

THE RELATIVE VALUE OF TEACHING AND RESEARCH

by *James S. Fairweather*

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Research productivity, among all the aspects of faculty work, was the key determinant of faculty pay in the late 1980s. Faculty who taught less and published more received the highest average salaries irrespective of type of institution or discipline, according to the 1987-1988 National Survey of Postsecondary Faculty (NSOPF-88). Teaching was at best a neutral, more often a negative, factor in faculty pay.¹ Faculty perceptions of the relative value of teaching and research in promotion and tenure decisions matched these findings.²

Much has changed in the last decade. Ernest Boyer's influential *Scholarship Reconsidered* called for redefining teaching as a form of scholarship, thereby enhancing its value. The American Association of Higher Education created the Forum on Faculty Roles and Rewards to advocate for a balance between teaching and research. The Ohio legislature required faculty members in public institutions to increase their time spent on teaching by 10 percent. Roy Romer, governor of Colorado, suggested that some Colorado two-year colleges receive authority to offer baccalaureate degree programs because of their commitment to teaching.

Campus leaders picked up the theme. University of Massachusetts-Amherst Chancellor David Scott, for example, saw a restored balance between teaching and research as fundamental to reinventing the university for the twenty-first century.³ Several engineering colleges formed coalitions to enhance undergraduate education on their campuses.⁴ Many colleges and universities emulated Penn State's example by forming institutes to promote innovations in teaching and learning.

But countervailing forces persisted. The faculty labor market, some observers argued, is national and based primarily on enhancing prestige through research productivity.⁵ Administrators and faculty in all types of institutions therefore use similar research-oriented criteria in hiring and in rewarding existing faculty. Institutional drift, defined by sociologist Martin Trow as the process whereby lower status institutions mimic the behavior of higher status schools, continues in force.⁶

This chapter examines whether the substantial push for greater balance between teaching and research since 1988 is reflected in a key reward—faculty pay. Has the monetary value of teaching increased in the intervening five years?

DIFFERING PERSPECTIVES ON FACULTY PAY

Theories of faculty pay, according to economist Lee Hansen, can be categorized into two principal groups. According to these theories, aside from the obvious impact of external influences such as state budget allocations, faculty pay is either a function of market competition or institutional forces. Two schools of thought emphasize the *market* model.⁷ One school focuses on an emerging national labor market based on two highly valued commodities, research and scholarly prestige.⁸ Institutions of all types—members of this school emphasize institutional drift—value prospective and current faculty who exhibit research promise or research productivity.⁹

The market segmentation school, the second market-based camp, holds the opposite: Institutions of distinct types and missions value distinct behaviors in faculty. Teaching-oriented institutions pay their most productive and highest quality teachers more than faculty who publish and obtain external funding. Research universities pay their faculty in line with research productivity. Breneman and Youn summarize this position as follows: “large research universities and graduate-training institutions are in the market for different kinds of services than are institutions that emphasize undergraduate teaching...; organizations with an emphasis on research offer a distinctively different form of reward.”¹⁰

Some social scientists see faculty pay as an expression of institutional norms and values irrespective of espoused mission, and holding other influences constant.¹¹ Institutions that actually value teaching will pay their productive teachers the most, and institutions valuing research will pay their productive researchers the most.

PREVIOUS RESEARCH

Using a sample of 5,056 full-time tenure-track faculty from two- and four-year colleges in the NSOPF-88 data, we found substantial evidence for an emerging national market, slim evidence for a segmented market, and support for the view that pay reflects institutional norms and values.¹² Measures of teaching activity and productivity were unrelated or

negatively related to faculty pay irrespective of type of institution or program area.¹³ In contrast, research productivity, especially refereed publications, was uniformly, positively related to pay, again regardless of type of institution or program area.

THE 1992-1993 STUDY

We employed the 1992-93 National Survey of Postsecondary Faculty (NSOPF-93), sponsored by the National Center for Education Statistics, to examine whether, five years later, faculty pay better enhances the value of teaching.¹⁴ This chapter focuses on the 13,080 full-time, tenure-track faculty in two- and four-year colleges and universities responding to the survey—2,454 in public two-year colleges, 7,835 in public four-year institutions, and 2,791 in independent four-year institutions.

Indicators and Scales

This study, like our analysis of NSOPF-88, used *basic salary* from the academic institution as the measure of pay.¹⁵ Basic salary excludes supplemental income, such as monies from summer teaching or funded research, and from consulting. Analyses of simple bivariate relationships between salary and various faculty behaviors used the raw form of basic salary. Complex multivariate analyses used the log transformation of basic salary, consistent with econometric studies, and took length of contract (nine- or 12-month) into account.¹⁶

The study used several measures of faculty teaching and research activity and productivity.¹⁷ Consistent with the NSOPF 1988 analysis, measures of teaching-related activities and workloads included:

- the faculty member’s estimate of the *percent of time spent on teaching and instruction*, including teaching, advising, and supervising students; grading papers, preparing courses, and developing new curricula; and working with student organizations.
- *hours spent in the classroom per week*.
- whether or not the faculty member *taught only graduate students or taught only undergraduate students*.¹⁸

We added a new variable to estimate teaching workload more accurately:

- the *number of independent study contact hours per week*.

The study included three measures of research and scholarly activity and productivity used in the *NEA 1994 Almanac*:

- *percent of time spent on research and scholarship*, including time spent conducting research, preparing or reviewing articles or books, attending or preparing to attend professional meetings, and seeking outside funding for research.
- *total refereed publications during the career*, including articles, chapters in edited volumes, textbooks, other books, monographs, and reviews of books and articles.¹⁹
- whether or not the respondent was a *principal investigator* or co-principal investigator (PI) of an externally funded research project during fall 1992.²⁰

Multivariate analyses also included several control variables, each potentially related to faculty pay, to obtain more accurate estimates of the relationships between teaching, research, and faculty pay. A structural factor in faculty pay is the *length of contract* (nine- or 12-month). Other scholars have found relationships between academic discipline and pay.²¹ This study grouped faculty appointments into 10 program areas: agriculture/home economics, business, education, engineering, fine arts, health sciences, humanities, natural sciences, social sciences, and other fields. *High paying field* was derived from the ranking of average pay in each program area relative to the overall national average.²²

Previous research found relationships between several personal characteristics and salary, including *seniority*, *gender*, *race/ethnicity*, and working in an institution *under a collective bargaining agreement*.²³ Measures of seniority include *years since attained the highest degree*, *time in current rank*—years since achieving the rank held at the institution that employed the faculty member in fall 1992—and *years at the current institution*.

This study, like the earlier study, created scales to reduce the possibility of multicollinearity in multiple regression analyses. We found a high, negative relationship between time spent on teaching and time spent on research—-.59 at four-year colleges; -.32 in

two-year colleges. This amounts to an exchange relationship at four-year colleges—the more time spent on one activity, the less spent on the other. We therefore substituted a single scale—*more research/less teaching*, calculated by subtracting percent of time spent on teaching from percent of time spent on research—for the two indicators of time allocation in the multivariate analyses.

