

# The Relative Value of Teaching and Research—Revisited

By James S. Fairweather

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What aspects of faculty work do colleges reward? Research conducted in the 1990s provided a clear answer: scholarly productivity was the strongest correlate of faculty pay. Faculty who taught less and published more received the highest average salaries at all types of four-year institutions and in all disciplines. Teaching was typically unrelated to—or a negative factor in—faculty compensation.<sup>1</sup>

A decade ago, Ernest Boyer's *Scholarship Reconsidered* argued for a renewed commitment to college teaching. His message—recast instruction as a form of scholarship—led to many reforms in assessing faculty work.<sup>2</sup> Many states, including Ohio and Tennessee, tied public resources to a commitment to teaching and learning.<sup>3</sup> Federal agencies, such as the National Science Foundation, and independent foundations, such as the Bush Foundation, invested heavily in undergraduate education and professional development for teaching. D. Bruce Johnstone, a former SUNY chancellor, called for improved “learning productivity,” that is, efficiently increasing student learning outputs instead of focusing on instructional inputs.<sup>4</sup> Evidence mounted about the effectiveness of active and collaborative learning for increasing these outputs.<sup>5</sup> Many colleges and universities established teaching and learning centers for professors to promote these strategies.<sup>6</sup>

Research universities—often criticized for paying inadequate attention to undergraduate teaching—are not homogeneous.<sup>7</sup> These institutions vary in their origins. Some were research-oriented for decades, while others evolved from a commitment to public service and only recently focused on research and scholarship. These historical differences are reflected in growing differences in commitments to teaching and learning.<sup>8</sup> Some land-grant research universities—Pennsylvania State University and Michigan State University, for example—are determinedly promoting effective instructional practices.

Countervailing forces persist, and other institutions, often with different histories, remain less committed. The faculty labor market is national in scope, assert some observers, and remains based primarily on enhancing prestige through research productivity.<sup>9</sup> From this perspective, “administrators

and faculty in all types of institutions therefore use similar research-oriented criteria in hiring and in rewarding existing faculty."<sup>10</sup> This focus on prestige helps to explain a related trend: growing utilization of part-time faculty and non-tenure track staff to teach undergraduates.<sup>11</sup>

Does faculty pay reflect this push for greater commitment to teaching and learning, and for restoring the balance between teaching and research? Has the monetary value of teaching increased in the past five or ten years? This chapter provides some answers.

### FACULTY PAY: DIFFERING PERSPECTIVES

Theories of faculty pay can be categorized into pay as a function of (a) market competition or (b) institutional forces.<sup>12</sup> Two schools of thought at odds with each other drive the *market competition* model. One school posits an emerging national labor market based principally on research and scholarly prestige.<sup>13</sup> Institutions of *all types* value prospective and current faculty members who show research promise or productivity. Proponents of the market segmentation school, in contrast, note the existence of a class of teaching-oriented institutions that award higher pay to their most productive and highest quality teachers, not to faculty members who publish and obtain external funds. Research universities, members of both schools agree, pay their faculty in line with research productivity. "Large research universities and graduate-training institutions," note two observers, "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 rewards."<sup>14</sup>

Other economists believe that pay is an expression of *institutional norms and values* regardless of espoused mission or the nature of the market.<sup>15</sup> "Institutions that actually value teaching," assert these economists, "will pay their productive teachers the most, whereas institutions valuing research will pay their productive researchers the most."<sup>16</sup>

A recent reinterpretation of these theories sees faculty salaries as tools for institutional policy.<sup>17</sup> Institutional leaders, according to this reinterpretation, can rely on the national

market to set salaries, or they can use salaries to *decrease* the effects of markets—by taking into account factors such as seniority and internal measures of merit. The University of California system, for example, established career ladders with standardized salary levels for each step. Institutional leaders, notes this study, can also set salary policies to "elevate teaching and public service as criteria for salary adjustments."<sup>18</sup>

This essay addresses the competing claims of the two market competition schools of thought. The data are inadequate to compare market competition and institutional forces perspectives directly, but the results shed light on the debate.

