispanic	-0.034	0.001	-0.096	-0.021	0.035	0.035	-0.021	0.016	-0.007	0.013
Asian	-0.131**	-0.064**	-0.061	-0.053*	-0.085*	-0.095***	-0.020	-0.126***	0.027	0.007
Noncitizen	0.062	0.072***	0.008	0.029	0.026	0.039	0.180**	0.190***	0.057	0.013
Doctoral degree	0.017	-0.042**	0.037	-0.006	0.035	0.026	-0.023	-0.045**	0.001	0.015
Professional degree	0.070*	0.007	0.121**	0.054*	-0.027	0.021	0.054	-0.035	-0.034	-0.028
First/only job	-0.114***	-0.105***	-0.049**	-0.018	-0.033*	-0.067***	-0.122***	-0.177***	-0.071***	-0.063***
Experience composite	-0.101	0.071**	-0.109*	-0.010	-0.064	0.028	-0.015	0.227***	0.002	-0.005
Experience, squared	0.002***	-0.005	-0.003	-0.001	-0.019*	-0.012**	-0.004	-0.012**	0.009	0.004
Married with children	0.019	0.066***	-0.007	0.068***	-0.028	0.030	0.024	0.109***	0.002	0.013
Married, no children	-0.018	0.053**	-0.033	0.015	-0.021	0.055*	0.019	0.095***	-0.012	0.004
Not married, children	0.084**	0.066**	0.071*	0.031	-0.001	0.040	0.024	0.122***	0.055**	0.004
Base salary/1000	0.001	0.000	0.000	-0.002***	0.003***	0.003***	0.000	0.001***	-0.002***	-0.001**
Refereed publications	0.047*	0.056***	0.009	0.022	0.142***	0.217***	0.061**	0.051**	-0.007	-0.005
Principal investigator	0.086***	0.038**	0.070**	0.041*	0.042*	0.018	0.075***	0.075***	-0.012	-0.021*
1–10% research	0.014	0.034*	0.026	0.065***	0.059*	0.072***	0.013	0.036*	-0.015	-0.009
11%–25% research	0.054*	0.032*	0.022	0.069**	0.090**	0.163***	0.058*	0.009	0.009	-0.013
25% + research	0.046	0.024	0.017	0.050*	0.124**	0.155***	-0.023	-0.081***	0.009	-0.037**
Percent time teaching	0.000	0.000	0.000	0.001*	0.000	0.000	-0.001*	-0.003***	0.000	0.000
Teach grad students	0.076**	0.029	-0.002	0.051**	0.051*	0.017	0.075***	0.023	-0.003	-0.002
Teach undergraduates	0.023	0.018	-0.008	0.046**	0.009	0.000	0.005	0.002	0.018	0.006
1%–10% service	0.086***	0.064***	0.035	0.060***	0.101***	0.052***	0.087***	0.098***	0.032*	0.007
10% + time service	0.019	0.055***	0.058*	0.060**	0.066*	0.064***	0.043	0.022	-0.029	0.032*
1%–10% admin.	-0.070***	-0.057***	-0.081***	-0.066***	-0.023	-0.036**	-0.039*	-0.038**	0.012	0.000
10%+ administration	-0.030	-0.069***	-0.072*	-0.121***	0.000	-0.015	0.036	0.058*	0.018	0.027