We also found high, positive correlations between years since attained the highest degree, years in rank, and years in the current institution, ranging from .68 to .71 in four-year institutions, and .42 to .63 in two-year colleges. We used *years since attained the highest degree* in the regression analyses, the variable with the highest correlation with basic salary.²⁴

RESULTS

Table 1 shows the means and variances for study variables.²⁵ We separated indicators into quartiles and then examined salary differences by faculty teaching and research activity in four-year institutions.²⁶ We supplemented these bivariate analyses by studying the correlations between measures of faculty activities and faculty pay. The multivariate analyses consisted of semi-log regression models of the logarithmic transformation of basic salary on various control variables and on our measures of teaching and research. We completed separate analyses for different types of institution and program areas and compared our results to similar analyses of NSOPF-88 data, when possible.²⁷

Institutional Type and Program Area

In 1992-93, as in 1987-88, basic salary varied by type of institution (Table 2). Faculty in “other four-year” institutions—primarily separate engineering and medical colleges—received the highest average salaries (about \$67,000), followed in descending order by faculty in research universities (about \$63,000), doctoral-granting universities (about \$50,000), comprehensive colleges and universities (about \$45,000), and liberal arts colleges (about \$40,000).²⁸ The same relationship between type of institution and faculty salary held for public institutions.²⁹ At independent institutions, faculty members in research universities received the highest salaries, followed by faculty in “other four-year” institutions, doctoral-grant-

TABLE 1

	PUBLIC						INDEPENDENT		
	Four-year			Two-Year			Four-Year		
	Mean	SD	SE	Mean	SD	SE	Mean	SD	SE
Income									
Basic Salary (\$)	53,550	29,216	428	41,199	10,530	222	51,697	24,978	496
Log (Basic Salary)	10.82	.36	.005	10.59	.26	.006	10.76	.41	.008
Control Variables									
% on 12-month Appt.	24.42	42.96	.605	16.67	37.27	.752	25.44	43.55	.824
High Paying Field*	-.29	.77	.011	NA	NA	NA	-.39	.74	.014
Years Since Attained Highest Degree	17.42	9.76	.138	17.23	9.32	.190	17.23	10.17	.193
Years in Current Rank**	8.98	7.32	.106	8.88	7.44	.165	8.08	7.03	.137
Years at Current Institution**	12.78	9.36	.135	13.00	8.82	.182	12.34	9.91	.193
% Racial/Ethnic Minority	12.97	33.60	.473	15.52	36.21	.731	10.26	30.34	.574
% Male	76.75	42.24	.595	58.77	49.22	.994	73.46	44.16	.836
% Under Collective Bargaining Agreement	22.30	41.62	.603	61.23	48.72	.010	7.10	25.69	.501
Teaching									
% Time, Teaching	50.58	24.55	.350	71.38	23.61	.484	53.92	22.78	.494
Hours in Class/Week	9.06	6.68	.097	15.58	8.72	.179	9.53	6.63	.128
Independent Study Contact Hours/Week	6.95	10.83	.152	5.12	12.49	.252	5.44	10.15	.192
Taught only Undergraduates	52.44	49.94	.703	NA	NA	NA	60.00	48.99	.927
Taught only Graduate Students	19.46	39.59	.557	NA	NA	NA	19.75	39.81	.754
More Research/Less Teaching***	-26.32	39.96	.570	-66.49	27.51	.564	-3.30	42.19	.810
Research									
% Time, Research	24.28	20.41	.291	4.88	8.43	.173	20.66	21.05	.404
Career Publications (Refereed)	26.32	44.76	.635	2.81	11.39	.232	22.74	41.53	.793
% Principal Investigator, Funded Research Project	31.27	46.36	.653	3.56	18.53	.374	23.97	42.69	.808
Administration									
% Department Chair	12.29	32.83	.472	15.41	36.10	.745	21.94	41.39	.802

* -1 = below average, 0 = average, 1 = above average

SE = Standard Error

** Not used in analysis

*** Scale from -100 to +100

SD = Standard Deviation

NA = Not Applicable

SOURCE: NSOPF 1993.

ing universities, comprehensive colleges and universities, and liberal arts colleges.³⁰ The average pay of faculty members in public two-

year colleges was about \$42,000 in 1992-93.

These results resemble the 1987-88 patterns. Two key exceptions were the higher pay

in independent research universities than in independent “other four-year” institutions, and the significantly higher pay in public doctoral-granting institutions than in public comprehensive colleges.³¹

In 1992-93, faculty in engineering and the health sciences received average salaries above the national norm (Table 3). Faculty in agriculture/home economics, business, and natural sciences were paid at the national average. Faculty in education, fine arts, humanities, social sciences, and other fields were paid, on average, below the national norm.³² The 1987-88 and 1992-93 patterns are identical.

Faculty Activities and Pay: Bivariate Analyses

This section examines the bivariate relationships between pay with measures of teaching and research activity and productivity, by type of institution and by control. We also examine the relationship between pay and chairing a department during fall 1992, a measure of administrative effort.

Teaching/Instruction

Teaching-related indicators included percent of time spent on teaching and instruction, hours in class per week, independent study contact hours per week, and type of students taught (undergraduate only, graduate only, or both).

For both public and independent colleges and universities, pay was inversely related to time spent on teaching: the more time spent on teaching, the less the pay (Table 4).³³ For public institutions, faculty in the bottom quartile—less than 31 percent—averaged about \$65,000; faculty in the 70+ percent quartile made about \$44,000. At independent institutions, faculty in the bottom quartile averaged about \$69,000; faculty in the 70+ percent quartile earned about \$40,000. The 1987-88 and 1992-93 patterns are nearly identical.

The inverse relationship between pay and time spent on teaching held for each type of public institution, although the difference in pay between faculty in the 51-70 percent and the 70+ percent quartiles was not appreciable in research universities or in “other four-year” institutions.³⁴ Results for 1987-88 and 1992-93 were similar, though the pay gap between faculty in 70+ and the 51-70 percent quartiles at public research universities diminished (approximately \$49,000 versus \$51,000 in 1992-93).

Pay varied inversely with time spent on teaching at independent research universities, comprehensives, and “other four-year” institutions. The relationship was dichotomous at independent doctoral-granting universities: Faculty in the lower two quartiles were paid significantly more than colleagues in the upper

TABLE 2

BASIC SALARY (MEANS), BY SOURCE OF CONTROL AND TYPE OF INSTITUTION

	Total	SE	Public	SE	Independent	SE
All Four-Year	52,976	330	53,550	428	51,697	496
Research	63,132	1,030	61,154	1,223	71,292	1,667
Doctoral	50,082	452	48,567	549	53,512	778
Comprehensive	44,890	237	45,235	247	43,844	590
Liberal Arts	39,684	465	NA	NA	39,684	465
Other	67,138	1,698	68,965	1,967	64,016	3,196
Public Two-Year	41,199	222				

NA = Not Applicable

SOURCE: NSOPF 1993.

TABLE 3

BASIC SALARY (MEANS), BY SOURCE OF CONTROL AND PROGRAM AREA: FOUR-YEAR INSTITUTIONS

Program Area	Total	SE	Public	SE	Independent	SE
Agriculture-Home Economics	54,421	1,261	52,850	1,312	46,066	3,702
Business	54,861	809	56,646	859	50,702	1,729
Education	44,516	506	45,290	564	40,965	1,098
Engineering	58,050	931	58,176	1,092	57,527	1,823
Fine Arts	41,729	605	42,448	770	40,594	971
Health Sciences	74,018	2,260	75,690	2,962	70,010	2,878
Humanities	45,287	395	45,721	484	44,547	672
Natural Sciences	54,045	543	53,956	628	54,237	1,040
Social Sciences	49,913	547	49,770	652	50,156	969
Other	49,340	742	48,272	766	51,408	1,510

SOURCE: NSOPF 1993.