### PREVIOUS RESEARCH

Using samples of 5,056 and 13,040 full-time tenure-track faculty members, respectively, the National Surveys of Postsecondary Faculty 1987–88 (NSOPF-88) and 1992–93 (NSOPF-93) reported substantial evidence of a national market, and limited evidence of a segmented market.<sup>19</sup> Publishing productivity was consistently and positively related to pay irrespective of institutional type or academic discipline. Measures of teaching activity and productivity were unrelated or negatively indicative of faculty compensation.

### THE 1998–99 STUDY

This report examines the relationships between faculty teaching, research, and pay. It focuses on the 8,416 full-time, tenure-track faculty in two- and four-year colleges and universities responding to the 1998–99 National Survey of Postsecondary Faculty (NSOPF-99).<sup>20</sup> Eliminating the 75 faculty from independent two-year colleges produced a sample of 8,341: 1,859 in public two-year colleges, 4,518 in public four-year institutions, and 1,964 in independent four-year institutions.<sup>21</sup> I compared results with NSOPF-93 and, when possible, with NSOPF-88.

### Indicators and Scales

This study used *basic salary* from the academic institution as the measure of pay.<sup>22</sup> Basic salary excludes supplemental income, such as monies from summer teaching, funded

research, and 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 (9- or 12-month) into account.<sup>23</sup>

To permit comparisons over time, I used the same measures of faculty teaching and research productivity as for NSOPF-93.<sup>24</sup> 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, taught only undergraduate students, or taught both undergraduate and graduate students.*
- *The number of independent study contact hours per week.*<sup>25</sup>

The study included measures of research and of scholarly activity and productivity used to analyze NSOPF-93 data:

- *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.<sup>26</sup>
- *Average publications per year* (used in bivariate analyses only) that took seniority into account by dividing the *total refereed publications during the career* by *years since attaining highest degree.*
- Whether or not the respondent was a *principal or co-principal investigator (PI) on an externally funded project* during fall 1998.<sup>27</sup>

Multivariate analyses also included several control variables, each potentially related to faculty pay, to obtain more accurate estimates

of the relationships between faculty pay, teaching, and research. A structural factor in faculty pay is the *length of contract* (9- or 12-month). Pay also varies by *academic discipline*.<sup>28</sup> As in the study of NSOPF-93 data, we grouped faculty respondents into ten 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 relative to the overall national average.<sup>29</sup> I also included a measure of administrative service likely to affect pay: service as a *department chair* during fall 1998.

Personal characteristics also affect salary, including seniority, gender, race/ethnicity, and working in an institution under a collective bargaining agreement.<sup>30</sup> Measures of seniority included years since attaining the highest degree, years in current rank, and years at the current institution.

As in the analyses of NSOPF-88 and NSOPF-93 data, I found a strong, negative relationship between time spent on research and time spent on teaching: -.52 at four-year institutions, -.33 in public two-year colleges. The more time faculty members spent on one activity, the less they spent on the other. To reflect this exchange relationship and to reduce the effects of multicollinearity, I substituted a single scale—*more research/less teaching*—for the two NSOPF-99 time allocation measures. I calculated this scale by subtracting the percent of time spent on teaching from the percent of time spent on research.<sup>31</sup>

I also found strong, positive correlations between years since attaining the highest degree, years in rank, and years at the current institution. The range: from .69 to .84 in four-year institutions and from .34 to .78 in public two-year colleges. I used *years since attaining the highest degree* in the regression analyses, the variable with the highest correlation with basic salary.

## RESULTS

Table 1 shows the means and variances for study variables.<sup>32</sup> I separated indicators into quartiles and then examined salary differences by faculty teaching and research activity in four-year colleges and universities.<sup>33</sup> I then

examined the correlation coefficients between measures of faculty activities and pay. I included the results from NSOPF-93 for comparison. The multivariate analyses consisted of semi-log regressions of the logarithmic transformation of basic salary on various control

variables and on the same measures of teaching and research derived from NSOPF-93 used in the *NEA 1997 Almanac*. I completed separate analyses by type of institution and program area, comparing the results with NSOPF-88 and NSOPF-93 data when possible.<sup>34</sup>