	1	2	3	4	5	6	7	8	9	10
Department chair	0.009	0.035*	0.088**	0.061***	0.028	0.015	0.004	-0.006	-0.027	0.017
11–12 month	-0.179***	-0.186***	-0.225***	-0.245***	-0.011	-0.043***	-0.023	-0.049***	-0.020	-0.019*
Research university	-0.020	-0.002	-0.120***	-0.036	0.032	0.005	0.001	0.008	0.014	-0.009
Doctoral university	-0.039	-0.027	-0.027	-0.014	-0.003	0.003	-0.034	-0.057**	0.004	-0.004
Private liberal arts	-0.023	0.026	0.007	0.041	-0.066*	0.008	0.014	0.063*	0.000	-0.003
Public 2-year	0.062**	0.052**	0.121***	0.105***	-0.039	0.027	-0.025	0.007	0.056**	0.050***
Other institution	0.018	0.006	-0.024	-0.004	0.037	0.026	0.000	-0.016	0.038	-0.008
Public	-0.038	-0.031*	-0.031	-0.040*	-0.001	-0.022	-0.002	-0.015	-0.035**	-0.031***
Black institution	0.029	-0.010	-0.041	-0.016	-0.017	-0.022	0.023	-0.036	0.055	0.051*
Unionized institution	0.030	-0.019	0.019	-0.011	0.025	-0.031**	0.015	0.003	0.000	0.015
Agriculture/home econ	-0.104	-0.203***	-0.102	-0.210***	-0.067	-0.079*	-0.078	-0.075*	0.041	0.029
Education	0.033	0.011	-0.001	0.076*	0.062	0.089**	0.029	-0.012	0.034	-0.017
Engineering/computer	-0.001	-0.068**	0.090	-0.101***	-0.037	-0.034	-0.056	0.005	-0.071	0.022
Fine arts	0.067	0.062*	-0.071	-0.179***	0.343***	0.490***	0.061	-0.036	0.039	0.065**
Health sciences	0.008	-0.024	-0.122***	-0.125***	0.100**	0.108***	-0.022	-0.073**	0.145***	0.032
Humanities	0.003	-0.043*	0.004	-0.097***	0.154***	0.189***	-0.086***	-0.145***	0.019	0.012
Science	-0.077*	-0.090***	-0.062	-0.106***	-0.013	0.011	-0.084***	-0.122***	-0.005	0.020
Social science	0.052	0.018	-0.011	-0.072**	0.083*	0.175***	-0.023	-0.043*	0.036	0.034*
Other academic field	-0.031	-0.092***	-0.056	-0.126***	0.082*	0.089***	-0.024	-0.056**	-0.002	0.004
Constant	0.170	0.078	0.275**	0.191***	-0.191***	-0.268***	-0.187***	-0.294***	-0.097***	-0.081***
Number of cases	4,962	7,490	5,365	7,490	4,962	7,490	4,962	7,490	4,962	7,490
G^2/df	0.932	1.109	0.968	1.444	0.741	1.170	0.805	1.319	0.520	0.685
Pseudo R^2	0.070	0.094	0.070	0.115	0.103	0.157	0.072	0.134	0.051	0.046
Baseline P	0.693	0.781	0.477	0.552	0.211	0.280	0.229	0.342	0.112	0.101

Notes: Raw logistic regression coefficients and standard errors for each model are available from the author on request. The delta-p is used to represent the change in the probability of receiving supplemental earnings associated with a one-unit change in each independent variable (Petersen, 1985; Cabrera, 1994). Delta-p = $\exp(L_1)/[1 + \exp(L_1)] - P_0$. Pseudo R^2 = $\chi^2/(N+\chi^2)$.

***$p < .001$, **$p < .01$, *$p < .05$.

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

while the probability of receiving supplemental earnings from private consulting increases with base salary. Among women, base institutional salary is unrelated to the likelihood of receiving supplemental earnings from either the institution or private consulting.

The relationship between marital and parental status and the probability of receiving various types of supplemental earnings also varies between women and men faculty. Table 5 shows that the probability of receiving supplemental earnings from institutional sources is greater among married men with children than among other men and greater among unmarried women with children than among other women. Unmarried women with children are also more likely than other women to receive supplemental earnings from other employment. Among men, the likelihood of receiving supplemental earnings from other employment is unrelated to marital or parental status. Married men with no children are more likely than other men to receive supplemental earnings from royalties, performances, and speaking fees. Married men and men with children are more likely than their single, childless male counterparts to receive supplemental earnings from private consulting. Among women, marital and parental status are unrelated to the likelihood of receiving supplemental earnings from royalties, performances, and speaking fees or supplemental earnings from private consulting.