TABLE 4

BASIC SALARY (MEANS), BY SOURCE OF CONTROL, TYPE OF INSTITUTION, AND TEACHING-RELATED VARIABLES: PUBLIC AND INDEPENDENT FOUR-YEAR INSTITUTIONS

	Percent of Time Spent on Teaching and Instruction							
	< 31%	SE	31-50%	SE	51-70%	SE	> 70%	SE
Public								
All Four-Year	64,775	912	54,291	1,209	47,264	410	44,390	370
Research	68,259	1,590	60,925	3,184	51,286	983	49,180	1,419
Doctoral	57,617	1,464	46,579	808	46,245	887	42,811	866
Comprehensive	51,686	725	46,570	509	44,373	472	42,626	368
Other Four-Year	80,283	3,493	67,756	3,244	57,722	3,682	52,253	2,764
Independent								
All Four-Year	68,611	1,514	54,780	943	44,952	627	40,402	472
Research	79,498	2,611	67,229	2,683	60,704	3,818	50,533	2,161
Doctoral	56,770	1,404	57,737	1,514	49,207	1,515	47,484	1,453
Comprehensive	52,206	3,012	46,182	1,260	43,151	794	39,985	684
Liberal Arts	41,059	1,598	43,076	1,327	40,556	878	37,708	613
Other Four-Year	85,732	6,135	53,616	4,031	42,409	1,879	41,517	5,075

TABLE 4 (CONTINUED)

**BASIC SALARY (MEANS), BY SOURCE OF CONTROL, TYPE OF INSTITUTION, AND TEACHING-RELATED VARIABLES:
PUBLIC AND INDEPENDENT FOUR-YEAR INSTITUTIONS**

	Hours in Class Per Week							
	<6	SE	6-8	SE	9-12	SE	>12	SE
Public								
All Four-Year	64,374	1,340	52,559	608	46,670	420	46,781	403
Research	68,332	2,522	56,975	1,275	49,679	1,155	55,187	1,749
Doctoral	54,150	1,322	47,629	817	44,636	862	46,868	1,274
Comprehensive	49,009	802	47,331	647	44,977	451	43,369	344
Other Four-Year	81,165	3,473	59,461	2,954	62,262	4,088	56,898	2,734
Independent								
All Four-Year	65,312	1,333	54,055	901	44,780	694	43,205	763
Research	73,911	2,215	67,043	2,759	71,988	10,220	67,157	4,962
Doctoral	57,765	1,652	55,300	1,277	46,972	1,220	48,882	1,888
Comprehensive	52,120	3,106	46,601	1,368	43,552	790	40,590	801
Liberal Arts	40,914	1,629	45,830	1,298	40,850	732	35,721	608
Other Four-Year	74,161	5,615	53,501	4,974	50,469	3,397	62,173	6,414
	Independent Study Contact Hours Per Week							
	0	SE	1-3	SE	4-8	SE	>8	SE
Public								
All Four-Year	49,233	499	54,854	1,204	53,064	687	56,323	728
Research	57,618	1,607	64,939	3,787	59,634	1,675	60,952	1,371
Doctoral	46,115	936	48,872	1,069	47,749	988	50,862	1,253
Comprehensive	44,266	412	45,848	465	45,141	573	45,992	580
Other Four-Year	63,112	3,481	67,029	4,508	64,909	2,455	74,129	3,894
Independent								
All Four-Year	48,965	860	49,836	785	56,031	1,212	53,961	1,262
Research	74,217	4,598	63,278	2,489	75,004	2,786	76,510	3,927
Doctoral	54,220	1,489	58,177	1,614	49,827	1,578	50,527	1,368
Comprehensive	43,605	914	41,734	782	45,666	1,601	46,203	1,923
Liberal Arts	38,073	695	40,647	857	40,279	1,033	39,976	1,332
Other Four-Year	54,043	4,334	61,353	6,000	80,398	7,982	60,581	6,896
	Type of Students Taught							
	Under-graduate	SE	Both	SE	Graduate	SE		
Public								
All Four-Year	48,047	320	50,689	503	66,339	1,938		
Research	55,273	1,078	54,893	1,107	70,284	3,770		
Doctoral	46,098	636	46,143	778	56,459	1,671		
Comprehensive	44,450	287	47,117	556	48,148	966		
Other Four-Year	49,469	1,574	62,771	4,475	79,938	3,289		

TABLE 4 (CONTINUED)

	Type of Students Taught					
	Under-graduate	SE	Both	SE	Graduate	SE
Independent						
All Four-Year	43,044	371	52,522	1,014	70,493	1,657
Research	57,644	2,134	64,727	3,285	79,080	3,085
Doctoral	50,786	964	49,770	1,093	65,654	2,137
Comprehensive	41,014	516	47,980	1,132	54,177	3,232
Liberal Arts	39,645	483	40,460	2,160	NA	NA
Other Four-Year	38,926	1,779	45,727	1,729	67,736	4,191

NA = Not Applicable

SOURCE: NSOPF 1993.

two quartiles. Faculty in the 70+ quartile at independent liberal arts colleges received significantly less pay than colleagues in the lower three quartiles.³⁵

The 1987-88 and 1992-93 results were similar with two exceptions:

- pay did not vary by quartile of time spent on teaching at liberal arts colleges in 1987-88; in 1992-93 it did.
- pay was more strongly and negatively related to time spent on teaching in 1992-93 than in 1987-88 at independent comprehensive colleges and universities.

These two examples of the inverse relationship between pay and teaching effort applied to the most teaching-oriented independent institutions.

Pay decreased as hours spent in the classroom per week increased at all types of institutions.³⁶ The one exception among public institutions: research universities, where pay decreased until reaching 12 hours per week in the classroom, when it increased.³⁷ But, even here, faculty members spending the fewest hours in the classroom received the most pay. The 1987-88 and 1992-93 patterns are identical.

Independent institutions show more complex relationships between hours spent in the classroom per week and pay, though the gen-

eral pattern holds.³⁸ Faculty spending the least time in class at research universities and “other four-year” institutions made the most money, but the trend was not linear as hours in class increased. Faculty spending less than nine hours in class per week at doctoral-granting universities received significantly higher salaries than colleagues in the 9-12 and 12+ hours categories. Pay decreased directly with hours spent in the classroom at comprehensive colleges and universities. Pay initially increased with time spent in the classroom at liberal arts colleges, but then decreased so that faculty spending the most time in class received the lowest pay. Pay was more strongly and negatively related to hours spent in the classroom in comprehensive institutions in 1992-93 than in 1987-88; otherwise, the patterns in the two samples are similar.

Independent study contact hours per week, in contrast to time spent on teaching and hours spent in the classroom per week, was somewhat positively related to pay.³⁹ Seniority may explain this result—senior faculty may be more likely to supervise independent studies than juniors. This pattern varied substantially by type of institution. Pay varied little by independent study contact hours for faculty in research universities, though it went up and down a bit in independent institutions.⁴⁰ Pay increased slightly with greater independent

study contact hours in public doctorals, but it declined slightly in independent doctorals.⁴¹ Pay tended to increase with independent study contact hours in public and independent comprehensive colleges and universities, liberal arts colleges, and public “other four-year” institutions.⁴² Comparable data for 1987-88 are not available.

Faculty who taught only graduate students in 1992-93 received higher salaries on average than colleagues who taught both undergraduates and graduates or only undergraduates.⁴³ This pattern held true for faculty in all types of public⁴⁴ and independent⁴⁵ institutions, except for liberal arts colleges where the typology does not apply.

Research/Scholarship

Measures of research and scholarship included percent of time spent on those activities, number of refereed publications during the career, average number of refereed publications per year—a variable that takes length of time in the faculty position into account—and being a principal or co-principal investigator (PI) on an externally funded research project during fall 1992.

The more time spent on research and scholarship, NSOPF-93 data show, the higher the pay.⁴⁶ This result held everywhere—the pay differential between faculty members spending the most and the least time on research averaged about \$11,000 in public four-year institutions, and about \$16,000 in the independents—but the *patterns* of pay by time spent on research varied substantially by type of institution (Table 5).

Research universities did not show linear, or ever-increasing, rewards for scholarship. Faculty at public universities in the top quartile of time spent on research (35+ percent) earned significantly more than faculty in the bottom quartile (less than 7 percent); at independent research universities, faculty in the 35+ percent category made significantly more than their colleagues in all other categories.⁴⁷ This pattern resembled the 1987-88 trend, though pay varied in a more linear fashion in 1987-88 for faculty at independent research universities.