**Table 1****Means and Variances for Study Variables**

	Public						Independent		
	Four-Year			Two-Year			Four-Year		
	Mean	SD	SE	Mean	SD	SE	Mean	SD	SE
<b>Income</b>									
Basic Salary (\$)	66,059	29,980	470	46,218	13,600	330	63,629	34,371	792
Log (Basic Salary)	11.02	.37	.006	10.70	.30	.007	10.96	.44	.010
<b>Control Variables</b>									
% on 12-month Appointment	16.44	36.67	.554	12.18	32.63	.762	16.86	38.36	.849
High Paying Field*	-.03	.73	.011	NA	NA	NA	-.07	.77	.017
Years Since Attained Highest Degree	18.65	10.27	.156	16.85	9.74	.231	17.99	10.86	.241
Years in Current Rank**	8.48	7.00	.119	8.67	7.23	.207	8.20	7.22	.178
Years at Current Institution**	14.18	10.05	.152	12.97	9.21	.215	13.90	10.60	.234
% Racial/Ethnic Minority	15.64	35.92	.540	14.27	34.87	.811	13.06	34.56	.761
% Male	70.82	44.96	.677	51.18	49.83	1.165	71.59	46.25	1.020
% Under Collective Bargaining Agreement	45.57	49.26	.759	68.04	46.60	1.099	15.37	37.01	.836
<b>Teaching</b>									
% Time, Teaching	51.76	24.61	.374	73.40	21.93	.516	55.76	25.48	.566
Hours in Class/Week	9.12	6.07	.096	17.20	10.62	.252	9.37	5.89	.135
Independent Study Contact Hours/Week	5.98	7.96	.120	4.68	8.39	.195	5.27	8.40	.185
Taught only Undergraduates	48.73	49.43	.744	NA	NA	NA	56.06	50.90	1.120
Taught only Graduate Students	19.69	39.32	.592	NA	NA	NA	23.60	43.55	.958
More Research/ Less Teaching***	-31.27	37.57	.571	-70.10	24.49	.576	-38.44	39.45	.876
<b>Research</b>									
% Time, Research	20.52	18.59	.283	3.38	6.01	.141	17.34	19.20	.426
Career Publications (Refereed)	34.39	45.49	.692	4.54	16.82	.393	27.47	42.55	.943
% Principal Investigator, Funded Research Project Administration	27.73	44.27	.666	2.01	13.97	.325	18.13	39.52	.870
% Department Chair	9.19	28.57	.430	12.63	33.11	.771	16.85	38.39	.845

Source: NSOPF 1999.

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

\*\* Not used in analysis.

\*\*\* Scale from -100 to +100.

NA = Not Applicable.

## INSTITUTIONAL TYPE AND PROGRAM AREA

Faculty pay varied by type of institution, as in the previous *NEA Almanac* studies (Table 2).<sup>35</sup> The average faculty salary in four-year institutions in 1998–1999 was about \$65,000. Faculty in “other four-year institutions”—primarily separate engineering and medical colleges—received the highest average salaries (about \$84,000), followed in descending order by faculty in research universities (about \$76,000), doctoral-granting universities (about \$62,000), comprehensive colleges and universities (about \$54,000), and liberal arts colleges (about \$49,000).<sup>36</sup> This overall relationship between type of institution and faculty salary also held for public institutions.<sup>37</sup> In independent institutions, faculty in research universities received the highest salaries, followed by faculty doctoral-granting universities, other four-year institutions, comprehensive colleges and universities, and liberal arts colleges.<sup>38</sup> The average pay for faculty in public two-year colleges in 1998–99 was about \$46,000. These results resemble the findings for NSOPF-93.

In 1998–99, faculty in business, engineering, and the health sciences received average salaries statistically above the national norm (Table 3).<sup>39</sup> Faculty in agriculture/home economics, natural sciences, social sciences, and other fields received about the national average. Faculty salaries in education, fine arts, and humanities averaged below the national

norm. Pay also varied by program area when broken down by public and independent institutions, though the pattern varied slightly from the overall distribution.<sup>40</sup> These patterns differ somewhat from NSOPF 1992–93 where business salaries were at—rather than above—the national average, and where salaries for faculty in the social sciences and in other fields were below—rather than at—the national average.<sup>41</sup>

## 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 four-year institution and source of control. To study the effect of administrative activity on compensation I also examined the relationship between pay and being a department chair during Fall term, 1998.