Both women and men with an 11- or 12-month contract are less likely than their counterparts with 9- or 10-month contracts to receive some type of supplemental earnings or supplemental earnings from institutional sources. While men with 11- or 12-month contracts are less likely than men with shorter contracts to receive supplemental earnings from royalties, performances, and speaking fees, private consulting, or other employment, contract length is unrelated to the likelihood of receiving these sources of supplemental earnings among women.

The relationship between most of the other measures of structural characteristics and the probability of receiving various types of supplemental earnings is remarkably similar for women and men. One exception is that women at research universities appear to be less likely than their female counterparts at other types of 4-year institutions to receive supplemental earnings from their institution, while men at research universities appear to be as likely as men at other types of 4-year institutions to receive supplemental earnings from the institution. A second exception is that women in health sciences appear to be more likely than women in other academic fields to receive supplemental earnings from other employment, net of other variables, while working in health sciences is not associated with an increased probability of receiving supplemental earnings from other employment among men.

Both women and men Asian faculty are less likely than women and men faculty of other racial/ethnic groups to receive some type of supplemental earnings and supplemental earnings from royalties, performances, and speaking fees. Asian men also appear to be less likely than their male counterparts of other

racial/ethnic groups to receive supplemental earnings from institutional sources and from private consulting. Among women, the probability of receiving supplemental earnings from institutional sources and private consulting does not appear to vary by race/ethnicity after controlling for differences in human capital and structural characteristics.

Sex Differences in the Financial Welfare of Faculty

The observed male-female gap in total earnings is observed to be larger than the observed male-female gap in base institutional salaries among full-time faculty overall and at both public 2-year institutions and 4-year institutions. Table 2 shows that, overall, women full-time faculty are observed to average 30% lower total earnings than men full-time faculty ($46,414 versus $66,364), compared with 27% lower base institutional salaries ($39,622 versus $54,646). The observed male-female gap in total earnings is somewhat smaller among full-time faculty at public 2-year institutions than among full-time faculty at 4-year institutions (20% versus 31%). Nonetheless, the increase in the observed sex difference associated with considering total earnings rather than base institutional salary is considerably larger among faculty at public 2-year institutions (20% versus 11%) than among faculty at 4-year institutions (31% versus 29%). The observed sex gap in total earnings is similar to the observed sex gap in base institutional salary among faculty at 4-year institutions in each of the four academic field groupings.

Controlling for differences in human capital and structural characteristics reduces the magnitude of the observed male-female gap in total earnings to 13.4%. Table 4 shows that the unexplained sex difference in total earnings is larger than the unexplained sex difference in base institutional salaries. After controlling for human capital and structural characteristics, base institutional salaries are 9.5% lower for women than for men, a finding that is consistent with that found by other researchers (e.g., Nettles et al., 2000; Perna, 2001; Toutkoushian, 1998).

The magnitude of the unexplained male-female salary gap in total earnings is comparable among faculty at public 2-year institutions and 4-year institutions (13%). Nonetheless, this finding masks an important difference between faculty at public 2-year institutions and 4-year institutions. Specifically, the unexplained male-female gap in base salaries is smaller among faculty at public 2-year institutions than among faculty at 4-year institutions (5.5% versus 10%), while the unexplained male-female gap in total supplemental earnings is greater among recipients at public 2-year institutions than among recipients at 4-year institutions (58% versus 35%). Among faculty at 4-year institutions, the unexplained sex difference in total earnings appears to be somewhat smaller in arts and humanities and natural and physical sciences than in professional fields (11% versus 19%).

CONCLUSIONS

The results of this study show that the majority (75%) of full-time faculty are supplementing their base institutional salaries with income from other sources. But, women are not only less likely than men to receive most types of supplemental income, but also average lower amounts than men of most types of supplemental earnings even after controlling for differences in human capital and structural characteristics. As a result of these differences, the unexplained male advantage in total earnings—base salary and all supplemental earnings combined—is larger than the unexplained male advantage in base salaries (13.4% versus 9.5%). While numerous researchers have documented that women average lower institutional base salaries than men even after controlling for other variables (e.g., Barbezat, 1988; Bellas, 1993; Nettles et al., 2000; Perna, 2001; Toutkoushian, 1998; Weiler, 1990), the results of the present study provide information about an additional source of sex differences in the financial welfare of the nation's faculty.