NSOPF-88 and NSOPF-93 data showed the same dichotomous result for faculty members in public and independent doctoral-granting universities: Faculty who spent the most time

on research made the most money at the publics; faculty who spent the least time on research made the least money at the independents.⁴⁸ Pay increased in a more linear fashion with time spent on research for faculty in all comprehensives in 1987-88 and in 1992-93.⁴⁹

These variables were unrelated at public “other four-year” institutions and only marginally related at independent “other four-year” schools.⁵⁰ Pay increased with time spent on research for faculty in liberal arts colleges; this relationship was not significant in 1987-88.⁵¹

The greater the publishing productivity the higher the average pay for full-time, tenure-track faculty in public and independent institutions, in 1987-88 and 1992-93. This relationship held true for career publications⁵² and for average publications per year,⁵³ irrespective of type of institution or source of control.

PIs received higher pay, on average, than non-PIs at all types of institution and sources of control, except at independent doctoral-granting universities.⁵⁴ PIs at liberal arts colleges made significantly more money than non-PIs in 1992-93, the only change between 1987-88 and 1992-93 results.

Administration

Faculty members in public institutions who served as department chairs in fall 1992 received higher than average pay (Table 6).⁵⁵ Among the independents, this pattern applied only to chairs at doctoral-granting universities, liberal arts colleges, and “other four-year” institutions.⁵⁶

Correlational Analyses

Table 7 shows the intercorrelations between salary and teaching, research, and administration by type of institution for 1987-88 and 1992-93. Pay and time spent on teaching and instruction were inversely related for each type of institution, including modest negative relationships for faculty in liberal arts colleges and community colleges. The relationship was more strongly negative in 1992-93 for faculty in public comprehensives, but less strongly negative in public research universities. Pay and hours spent in the classroom per week were also negatively related at most institutions—slightly more so in public institutions in 1992-93 than in 1987-88; this association was about the same at independent institutions, except for doctoral-granting

TABLE 5

**BASIC SALARY (MEANS), BY SOURCE OF CONTROL, TYPE OF INSTITUTION, AND RESEARCH-RELATED VARIABLES:
PUBLIC AND INDEPENDENT FOUR-YEAR INSTITUTIONS**

	Percent Time Spent on Research and Scholarship							
	< 7%	SE	7-19%	SE	20-34%	SE	>34%	SE
Public								
All Four-Year	48,887	569	50,898	583	53,323	675	60,051	1,411
Research	57,047	1,947	60,453	2,091	60,030	1,543	63,394	2,569
Doctoral	46,316	1,072	47,633	1,053	45,818	840	53,535	1,273
Comprehensive	43,937	382	45,131	440	45,820	556	48,749	837
Other Four-Year	70,320	4,939	66,560	3,363	67,182	3,447	70,860	2,796
Independent								
All Four-Year	42,156	615	48,136	830	55,285	1,059	68,310	1,476
Research	61,984	4,718	67,710	4,668	64,726	2,282	77,483	2,525
Doctoral	46,059	1,314	53,224	1,672	57,174	1,557	54,602	1,295
Comprehensive	40,193	643	42,575	746	48,504	1,885	55,315	2,957
Liberal Arts	36,737	555	41,259	898	43,489	1,191	50,202	3,178
Other Four-Year	55,965	5,025	55,168	5,187	80,269	8,215	68,669	6,383
	Number of Refereed Publications (Career)							
	<3	SE	3-10	SE	11-29	SE	>30	SE
Public								
All Four-Year	45,543	418	46,156	443	51,858	492	69,811	1,607
Research	54,506	1,582	50,895	1,439	53,709	1,096	72,315	2,765
Doctoral	41,708	1,019	41,837	635	49,212	847	61,494	1,419
Comprehensive	41,642	349	43,733	414	49,505	529	55,366	892
Other Four-Year	54,133	2,346	61,711	3,387	62,828	2,713	88,499	4,473
Independent								
All Four-Year	40,426	542	47,100	785	54,467	1,034	73,159	1,406
Research	62,207	4,293	54,245	2,117	63,612	3,067	83,140	2,494
Doctoral	45,592	1,411	49,318	1,699	54,951	1,412	62,569	1,299
Comprehensive	39,229	590	45,162	1,136	46,768	1,190	59,491	4,127
Liberal Arts	34,539	493	40,438	753	45,347	1,017	57,289	2,343
Other Four-Year	48,680	4,019	74,223	8,720	71,956	7,515	70,463	5,703
	Average Publications per Year (Career)							
	<.17	SE	.17-.845	SE	.846-2	SE	>2	SE
Public								
All Four-Year	47,384	465	49,332	430	53,623	586	63,079	1,562
Research	56,468	1,654	55,423	1,419	56,973	1,125	68,469	2,918
Doctoral	43,575	1,155	47,033	761	49,429	951	53,018	1,436
Comprehensive	43,014	374	46,035	429	46,977	576	46,736	849
Other Four-Year	59,911	3,253	56,215	2,130	75,342	3,761	80,939	4,894

TABLE 5 (CONTINUED)

**BASIC SALARY (MEANS), BY SOURCE OF CONTROL, TYPE OF INSTITUTION, AND RESEARCH-RELATED VARIABLES:
PUBLIC AND INDEPENDENT FOUR-YEAR INSTITUTIONS**

	Average Publications per Year (Career)							
	<.17	SE	.17-.845	SE	.846-2	SE	>2	SE
Independent								
All Four-Year	41,901	596	48,901	819	54,804	1,135	66,561	1,373
Research	63,994	4,534	61,841	3,407	67,209	3,342	77,276	2,469
Doctoral	50,571	1,893	52,066	1,831	54,186	1,106	56,533	1,486
Comprehensive	40,057	649	46,297	1,054	44,841	1,297	51,312	3,494
Liberal Arts	35,967	545	41,421	810	44,431	1,404	44,777	1,939
Other Four-Year	50,823	4,689	67,223	7,042	70,234	7,912	70,564	5,360
	Status as Principal Investigator (PI)							
	Not PI	SE	PI	SE				
Public								
All Four-Year	49,598	307	62,093	1,279				
Research	56,550	862	66,137	2,426				
Doctoral	46,385	564	53,762	1,232				
Comprehensive	44,838	261	47,830	727				
Other Four-Year	64,267	2,650	74,961	2,832				
Independent								
All Four-Year	47,201	467	66,652	1,387				
Research	62,579	2,128	79,626	2,408				
Doctoral	53,362	949	53,957	1,279				
Comprehensive	42,906	550	51,905	3,051				
Liberal Arts	39,154	492	43,798	1,338				
Other Four-Year	59,660	3,412	75,644	7,220				

SOURCE: NSOPF 1993.

universities, where the relationship became more strongly negative.

Pay and independent study contact hours per week were unrelated, according to the intercorrelations. In 1992-93, as in 1987-88, pay and teaching only undergraduates were negatively related; pay and teaching only graduate students were positively related.

Consistent with the bivariate analyses, pay and spending more time on research were positively related. The strongest correlate of faculty pay, in general, was career publications. This relationship remained at least as strong in

1992-93 as in 1987-88; it was even stronger in independent doctoral-granting universities, comprehensive institutions, and liberal arts colleges. Being a principal investigator was positively related to pay in some types of institutions, unrelated to pay in others.

Summary

In 1992-93, as in 1987-88, pay and teaching activity and productivity were negatively correlated; pay and scholarly productivity were positively correlated—both with occasional exceptions.