### 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).

Pay was inversely related to time spent on teaching at public and independent institutions: the more time spent on teaching, the less the pay (Table 4).<sup>42</sup> For public institutions,

**Table 2**

### Basic Salary (Means), by Source of Control and Type of Institute

	Total	SE	Public	SE	Independent	SE
All Four-Year	\$65,289	407	\$66,059	470	\$63,629	792
Research	76,294	730	72,892	741	89,889	2,019
Doctoral	61,977	827	59,916	811	68,161	2,093
Comprehensive	54,263	417	54,043	452	54,845	953
Liberal Arts	48,999	639	NA	NA	47,705	718
Other	84,287	2,978	102,572	4,306	63,551	3,130
Public Two-Year	46,218	330				

Source: NSOPF 1999.

NA = Not Applicable.

**Table 3****Basic Salary (Means), by Source of Control of Program Area: Four-Year Institutions**

Program Area	Total	SE	Public	SE	Independent	SE
Agriculture-Home Economics	\$68,500	1,498	\$68,885	1,541	INC	INC
Business	68,444	1,015	69,099	1,020	67,545	2,028
Education	52,681	708	53,275	736	50,670	1,846
Engineering	70,379	1,229	70,117	1,381	71,406	2,709
Fine Arts	50,632	838	50,347	1,013	51,112	1,488
Health Sciences	91,848	1,909	91,516	2,136	92,589	3,958
Humanities	53,843	718	54,360	832	53,071	1,316
Natural Sciences	66,564	742	67,181	820	65,094	1,576
Social Sciences	64,778	1,214	67,691	1,568	58,368	1,654
Other	62,416	1,177	61,179	1,379	64,696	2,181

Source: NSOPF 1999.

INC = Inadequate cases for accurate estimate.

pay decreased in a linear fashion. Faculty in the top quartile of time on teaching—more than 70 percent—averaged the lowest pay (about \$55,000) and faculty in the bottom quartile—less than 35 percent—earned the most (about \$85,000).<sup>43</sup> For independent institutions, the respective values were about \$50,000 (most time), and about \$85,000 (least time).<sup>44</sup> These patterns are nearly identical to the results for NSOPF-88 and NSOPF-93.

The inverse relationship between pay and time spent on teaching held for each type of public institution, with some slight variations.<sup>45</sup> Research universities and comprehensives showed little difference in pay between faculty members spending more than 70 percent of their time on teaching and their colleagues in the 55 to 70 percent range. Doctoral-granting universities showed little difference in pay between faculty members in three categories: 35 to 54 percent, 55 to 70 percent, and more than 70 percent of their time spent on teaching. Faculty in other four-year institutions earned significantly higher salaries if they spent less than 35 percent of their time of teaching.<sup>46</sup> These results varied somewhat from the findings for NSOPF-93, though in each type of public institution faculty members who spent the least time on teaching earned the highest salaries.

Pay varied inversely with time spent on teaching at independent research universities, doctoral-granting universities, and comprehensives.<sup>47</sup> Faculty members in four-year independent “other institutions” who spent the least time on teaching received the most pay; colleagues who spent the most time on teaching earned the least.<sup>48</sup> Pay varied by time spent on teaching in liberal arts colleges, but faculty members who spent the least time on teaching did not receive the most pay. Faculty in the second (35 to 54 percent) and third (55 to 70 percent) quartiles earned more pay than colleagues spending more than 70 percent of their time on teaching.<sup>49</sup> These findings are virtually identical to the results for NSOPF-93.