Although the model used in this study drew on theoretical perspectives that are typically used to examine sex differences in base institutional salaries, the results of this research show that the supplemental earnings determination process differs from the base salary determination process. While the measures of human capital and structural characteristics included in the model explain 52% of the variance in institutional base salary (Table 4), these variables explain a smaller proportion of the variance in total earnings (45%) and each type of supplemental earnings. The modest size of the pseudo R^2s for the logistic regression analyses (ranging from .035 to .164) and the adjusted R^2s for the OLS regression analyses (ranging from .084 to .235) suggests that the measures of human capital and structural characteristics included in the model are insufficient predictors of supplemental earnings and/or that the supplemental earnings determination process is much less predictable than the base institutional salary determination process.

One important way in which the process of determining supplemental earnings differs from the process of determining base institutional salaries is that the supply of faculty for supplemental earnings is much less certain than the supply of faculty for base salaries. In other words, while all faculty are interested in receiving a base salary, not all faculty are interested in receiving supplemental earnings. Therefore, one possible explanation for the findings that women are less likely than men to receive most types of supplemental earnings, and that women receive lower amounts than men of most types of supplemental earnings, is that women are less motivated or have less preference for each type of supplemental earnings than men.

Although the proxies for preference, taste, and motivation for supplemental earnings used in this research (family responsibilities and base institutional sal-

ary) are less than ideal, the results of this study suggest that women and men have different preferences, tastes, and motivations for supplemental earnings. For example, women appear to be less motivated than men by economic concerns (as measured by base salary) to seek supplemental earnings from their institutions. However, unmarried women with children appear to be more motivated than other women to receive supplemental earnings from their institutions and from other employment. Married men and men with children are more likely than single, childless men to receive supplemental earnings from private consulting, while marital and parental status are unrelated to the likelihood of receiving supplemental earnings from private consulting among women, suggesting that married men may have more time (e.g., through greater household support) than other faculty to engage in private consulting. While men with 9- or 10-month contracts are more likely than their male counterparts with longer contracts to receive supplemental earnings from royalties, performances, and speaking fees, private consulting, and other employment, contract length is unrelated to these outcomes among women. These findings suggest that women with 9- or 10-month contracts are less likely than men to spend their summers pursuing these types of activities.

The results of this research also suggest that the supplemental earnings determination process varies by institutional level and academic field. While this study provides a preliminary exploration of the most appropriate conceptual framework for examining supplemental earnings, future research should examine ways in which the conceptual framework used in this research can be modified in order to develop a better understanding of the predictors of supplemental earnings. In particular, such research should focus on the ways in which the model should be adapted to better explain the supplemental earnings determination process at public 2-year institutions and 4-year institutions and for faculty in different academic field groupings.

IMPLICATIONS

The implications of this research vary based on the source of supplemental earnings. First, this study showed that, regardless of institutional level or academic field, women full-time faculty were less likely than male full-time faculty in fall 1992 to receive supplemental earnings from their institutions and averaged lower amounts of supplemental earnings from their institutions, even after controlling for differences in human capital and structural characteristics. Individual colleges and universities are urged use these findings to explore the extent to which women are less likely than men to receive supplemental earnings from their institutions because they have less information about such opportunities or are otherwise discouraged from pursuing such opportunities, rather than because they prefer not to engage in such activities.