TABLE 6

**BASIC SALARY (MEANS), BY SOURCE OF CONTROL,
TYPE OF INSTITUTION, AND ADMINISTRATIVE-
RELATED VARIABLE: PUBLIC AND INDEPENDENT
FOUR-YEAR INSTITUTIONS**

	Department Chair			
	No	SE	Yes	SE
Public				
All Four-Year	51,183	466	64,701	1,227
Research	59,186	1,355	77,547	3,193
Doctoral	46,310	510	62,933	2,230
Comprehensive	44,257	260	51,333	727
Other Four-Year	64,794	1,794	93,263	8,053
Independent				
All Four-Year	51,413	557	52,260	1,158
Research	70,637	1,774	74,473	5,055
Doctoral	52,739	891	57,167	1,635
Comprehensive	43,293	649	45,591	1,526
Liberal Arts	38,716	569	41,559	841
Other Four-Year	58,636	3,299	76,717	7,495

SOURCE: NSOPF 1993.

**Faculty Activities and Pay:
Multivariate Analyses**

Bivariate relationships do not examine other factors in pay, such as seniority and highest degree attained. We therefore examined semi-log regression models to estimate the effects of teaching and research on faculty pay more accurately, using the logarithmic transformation of basic salary [hereafter log (basic salary)] as the criterion. The regression models accounted for between 39 and 60 percent of the variance in log (basic salary) for faculty members in four-year institutions, and 28 percent in public two-year colleges (Table 8). For analyses by program area, the model accounted for between 49 and 72 percent of the variance in log (basic salary) (Table 9). The slightly different mix of variables and scales used in 1987-88 permitted only approximate comparisons. This discussion focuses on the relative importance of teaching and research in faculty pay, not on the control variables.

Type of Institution

Publishing, spending more time on research and less on teaching, and teaching only graduate students were the three strongest behavioral predictors of pay for faculty in public research universities (Table 8). Spending more hours teaching in the classroom showed a modest, negative relation to pay. The behavioral relationships with pay for faculty in independent research universities were similar; being a PI was an additional positive factor.

Spending more time on research and less on teaching, publishing, and teaching only graduate students were positive indicators of pay for faculty in public and independent doctoral-granting universities. Spending fewer hours in the classroom was also positively indicative of pay for faculty at independent doctoral-granting institutions. Comprehensive colleges and universities, public and independent, showed almost identical patterns. Publishing productivity was strongly, positively related to pay at independent liberal arts colleges. So were spending more time on research and less on teaching, and being a PI; pay and spending more hours in classroom instruction were negatively related.

Publishing was also a significant, positive predictor of pay for faculty in "other four-year" public institutions; independent study contact hours was the only positively related instruction-related indicator. Spending more time on research and less on teaching was positively related to pay for faculty in "other four-year" independent institutions, but publishing productivity was not significantly related to pay. Faculty in public two-year colleges who spent more time on research and less on teaching, and who published more, received the highest pay.

The difference in specific measures between 1987-88 and 1992-93 made direct comparisons impossible, but our results indicate the continued importance of publishing productivity in faculty pay, even in community colleges. Spending more time on research and less on teaching showed a more consistent, positive relationship to pay in 1992-93, across type of institution, than in 1987-88. Spending more hours in class was positively related to pay for faculty in public doctoral-granting and comprehensive institutions in 1987-88; by 1992-93, it was a negative factor in doctoral-

TABLE 7

CORRELATIONS BETWEEN FACULTY WORKLOAD WITH BASIC SALARY, BY TYPE OF INSTITUTION

	1	2	3	4	5	6	7	8	9
Public									
All Four-Year									
1993	-.28	-.13	.06	-.20	.21	.17	.38	.20	.14
1988	-.40	-.02	NA	.05	.27	.19	.38	.26	NA
Research									
1993	-.20	-.09	.01	-.12	.15	.08	.32	.12	.14
1988	-.32	.11	NA	-.02	.17	.05	.34	.21	NA
Doctoral									
1993	-.34	-.06	.10	-.15	.20	.19	.46	.20	.33
1988	-.32	-.10	NA	.09	.30	.17	.43	.26	NA
Comprehensive									
1993	-.25	-.13	.02	-.10	.07	.11	.27	.08	.20
1988	-.36	-.06	NA	.07	.33	.07	.23	.12	NA
Other Four-Year									
1993	-.34	-.14	.11	-.40	.25	.04	.48	.16	.29
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Two-Year									
1993	-.11	-.05	.03	NA	NA	.04	.11	.00	.09
1988	-.06	-.04	NA	NA	NA	.07	.06	NA	NA
Independent									
All Four-Year									
1993	-.45	-.18	.04	-.43	.36	.38	.47	.33	.01
1988	-.46	-.15	NA	.00	.28	.25	.46	.30	NA
Research									
1993	-.30	.04	.12	-.27	.23	.20	.40	.29	.05
1988	-.36	-.04	NA	-.02	.22	.01	.44	.12	NA
Doctoral									
1993	-.22	-.23	-.14	-.15	.36	.12	.33	.01	.09
1988	-.18	-.13	NA	.05	.20	.13	.19	.21	NA
Comprehensive									
1993	-.24	-.10	.07	-.28	.20	.25	.37	.16	.06
1988	-.25	-.13	NA	.19	.38	-.01	.21	.06	NA
Liberal Arts									
1993	-.13	-.18	.01	NA	NA	.26	.44	.12	.10
1988	-.07	-.14	NA	NA	NA	.13	.32	.03	NA
Other Four-Year									
1993	-.57	.06	-.01	-.44	.09	.08	.26	.19	.22
1988	-.41	-.04	NA	-.10	-.04	.10	.35	.32	NA

1 = Percent of time on teaching/instruction

2 = Number of hours teaching in class per week

3 = Independent study contact hours per week

4 = Taught only undergraduate students

5 = Taught only graduate students

6 = Percent of time on research/scholarship

7 = Number of refereed publications, career

8 = Principal investigator on research project, Fall 1992

9 = Department chair

NA = Not applicable or not available

SOURCES: NSOPF 1988, NSOPF 1993.

TABLE 8

SIGNIFICANT PREDICTORS OF LOG (BASIC SALARY)—FOUR-YEAR AND TWO-YEAR INSTITUTIONS)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Public														
Research	R square = .54		N (unweighted) = 822											
Beta	.142	.122	.014		.097		.124	.145	.001		.001		-.004	.082
Beta-Std.	.181	.264	.385		.104		.089	.118	.101	.157		-.063		.107
P Level	.0001	.0001	.0001		.0001		.0004	.0001	.0003	.0001		.01		.0001
Doctoral	R square = .57		N (unweighted) = 823											
Beta	.105	.084	.015		.058		.188	.143	.001	.001				.052
Beta-Std.	.134	.204	.478		.081		.190	.155	.129	.139				.064
P Level	.0001	.0001	.0001		.001		.0001	.0001	.0001	.0001				.007
Comprehensive	R square = .43		N (unweighted) = 2143											
Beta	.074	.082	.013		.061	.097	.192	.071	.001	.001				.035
Beta-Std.	.094	.194	.432		.101	.173	.269	.089	.141	.124				.033
P Level	.0001	.0001	.0001		.0001	.0001	.0001	.0001	.0001	.0001				.05
Other Four-Year	R square = .60		N (unweighted) = 227											
Beta	.113		.010		.103	.179	.216	.229		.002				.005
Beta-Std.	.148		.291		.126	.202	.236	.200		.217				.136
P Level	.007		.0001		.01	.0001	.0001	.0001		.0001				.004
Two-Year	R square = .28		N (unweighted) = 1996											
Beta	.058	NA	.011		.046	.047	.113	.099	.074	.001	.001			NA
Beta-Std.	.083	NA	.403		.061	.089	.209	.157	.101	.079	.060			NA
P Level	.0001	NA	.0001		.001	.0001	.0001	.0001	.0001	.0001	.002			NA
Independent														
Research	R square = .48		N (unweighted) = 244											
Beta	.105		.018				.290		.001	.001	.113			.092
Beta-Std.	.125		.507				.154		.128	.124	.139			.113
P Level	.01		.0001				.003		.02	.04	.01			.03
Doctoral	R square = .46		N (unweighted) = 441											
Beta	.060	.037	.014		.068		.204		.002	.001		-.006		.181
Beta-std.	.084	.083	.435		.086		.165		.195	.109		-.084		.242
P Level	.03	.03	.0001		.03		.0001		.0001	.008		.03		.0001
Comprehensive	R square = .39		N (unweighted) = 734											
Beta		.070	.013		.056		.266	-.043	.002	.001				.117
Beta-std.		.152	.403		.082		.364	-.057	.189	.079				.110
P Level		.0001	.0001		.007		.0001	.05	.0001	.01				.0002
Liberal Arts	R square = .52		N (unweighted) = 673											
Beta			.013		.036		.236		.001	.004	.057	-.004		NA
Beta-std.			.445		.057		.354		.111	.227	.061	-.086		NA
P Level			.0001		.05		.0001		.0001	.0001	.03	.002		NA