Pay decreased with hours spent in the classroom per week in an even more linear pattern than for time spent on teaching.<sup>50</sup> Across all four-year institutions, faculty members who spent less than 6 hours teaching in the classroom each week earned around \$80,000 (about \$79,000 for publics, \$83,000 for independents). Those who spent more than 11 hours in the classroom per week averaged between \$21,000 (publics) and \$34,000 (independents) less. For each type of public institution except other four-year institutions, faculty members who spent the least hours in the

**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							
	<35%	SE	35-54%	SE	55-70%	SE	>70%	SE
<b>Public</b>								
All Four-Year	\$85,271	1,298	\$65,967	724	\$57,096	605	\$54,934	646
Research	86,842	1,651	71,572	1,077	63,078	1,033	60,930	1,573
Doctoral	70,821	1,862	60,884	1,322	51,314	1,054	56,343	1,917
Comprehensive	62,498	1,587	56,332	895	51,554	767	52,128	703
Other Four-Year	121,113	5,723	80,965	7,841	71,363	7,585	64,980	9,046
<b>Independent</b>								
All Four-Year	84,574	2,221	67,849	1,681	58,266	1,217	49,702	863
Research	104,128	3,299	82,704	3,583	82,622	3,845	64,866	4,532
Doctoral	83,684	5,773	70,672	3,771	58,723	2,669	58,988	3,214
Comprehensive	63,327	2,662	55,478	1,856	51,902	1,309	54,041	1,796
Liberal Arts	48,477	2,320	54,472	2,836	50,344	1,258	43,740	755
Other Four-Year	78,329	6,533	59,725	3,918	60,049	9,581	48,191	2,993
	Hours in Class Per Week							
	<6	SE	6-8	SE	9-11	SE	>11	SE
<b>Public</b>								
All Four-Year	79,269	1,008	63,368	698	58,772	790	58,328	926
Research	81,688	1,233	66,562	959	66,131	1,726	64,869	2,321
Doctoral	68,773	1,728	59,570	1,512	55,572	1,350	52,637	1,338
Comprehensive	60,993	1,697	57,053	1,281	52,254	779	52,073	577
Other Four-Year	107,214	5,571	80,836	6,823	79,614	9,301	115,853	10,575
<b>Independent</b>								
All Four-Year	83,307	1,992	66,809	1,631	57,739	1,291	49,298	891
Research	92,575	2,681	89,023	4,245	88,455	6,334	78,144	5,980
Doctoral	85,465	6,219	67,475	2,647	60,160	2,584	55,739	2,581
Comprehensive	65,663	2,818	59,550	2,102	55,019	1,839	48,230	1,299
Liberal Arts	51,490	5,133	52,963	1,875	50,499	1,278	43,577	702
Other Four-Year	80,291	6,451	54,566	4,074	54,641	5,578	53,459	3,861
	Independent Study Contact Hours Per Week							
	0	SE	1-2	SE	3-7	SE	>7	SE
<b>Public</b>								
All Four-Year	63,116	855	64,387	1,052	66,564	963	69,340	896
Research	70,591	1,779	71,003	1,515	72,051	1,309	76,116	1,374
Doctoral	60,653	1,419	57,826	1,647	59,754	1,500	61,338	1,886
Comprehensive	56,570	842	52,510	1,056	54,059	929	51,614	763
Other Four-Year	83,861	7,614	114,780	11,970	128,326	14,410	97,636	4,083
<b>Independent</b>								
All Four-Year	60,354	1,267	59,247	1,735	64,279	1,563	71,119	1,814
Research	84,729	4,196	81,929	6,064	91,165	3,616	95,684	3,133
Doctoral	65,689	3,582	64,620	3,234	70,794	4,618	70,898	4,616
Comprehensive	58,112	1,803	54,395	1,870	51,244	1,575	51,332	1,751
Liberal Arts	46,612	931	48,976	2,297	49,138	1,256	46,207	1,588
Other Four-Year	70,367	8,029	51,738	2,537	67,512	7,920	72,239	6,945

**Table 4 (continued)****Basic Salary (Means), by Source of Control, Type of Institution, and Teaching-Related Variables: Public and Independent Four-Year Institutions**