A second set of implications pertains to the findings regarding supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria. Bowen and Schuster (1986) argued that this category of supplemental earnings has not only "long been accepted as part of the established academic way of life" but also "regarded as an almost mandatory part of a distinguished academic career" (pp. 257–258). A smaller share of women than men full-time faculty in fall 1992 were observed to receive supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria at both public 2-year institutions and 4-year institutions and in all academic field groupings except natural and physical sciences. The logistic regression analyses revealed that for all faculty except for those at 4-year institutions in arts and humanities and professional fields, the observed sex differences were entirely attributable to other differences between women and men that are related to receiving supplemental earnings from this source—particularly differences in base institutional salary, research productivity, and time on research. Therefore, in order to increase the share of women who are receiving supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria (and the monetary and prestige-related benefits associated with this source of supplemental earnings), individual colleges and universities must work to ensure that women have the equal opportunity to acquire the factors shown to promote this source of supplemental earnings. Specifically, colleges and universities should review their policies and practices to ensure that women have equal access to the highest base institutional salaries and the resources required to promote research productivity.

Supplemental earnings from private consulting are more controversial than supplemental earnings from institutional sources and royalties, performances, and speaking fees. Some have argued that private consulting may cause faculty to neglect their students and other academic and campus responsibilities, result in an abuse of academic freedom and conflicts of interest, entail an inappropriate use of institutional resources (e.g., offices, computers, telephones, support staff), and reduce institutional loyalty (Bowen and Schuster, 1986; Boyer and Lewis, 1984, 1985a, 1985b). Private consulting has also been said to be inconsistent with the traditional mission of higher education because it involves a limited sharing of expertise between a faculty member and a private client rather than the broad dissemination of learning (Bowen and Schuster, 1986).

Nonetheless, based on their review and synthesis of relevant research, Boyer and Lewis (1984, 1985a, 1985b) noted several individual-level benefits associated with faculty consulting. For example, like other sources of supplemental earnings, private consulting provides additional income to compensate for the ceiling on faculty earnings and the lower average salaries for faculty than for comparably trained individuals in other professions. Through consulting, faculty

may enhance their teaching and research resources and expertise, disseminate knowledge to interested individuals outside of the institution, become involved in practical affairs, gain "real-world" experience, update their disciplinary expertise and research methodology, develop new ideas for further research, build their professional competence and reputation, advance their careers, and enhance their vitality (Bok, 1982; Bowen and Schuster, 1986; Boyer and Lewis, 1984, 1985a, 1985b; Lawson, 1996). Based on his review of institutional statements regarding faculty consulting, Teague (1982) concluded that consulting is generally only institutionally sanctioned if such activities enhance professional development, are compatible with institutional priorities, and do not conflict with institutional responsibilities.

The results of this study suggest that women faculty are less likely than men faculty to realize the potential benefits associated with private consulting. Regardless of institutional level or academic field, women were less likely than men to receive supplemental earnings from private consulting even after controlling for other variables. At public 2-year institutions and 4-year institutions and in all academic field groupings except arts and humanities, women recipients of supplemental earnings from private consulting also averaged lower amounts than their male counterparts. Additional descriptive analyses (not shown) reveal that a smaller proportion of women than men are very satisfied with their freedom to do consulting (32% versus 40%). Therefore, future research should explore not only sex differences in preference, taste, and motivation for private consulting but also the extent to which women have less access than men to the networks that lead to private consulting opportunities, are less skilled at identifying and establishing private consulting relationships, and/or are less knowledgeable about the variety of related benefits.

Finally, the results of this research revealed that about 10% of both women and men faculty received supplemental earnings from employment at another academic or nonacademic institution. Controlling for differences in human capital and structural characteristics shows that women were less likely than men to receive supplemental earnings from other employment, and among recipients, averaged lower amounts than men of supplemental earnings from other employment. Nonetheless, the extent to which outside employment contributes to or detracts from the fulfillment by women and men faculty of their core responsibilities at the primary institution is unclear. Holding an 11- or 12-month appointment rather than a 9- or 10-month appointment reduces the probability of receiving supplemental earnings from outside employment among men but not among women. This suggests that, for women, earnings from outside employment are as likely to be generated during the academic year as during the summer. Faculty who receive lower base institutional salaries are more likely than their better paid counterparts to receive supplemental earnings from outside employment, suggesting that lower paid faculty may be motivated to pursue outside employ-

ment for economic reasons. Further research is required to understand the extent to which outside employment activities are related to the profession and academic discipline of faculty, particularly among women at 4-year institutions in health sciences. Future research should also explore the effects of outside employment on the performance of core responsibilities and career advancement, particularly among women and men junior faculty.