TABLE 8 (CONTINUED)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Other Four-Year	R square = .47		N (unweighted) = 113											
Beta		.166	.015				.232	.169	.003					
Beta-std.		.314	.334				.203	.152	.268					
P Level		.0002	.0001				.03	.04	.007					

1 = On a twelve month appointment

2 = High paying field

3 = Years since attained highest degree

4 = Minority

5 = Male

6 = In an institution with collective bargaining

7 = Highest degree

8 = Department chair

9 = More research/less teaching

10 = Total refereed publications, career

11 = Principal investigator, funded research

12 = Hours in class/week

13 = Independent study contact hours

14 = Taught only graduate students

Beta-Std. = Standardized regression coefficient

NA = Not Applicable

SOURCE: NSOPF 1993.

granting universities and unrelated to pay in the comprehensives.

Research and scholarly productivity continued as strong indicators of faculty pay in 1992-93. Teaching activity and productivity were either unrelated or negatively related to basic salary in 1992-93, as in 1987-88.

Program Area

The research and graduate-oriented model underlying high prestige in academe also appeared in analyses by discipline.⁵⁷ Faculty who spent more time on research and less time on teaching received higher pay in every field except agriculture/home economics and engineering. Publishing productivity was indicative of higher pay in all fields except fine arts⁵⁸ and "other" fields. Pay and being a PI were positively related in the health sciences and in the social sciences. Teaching only graduate students was positively related to pay for faculty members in business, the humanities, the natural sciences, the social sciences, and other fields.

Hours in class per week and pay, in contrast, were unrelated in eight fields, and negatively related in business and the humanities. We found only one positive relationship between instruction-related activities and pay in any program area—generating larger num-

bers of contact hours through independent study in agriculture/home economics.

CONCLUSION

Faculty pay, our study shows, has not changed in line with the intense scrutiny paid to teaching and learning since the late 1980s. Faculty pay may reflect a national labor market, where measures of scholarly productivity are important irrespective of type of school or discipline, or a continued push to enhance the prestige of local institutions through research and scholarly productivity. Perhaps five years is too short a period to reflect substantial change.

In any case, regardless of type of institution or program area, faculty members who spent less time on teaching and more on research, who published more, and who taught graduate students were more likely to receive higher salaries than their colleagues who devoted more of their time and effort to undergraduate teaching.

NOTES

¹ Fairweather, 1994, 1996.

² Carnegie Foundation for the Advancement of Teaching, 1989.

TABLE 9

SIGNIFICANT PREDICTORS OF LOG (BASIC SALARY), BY PROGRAM AREA—FOUR-YEAR INSTITUTIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Agriculture/ Home Eco.	R square = .72		N (unweighted) = 103												
Beta	.193		.015				.162	.272			.002			.005	
Beta-Std.	.316		.482				.200	.231			.311			.144	
P Level	.0002		.0001				.002	.0008			.0001			.02	
Business	R square = .55		N (unweighted) = 438												
Beta	.116	.069	.054	.007				.313	.084	.001	.002		-.010		.115
Beta-Std.	.120	.104	.075	.194				.387	.080	.086	.154		-.147		.118
P Level	.0005	.006	.04	.0001				.0001	.02	.04	.0001		.0001		.001
Education	R square = .54		N (unweighted) = 552												
Beta	.154		.017				.083	.269		.001	.002				
Beta-Std.	.184		.561				.130	.294		.072	.154				
P Level	.0001		.0001				.0001	.0001		.05	.0001				
Engineering	R square = .61		N (unweighted) = 306												
Beta	.201		.009	-.048				.224	.107		.002				
Beta-Std.	.255		.360	-.080				.273	.125		.297				
P Level	.0001		.0001	.03				.0001	.001		.0001				
Fine Arts	R square = .49		N (unweighted) = 394												
Beta	.114		.015	.134	.097	.109	.133	.102	.001						
Beta-Std.	.196		.530	.140	.147	.145	.233	.143	.107						
P Level	.0001		.0001	.0002	.0001	.0003	.0001	.0005	.008						
Health Sciences	R square = .57		N (unweighted) = 536												
Beta	.204		.013		.095	.184	.080	.003	.001	.084					
Beta-Std.	.189		.252		.090	.154	.058	.225	.076	.076					
P Level	.0001		.0001		.015	.0001	.05	.0001	.04	.04					
Humanities	R square = .55		N (unweighted) = 1217												
Beta	.057		.016		.051	.074	.248	.057	.001	.002			-.005		.076
Beta-Std.	.073		.523		.078	.102	.236	.073	.142	.191			-.075		.055
P Level	.0002		.0001		.0002	.0001	.0001	.0004	.0001	.0001			.0006		.008
Natural Sciences	R square = .58		N (unweighted) = 1153												
Beta	.124	.033	.014			.121	.237	.051	.001	.002					.067
Beta-Std.	.163	.050	.415			.140	.169	.052	.161	.273					.082
P Level	.0001	.04	.0001			.0001	.0001	.01	.0001	.0001					.0005
Social Sciences	R square = .61		N (unweighted) = 869												
Beta	.097		-.051	.017		.067	.069	.228	.050	.001	.001	.079			.130
Beta-Std.	.111		-.076	.533		.086	.085	.152	.058	.150	.159	.105			.133
P Level	.001		.0009	.0001		.0001	.0002	.0001	.01	.0001	.0001	.0001			.0001

TABLE 9 (CONTINUED)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Other Fields	R square = .51		N (unweighted) = 652												
Beta	.134	-.048	.017	.081			.138	.218		.002					.162
Beta-Std.	.184	-.064	.457	.070			.150	.251		.145					.204
P Level	.0001	.04	.0001	.01			.0001	.0001		.0001					.0001

1 = On twelve month appointment
 2 = Doctoral-granting institution
 3 = Source of control (public/independent)
 4 = Years since attained highest degree
 5 = Minority
 6 = Male
 7 = In an institution with collective bargaining
 8 = Highest degree
 9 = Department chair
 10 = More research/less teaching
 11 = Total refereed publications, career
 12 = Principal investigator, funded research
 13 = Hours in class/week
 14 = Independent study contact hours
 15 = Taught only graduate students
 Beta-Std. = Standardized regression coefficient

SOURCE: NSOPF 1993.

³ Scott and Awbrey, 1993.

⁴ Fairweather, 1996, 91-108, for example.

⁵ Winston, 1994.

⁶ Trow, 1984, Fairweather, 1996.

⁷ Hansen, 1986, 87-88.

⁸ Winston, 1994.

⁹ Fulton and Trow, 1974.

¹⁰ Breneman and Youn, 1988, 3.

¹¹ Getz and Siegfried, 1991, 265-266; Levin, 1991.