	Type of Students Taught					
	Undergraduate	SE	Both	SE	Graduate	SE
<b>Public</b>						
All Four-Year	\$57,774	443	\$70,780	917	\$79,499	1,423
Research	64,202	833	77,061	1,351	80,557	1,681
Doctoral	58,219	1,167	59,853	1,403	63,836	1,854
Comprehensive	52,761	546	55,502	856	60,430	1,850
Other Four-Year	56,487	5,654	114,795	6,531	108,921	6,873
<b>Independent</b>						
All Four-Year	53,813	780	76,582	2,150	77,782	1,862
Research	77,274	3,790	98,850	3,407	93,310	3,131
Doctoral	58,531	2,311	67,519	3,451	84,649	5,164
Comprehensive	52,378	1,012	55,785	2,792	68,133	2,711
Liberal Arts	NA	NA	NA	NA	NA	NA
Other Four-Year	52,308	5,864	92,064	11,983	59,498	2,740

Source: NSOPF 1999.  
NA = Not Applicable.

classroom were paid the most.<sup>51</sup> In independent institutions, the relationship between hours spent in the classroom per week and pay was more complex, although the general pattern held true. Hours spent in the classroom did not affect pay significantly in independent research universities. In all other types of independent institutions, however, pay increased as the amount of time in the classroom decreased.<sup>52</sup> For both public and independent institutions, these patterns are similar to those in 1992–93.

As in 1992–93, independent study contact hours per week bucked this trend.<sup>53</sup> Faculty in public and independent institutions who generated the most independent study contact hours received the highest pay,<sup>54</sup> although the difference in pay between the highest and lowest producers was considerably smaller than for percent time spent on teaching and for hours spent in the classroom each week. Seniority and scholarly prominence may affect this result—students may be more likely to ask the better known faculty members to supervise an independent study project. This pattern, however, varies substantially by type of institution. Only independent comprehensive colleges and universities,<sup>55</sup> and public research universities shared this overall pattern.<sup>56</sup>

Faculty members who taught only graduate students in 1998–99 averaged higher salaries than peers teaching undergraduates and graduate students or only undergraduates.<sup>57</sup> This pattern held for faculty in most types of public and independent institutions, except for liberal arts colleges where the typology does not apply.<sup>58</sup> The exceptions: public and independent “other” four-year institutions where the highest paid faculty members taught undergraduate and graduate students, and independent research universities where faculty members who taught only undergraduates received the lowest pay.<sup>59</sup> These results resemble the findings for NSOPF-88 and NSOPF-93 where faculty members who taught only graduate students received the most pay irrespective of type of institution and source of control.

### Research/Scholarship

Measures of research and scholarship included: percent of time spent on those activities, number of refereed publications during the career, average refereed publications per year—taking into account length of time since attaining the highest degree—and being a principal or co-principal investigator (PI) on an externally-funded research project during fall term, 1998.



Regardless of type of control, the greater the time spent on research and scholarship, the higher the pay (Table 5).<sup>60</sup> Across all types of public four-year institutions, faculty members who spent the most time on research earned approximately \$9,000 more than colleagues who spent the least time on research. The comparable salary differential in independent colleges and universities was \$27,000.

Patterns of pay varied substantially by type of institution. Among public institutions, only in research universities did pay vary significantly by time spent on research.<sup>61</sup> Among independent institutions, pay varied significantly by time spent in research only in liberal

arts colleges.<sup>62</sup> Time spent on research and scholarship in 1998–99, these results suggest, was less strongly related to faculty pay than in 1987–88 and in 1992–93.

Scholarly productivity, in contrast, remained as strongly related to faculty pay as a decade earlier. Faculty who published the most received the highest pay. This relationship held for career publications<sup>63</sup> and for average publications per year,<sup>64</sup> irrespective of type of institution or source of control.<sup>65</sup> Across all types of four-year institutions, faculty who produced more than 39 publications received between \$25,000 (publics) and \$51,000 (independents) more than colleagues