In summary, this research points to several differences in supplemental earnings between women and men faculty. The findings point to sex differences not only in the financial welfare of women and men faculty but also in the professional prestige- and vitality-related benefits associated with particular types of supplemental earnings. Although faculty spend a minimal proportion of time on consulting (on average less than 3%), some researchers (Boyer and Lewis, 1984, 1985a, 1985b) have concluded that a number of individual, institutional, and societal benefits are associated with faculty consulting. Future research should further explore the sex differences identified in this research by not only examining sex differences in preferences for consulting but also examining sex differences in patterns of faculty consulting over the course of the career, costs and benefits of consulting, and institutional barriers to and facilitators of consulting.

NOTES

1. The NSOPF:93 does not contain a variable to indicate whether an individual works at a historically Black college or university. Therefore, an institution in which African Americans comprise at least 50% of the student body is classified as predominantly Black.
2. Including faculty who received no supplemental pay would confound the interpretation of the results of the OLS analyses. For example, suppose faculty who received no earnings were included in the OLS analyses and that sex was found to be related to both the probability of receiving supplemental earnings and the amount of supplemental earnings received. Under this scenario, it would be impossible to determine the extent to which the relationship between sex and the amount of earnings received was attributable to women simply being less likely to receive supplemental earnings.

REFERENCES

Ashraf, J. (1994). Differences in returns to education: an analysis by race. *American Journal of Economics and Sociology* 53(3): 281–290.

Barbezat, D. (1988). Gender differences in the academic reward system. In D. W. Breneman and T. I. K. Youn (eds.), *Academic Labor Markets and Careers*, pp. 138–164. New York: Falmer Press.

Becker, G. S. (1962). Investment in human capital: a theoretical analysis. *Journal of Political Economy* 70 Supplement(5): S9–S49.

Becker, G. S. (1985). Human capital, effort, and the sexual division of labor. *Journal of Labor Economics* 3(1): S33–S58.

Bellas, M. L. (1993). Faculty salaries: still a cost of being female? *Social Science Quarterly* 74(1): 62–75.

Bok, D. (1982). *Beyond the Ivory Tower: Social Responsibilities of the Modern University.* Cambridge, MA: Harvard University Press.

Bowen, H. R., and Schuster, J. H. (1986). *American Professors: A National Resource Imperiled*. New York: Oxford University Press.

Boyer, C. M., and Lewis, D. R. (1984). Faculty consulting: responsibility or promiscuity? *Journal of Higher Education* 55(5): 637–659.

Boyer, C. M., and Lewis, D. R. (1985a). *And on the Seventh Day: Faculty Consulting and Supplemental Income*. (ASHE-ERIC Higher Education Report No. 3). Washington, DC: Association for the Study of Higher Education.

Boyer, C. M., and Lewis, D. R. (1985b). Maintaining faculty through outside professional consulting. In S. M. Clark and D. R. Lewis (eds.), *Faculty Vitality and Institutional Productivity: Critical Perspectives for Higher Education.* New York: Teachers College Press, pp. 177–197.

Cabrera, A. F. (1994). Logistic regression analysis in higher education: an applied perspective. In J. C. Smart (ed.), *Higher Education: Handbook of Theory and Research*, Vol. 10, pp. 225–256. New York: Agathon Press.

DeYoung, A. J. (1989). *Economics and American Education: A Historical and Critical Overview of the Impact of Economic Theories on Schooling in the United States*. White Plains, NY: Longman Inc.

Dillon, K. E., and Marsh, H. W. (1981). Faculty earnings compared with those of nonacademic professions. *Journal of Higher Education* 52(6): 615–623.

Dreijmanis, J. (1991). Higher education and employment: is professional employment a right? *Higher Education Review* 23(3): 7–18.

England, P. (1982). The failure of human capital theory to explain occupational sex segregation. *Journal of Human Resources* 17: 358–370.