¹² Fairweather, 1994, 1995. "The similarity in relationship between teaching and research behaviors with pay across type of institution, and especially the lack of a positive relationship between teaching productivity and pay at teaching-oriented institutions, is consistent with a national market for faculty...The findings are [also] consistent with the perspective on pay to reinforce institutional norms" (Fairweather, 1995, 188-189).

¹³ Fairweather, 1994.

¹⁴ NSOPF-93. NSOPF-93 originally contacted 974 public and independent colleges and universities and obtained an 85 percent institutional response rate (817). The surveyors stratified this sample of institutions by the then-existing Carnegie typology (Carnegie Foundation for the Advancement of Teaching, 1987), and then drew a random sample of faculty within each institution from lists obtained from participating institutions. Full-time women faculty and faculty from each racial and ethnic

group were oversampled. Of the original 31,354 sampled faculty members, 1,590 were ineligible, and 25,780 responded (an 87 percent response rate). Weights were calculated so that the statistical estimates would represent the population of faculty within the national universe of two- and four-year academic institutions.

¹⁵ The measure of basic salary was based on faculty responses to the question, "For the calendar year 1992, estimate your gross compensation before taxes for the source listed below: basic salary."

¹⁶ See Fairweather, 1995.

¹⁷ NSOPF-93 replaced missing values typically with imputed variables purportedly to make analyses easier. This process can distort results, so we deleted all imputed values and retained the original missing values.

¹⁸ NSOPF-88: Fairweather, 1994; percent: Baldrige, Curtis, Ecker, and Riley, 1978; Fulton and Trow, 1974; hours: Bayer, 1973; Fulton and Trow, 1974; graduate/undergraduate: Fairweather, 1994.

¹⁹ Fairweather, 1994. The present study, unlike the analysis of 1987-88 data, excluded "giving performances in the fine or applied arts" from the definition of career publications because of the low reliability of these estimates.

²⁰ Percent time: Baldrige et al., 1978; refereed publications and PI: Ladd, 1979.

²¹ Blau, 1973; Fulton and Trow, 1974; Gordon and Morton, 1974; Fairweather, 1994.

²² High paying field was scored as follows: 1 = program areas with average salaries above the overall mean (engineering, health sciences), 0 = program areas with average salaries at the overall mean (agriculture/home economics, business, natural sciences), -1 = program areas with salaries below the overall mean (education, fine arts, humanities, social sciences, other fields).

²³ Seniority: Fairweather, 1994; Moore, 1993; Parcel and Mueller, 1983; gender: Daymont and Andrisani, 1984; Gordon and Morton, 1974, race/ethnicity: Gordon and Morton, 1974; bargaining agreement: Fairweather, 1994.

²⁴ We used principal components analyses to create scales for more research/less teaching and for seniority in the analysis of 1987-88 data (Fairweather, 1994). The more simple approaches used in this study—creating a scale by subtracting time spent on teaching from time spent on research, and selecting the seniority measure with the highest correlation with basic salary—have equal utility, are easier to understand, and are likely to be as reliable as the more complex procedures.

²⁵ The criterion for minimally acceptable level of significance for statistical tests was $p < .05$. When multiple pairs were compared simultaneously—comparing each program area mean with the overall national average, for example—we increased the acceptable level of significance by the Bonferroni adjustment, dividing the level of significance by the number of multiple comparisons. The presentation of t-test results for mean differences or for differences between proportions, based on one-tailed tests of significance, is: $t(\text{comparison reference}) = t\text{-value}$, $p\text{-value}$ (level of significance). The relevant symbols are res = research universities, doc = doctoral-granting universities, comp = comprehensive colleges and universities, lib = liberal arts colleges, other = other four-year institutions, and cc = public two-year or community colleges. We would, for example, refer to a comparison between research universities and comprehensive colleges and universities as $t(\text{res}/\text{comp})$. The footnotes show only statistically significant differences.

²⁶ Population estimates from survey data were based on weights derived from the inverse of the probability of a faculty member in a particular type of institution being selected. The probability of selecting a faculty member for the sample was a function of the odds of an institution being selected from the universe of accredited postsecondary institutions, and the probability of a faculty member being selected from the population of faculty within his or her institution.

²⁷ Type of institution uses the Carnegie typology; see Carnegie Foundation for the Advancement of Teaching, 1987.

²⁸ $t(\text{other}/\text{res}) = 2.02$, $p < .05$; $t(\text{res}/\text{doc}) = 10.77$, $p < .001$; $t(\text{doc}/\text{comp}) = 10.18$, $p < .001$; $t(\text{comp}/\text{lib}) = 9.97$, $p < .001$.

²⁹ $t(\text{other}/\text{res}) = 3.37$, $p < .001$; $t(\text{res}/\text{doc}) = 9.39$, $p < .001$; $t(\text{doc}/\text{comp}) = 5.53$, $p < .001$.

³⁰ $t(\text{other}/\text{res}) = -2.02$, $p < .05$; $t(\text{other}/\text{doc}) = 3.19$, $p < .01$; $p(\text{res}/\text{doc}) = 9.66$, $p < .001$; $t(\text{doc}/\text{comp}) = 9.91$, $p < .001$; $t(\text{comp}/\text{lib}) = 5.54$, $p < .001$.

³¹ For all comparative data from NSOPF-88, see Fairweather, 1994.

³² $t(\text{education}) = -14.65$, $p < .001$; $t(\text{engineering}) = 5.35$, $p < .001$; $t(\text{fine arts}) = -17.61$, $p < .001$; $t(\text{health sciences}) = 10.29$, $p < .001$; $t(\text{humanities}) = -16.95$, $p < .001$; $t(\text{social sciences}) = -5.41$, $p < .001$; $t(\text{other}) = -5.10$, $p < .001$.

³³ All types of publics: $t(31/31-50) = -6.92$, $p < .001$; $t(31-50/51-70) = -5.50$, $p < .001$; $t(51-70/70) = -5.21$, $p < .001$. All types of independents: $t(31/31-50) = -7.75$, $p < .001$; $t(31-50/51-70) = -8.68$, $p < .001$; $t(51-70/70) = -5.80$, $p < .001$.

³⁴ Research: $t(31/31-50) = -2.06$, $p < .05$; $t(31-50/51-70) = -2.89$, $p < .01$. Doctoral: $t(31/31-50) = -6.60$, $p < .001$; $t(51-70/70) = -2.77$, $p < .01$. Comprehensive: $t(31/31-50) = -5.77$, $p < .001$; $t(31-50/51-70) = -3.17$, $p < .01$; $t(51-70/70) = -2.92$, $p < .01$. Other: $t(31/31-50) = -2.63$, $p < .01$; $t(31-50/51-70) = -2.04$, $p < .05$.

³⁵ Research: $t(31/31-50) = -3.28$, $p < .01$; $t(51-70/70) = -2.32$, $p < .01$. Doctoral: $t(31-50/51-70) = -3.98$, $p < .001$. Comprehensive: $t(31-50/51-70) = -2.04$, $p < .05$; $t(51-70/70) = -3.02$, $p < .01$. Liberal arts: $t(51-70/70) = -2.66$, $p < .01$. Other: $t(31/31-50) = -4.37$, $p < .001$; $t(31-50/51-70) = -2.52$, $p < .01$.

³⁶ All types of publics: $t(6/6-8) = -8.03$, $p < .001$; $t(6-8/9-12) = -7.97$, $p < .001$. All types of independents: $t(6/6-8) = -7.00$, $p < .001$; $t(6-8/9-12) = -8.16$, $p < .001$.

³⁷ Research: $t(6/6-8) = -4.02$, $p < .001$; $t(6-8/9-12) = -4.24$, $p < .001$; $t(9-12/12) = 2.62$, $p < .01$. Doctoral: $t(6/6-8) = -4.20$, $p < .001$; $t(6-8/9-12) = -2.52$, $p < .01$. Comprehensive: $t(6-8/9-12) = -2.98$, $p < .01$; $t(9-12/12) = -2.84$, $p < .01$. Other: $t(6/6-8) = -4.76$, $p < .001$.