Fairweather, J. S. (1993). Academic values and faculty rewards. *Review of Higher Education* 17(1): 43–68.

Fairweather, J. S. (1995). Myths and realities of academic labor markets. *Economics of Education Review* 14(2): 179–192.

Glassick, C. E., Huber, M. T., and Maeroff, G. I. (1997). *Scholarship Assessed: Evaluation of the Professoriate*. San Francisco: Jossey-Bass Inc.

Hansen, W. L. (1988). Merit pay in higher education. In D. W. Breneman and T. I. K. Youn (eds.), *Academic Labor Markets and Careers*, pp. 114–137. New York: The Falmer Press.

Kim, J., and Mueller, C. W. (1978). *Introduction to Factor Analysis: What It Is and How To Do It*. Newbury Park, CA: Sage Publications.

Kirschstein, R. J., Matheson, N., and Jing, Z. (1997). *Instructional Faculty and Staff in Higher Education Institutions: Fall 1987 and Fall 1992*. Washington, DC: National Center for Education Statistics. (NCES 97-447)

Lawson, J. C. (1996). Moonlighting becomes them. *Black Issues in Higher Education* 13(6): 24–25.

Marsh, H. W., and Dillon, K. E. (1980). Academic productivity and faculty supplemental income. *Journal of Higher Education* 51(5): 546–555.

Marshall, H., and Perrucci, C. (1982). The structure of academic fields and rewards in academia. *Sociology and Social Research* 66(2): 127–147.

Menard, S. (1995). *Applied Logistic Regression Analysis*. Thousand Oaks, CA: Sage Publications.

National Center for Education Statistics (1997). National Study of Postsecondary Faculty (NSOPF:88/93). Washington, DC: Author.

Nettles, M. T., Perna, L. W., Bradburn, E. M., and Zimbler, L. (2000). *Salary, Promotion, and Tenure Status of Minority and Women Faculty in U.S. Colleges and Universities*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. (NCES 2000-173)

Perna, L. W. (2001). Sex differences in faculty salaries: a cohort analysis. *Review of Higher Education* 24(3): 283–307.

Petersen, T. (1985). A comment on presenting results from logit and probit models. *American Sociological Review* 50(1): 130–131.

Pfeffer, J., and Langton, N. (1988). Wage inequality and the organization of work: the case of academic departments. *Administrative Science Quarterly* 33: 588–606.

Polachek, S. W. (1977). Occupational segregation among women: theory, evidence, and a prognosis. In C. B. Lloyd, E. S. Andrews, and C. L. Gilroy (eds.), *Women in the Labor Market*, pp. 137–157. New York: Columbia University Press.

Schultz, T. W. (1961). Investment in human capital. *American Economic Review* 51(1): 1–17.

Smart, J. C. (1991). Gender equity in academic rank and salary. *Review of Higher Education* 14(4): 511–526.

Smart, J. C., and McLaughlin, G. W. (1978). Reward structures of academic disciplines. *Research in Higher Education* 8(1): 39–55.

Teague, G. V. (1982). Faculty consulting: Do universities have "control"? *Research in Higher Education* 17(2): 179–186.

Toutkoushian, R. K. (1998). Racial and marital status differences in faculty pay. *Journal of Higher Education* 69(5): 513–541.

Tuckman, H. P. (1979). The academic reward structure in American higher education. In D. W. Breneman and T. I. K. Youn (eds.), *Academic Rewards in Higher Education*, pp. 165–190. Cambridge, MA: Ballinger Publishing Company.

Weiler, W. C. (1990). Integrating rank differences into a model of male-female faculty salary discrimination. *Quarterly Review of Economics and Business* 30(1): 3–15.

Youn, T. I. K. (1988). Studies of academic markets and careers: an historical review. In D. W. Breneman and T. I. K. Youn (eds.), *Academic Labor Markets and Careers*, pp. 8–27. New York: Falmer Press.

Youn, T. I. K. (1992). The sociology of academic careers and academic labor markets. *Research in Labor Economics* 13: 101–130.