³⁸ Research: $t(6/6-8) = -1.94$, $p < .05$. Doctoral: $t(6-8/9-12) = -4.69$, $p < .001$. Comprehensive: $t(6-8/9-12) = -1.92$, $p < .05$; $t(9-12/12) = -2.63$, $p < .01$. Liberal arts: $t(6/6-8) = 2.36$, $p < .01$; $t(6-8/9-12) = -3.34$, $p < .001$; $t(9-12/12) = -5.39$, $p < .001$. Other: $t(6/6-8) = -2.75$, $p < .01$.

³⁹ All types of publics: $t(0/1-3) = 4.31$, $p < .001$; $t(4-8/8) = 3.26$, $p < .01$. All types of independents: $t(1-3/4-8) = 4.29$, $p < .001$.

⁴⁰ $t(0/1-3) = -2.09$, $p < .05$; $t(1-3/4-8) = 3.14$, $p < .01$.

⁴¹ Public: $t(1/1-3) = 1.94$, $p < .05$; $t(4-8/8) = 1.95$, $p < .05$. Independent: $t(1-3/4-8) = -3.70$, $p < .001$.

- ⁴² Public: Comprehensive: $t(0/1-3) = 2.55, p < .01$. Other: $t(4-8/8) = 2.00, p < .05$. Independent: Comprehensive: $t(1-3/4-8) = 2.21, p < .05$. Liberal arts: $t(0/1-3) = 2.33, p < .01$.
- ⁴³ Public: $t(\text{grad}/\text{und}) = 9.31, p < .001$; $t(\text{grad}/\text{both}) = 7.82, p < .001$. Independent: $t(\text{grad}/\text{und}) = 16.19, p < .001$; $t(\text{grad}/\text{both}) = 9.26, p < .001$.
- ⁴⁴ Research: $t(\text{grad}/\text{und}) = 3.83, p < .001$; $t(\text{grad}/\text{both}) = 3.92, p < .001$. Doctoral: $t(\text{grad}/\text{und}) = 5.79, p < .001$; $t(\text{grad}/\text{both}) = 5.60, p < .001$. Comprehensive: $t(\text{grad}/\text{und}) = 3.67, p < .001$. Other: $t(\text{grad}/\text{und}) = 8.41, p < .001$; $t(\text{grad}/\text{both}) = 3.09, p < .01$.
- ⁴⁵ Research: $t(\text{grad}/\text{und}) = 5.71, p < .001$; $t(\text{grad}/\text{both}) = 3.18, p < .01$. Doctoral: $t(\text{grad}/\text{und}) = 6.34, p < .001$; $t(\text{grad}/\text{both}) = 6.62, p < .001$. Comprehensive: $t(\text{grad}/\text{und}) = 4.02, p < .001$. Other: $t(\text{grad}/\text{und}) = 6.33, p < .001$; $t(\text{grad}/\text{both}) = 4.85, p < .001$.
- ⁴⁶ All types of publics: $t(7/7-19) = 2.47, p < .01$; $t(7-19/20-34) = 2.72, p < .01$; $t(20-34/35) = 4.30, p < .001$. All types of independents: $t(7/7-19) = 5.79, p < .001$; $t(7-19/20-34) = 5.31, p < .001$; $t(20-34/35) = 7.17, p < .001$.
- ⁴⁷ Public: $t(7/35) = 1.97, p < .05$. Independent: $t(20-34/35) = 3.88, p < .001$.
- ⁴⁸ Public: $t(20-34/35) = 5.06, p < .001$. Independent: $t(7/7-19) = 3.37, p < .001$.
- ⁴⁹ Public: $t(7/7-19) = 2.05, p < .05$; $t(20-34/35) = 2.91, p < .01$. Independent: $t(7/7-19) = 2.42, p < .01$; $t(7-19/20-34) = 2.92, p < .01$.
- ⁵⁰ $t(7-19/20-34) = 2.58, p < .01$.
- ⁵¹ $t(7/7-19) = 4.28, p < .001$; $t(20-34/35) = 1.98, p < .05$.
- ⁵² All types of publics: $t(3-10/11-29) = 8.61, p < .001$; $t(11-29/30) = 10.68, p < .001$. Research: $t(11-29/30) = 6.26, p < .001$. Doctoral: $t(3-10/11-29) = 6.97, p < .001$; $t(11-29/30) = 7.43, p < .001$. Comprehensive: $t(3/3-10) = 3.86, p < .001$; $t(3-10/11-29) = 8.59, p < .001$; $t(11-29/30) = 5.65, p < .001$. Other: $t(11-29/30) = 4.92, p < .001$. All types of independents: $t(3/3-10) = 7.00, p < .001$; $t(3-10/11-29) = 5.68, p < .001$; $t(11-29/30) = 10.71, p < .001$. Research: $t(11-29/30) = 4.94, p < .001$. Doctoral: $t(3-10/11-29) = 2.55, p < .01$; $t(11-29/30) = 3.97, p < .001$. Comprehensive: $t(3/3-10) = 4.64, p < .001$; $t(11-29/30) = 2.96, p < .01$. Liberal arts: $t(3/3-10) = 6.55, p < .001$; $t(3-10/11-29) = 3.88, p < .001$; $t(11-29/30) = 4.59, p < .001$. Other: $t(3/3-10) = 2.66, p < .01$.
- ⁵³ All types of publics: $t(.17/.17-.845) = 3.08, p < .01$; $t(.17-.845/.846-2) = 5.90, p < .001$; $t(.846-2/2) = 5.67, p < .001$. Research: $t(.846-2/2) = 3.68, p < .001$. Doctoral: $t(.17/.17-.845) = 2.50, p < .01$; $t(.17-.845/.846-2) = 1.97, p < .05$; $t(.846-2/2) = 2.08, p < .05$. Comprehensive: $t(.17/.17-.845) = 5.31, p < .001$. Other: $t(.17-.845/.846-2) = 4.43, p < .001$. All types of independents: $t(.17/.17-.845) = 6.91, p < .001$;

$t(.17-.845/.846-2) = 4.22, p < .001$; $t(.846-2/2) = 5.57, p < .001$. Research: $t(.846-2/2) = 2.42, p < .01$. Doctoral: $t(.17/2) = 2.48, p < .01$. Comprehensive: $t(.17/.17-.845) = 5.04, p < .001$. Liberal arts: $t(.17/.17-.845) = 9.18, p < .001$; $t(.17-.845/.846-2) = 2.11, p < .05$. Other: $t(.17/.17-.845) = 1.94, p < .05$; $t(.17/2) = 2.77, p < .01$.

⁵⁴ All types of publics: $t = 9.50, p < .001$. Research: $t = 3.72, p < .001$. Doctoral: $t = 5.44, p < .001$. Comprehensive: $t = 3.87, p < .001$. Other: $t = 2.76, p < .01$. All types of independents: $t = 13.29, p < .001$. Research: $t = 5.30, p < .001$. Comprehensive: $t = 2.90, p < .01$. Liberal arts: $t = 3.26, p < .01$. Other: $t = 2.00, p < .05$.

⁵⁵ All types of publics: $t = 10.30, p < .001$. Research: $t = 5.29, p < .001$. Doctoral: $t = 7.27, p < .001$. Comprehensive: $t = 9.17, p < .001$. Other: $t = 3.45, p < .001$.

⁵⁶ Doctoral: $t = 2.38, p < .01$. Liberal arts: $t = 2.80, p < .01$. Other: $t = 2.21, p < .05$.

⁵⁷ Fulton and Trow, 1974.

⁵⁸ Recall that exhibitions and performances were not included in the definition of career refereed publications.

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