**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							
	<5%	SE	6-14%	SE	15-29%	SE	>29%	SE
<b>Public</b>								
All Four-Year	\$63,432	1,111	\$64,027	938	\$62,943	804	\$72,429	869
Research	73,783	2,561	73,712	1,845	67,094	1,200	75,943	1,111
Doctoral	61,528	2,285	59,428	1,573	58,217	1,599	61,157	1,322
Comprehensive	55,106	1,024	53,403	713	53,670	827	55,445	1,238
Other Four-Year	92,958	8,445	114,032	9,943	106,405	11,515	93,634	4,353
<b>Independent</b>								
All Four-Year	53,058	1,315	57,924	1,126	67,794	1,693	80,251	2,156
Research	89,199	7,759	93,293	4,458	87,619	3,523	89,903	3,086
Doctoral	67,818	7,620	65,900	3,802	66,816	2,716	72,795	4,291
Comprehensive	54,570	1,814	53,294	1,443	57,051	2,177	59,221	2,731
Liberal Arts	42,340	788	47,628	913	54,240	2,471	54,178	3,108
Other Four-Year	62,682	6,193	56,089	3,823	78,878	11,587	74,154	6,314
	Number of Refereed Publications (Career)							
	<4	SE	4-15	SE	16-39	SE	>39	SE
<b>Public</b>								
All Four-Year	52,435	756	55,894	601	64,523	677	87,782	1,199
Research	56,860	1,798	58,027	1,150	66,029	961	90,112	1,334
Doctoral	47,539	1,530	53,683	1,110	63,746	1,502	69,618	1,807
Comprehensive	51,493	855	52,378	704	56,559	763	63,887	1,608
Other Four-Year	67,462	9,141	83,797	6,465	92,532	5,516	136,102	8,188
<b>Independent</b>								
All Four-Year	49,595	996	54,998	996	68,574	1,562	90,710	2,354
Research	76,314	6,291	66,796	4,016	82,068	2,924	102,555	3,209
Doctoral	59,663	4,688	62,480	2,485	66,412	3,823	85,263	5,336
Comprehensive	52,823	1,748	53,212	1,470	60,179	1,823	62,371	2,888
Liberal Arts	42,404	716	48,009	954	60,132	3,238	58,397	3,818
Other Four-Year	48,132	3,470	63,648	6,039	61,404	5,617	83,847	8,336

**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)							
	<.36	SE	.36-1.222	SE	1.223-2.575	SE	>2.575	SE
<b>Public</b>								
All Four-Year	\$55,709	726	\$62,027	771	\$65,920	794	\$78,909	1,209
Research	59,662	1,680	67,759	1,489	69,982	1,153	82,638	1,385
Doctoral	54,390	1,550	59,932	1,314	60,243	1,542	63,201	1,953
Comprehensive	54,349	871	53,963	615	54,293	951	52,883	1,242
Other Four-Year	69,002	7,121	99,955	7,330	98,129	5,753	128,905	9,133
<b>Independent</b>								
All Four-Year	52,721	1,007	60,059	1,178	66,193	1,531	84,354	2,616
Research	76,939	6,827	81,235	3,728	81,264	2,522	101,404	3,645
Doctoral	64,182	4,307	65,254	2,501	67,046	4,165	77,807	5,858
Comprehensive	55,450	1,558	55,114	1,702	53,673	1,980	52,792	2,291
Liberal Arts	45,380	844	49,909	1,266	51,131	1,712	47,041	5,459
Other Four-Year	47,653	3,162	65,605	5,414	74,788	8,826	69,007	7,569
	Status as Principal Investigator (PI)							
	Not PI	SE	PI	SE				
<b>Public</b>								
All Four-Year	61,915	513	76,538	968				
Research	68,044	888	80,424	1,237				
Doctoral	58,956	958	62,699	1,506				
Comprehensive	53,766	495	56,080	1,058				
Other Four-Year	99,622	6,152	107,027	5,573				
<b>Independent</b>								
All Four-Year	59,122	778	83,291	2,235				
Research	85,045	2,671	96,125	3,029				
Doctoral	67,620	2,338	70,552	4,717				
Comprehensive	54,680	1,010	57,080	2,588				
Liberal Arts	47,642	761	48,452	2,085				
Other Four-Year	57,705	2,793	89,210	9,487				

Source: NSOPF 1999.

who produced fewer than four publications during their careers.

PIs, on average, received higher pay than non-PIs.<sup>66</sup> Salary differences averaged about \$15,000 in public institutions, and about \$24,000 in independent colleges and universities. This trend was less pronounced (by institutional type) in 1998–99 than in 1992–93. PIs received more than non-PIs in independent research universities and other four-year institutions, and in public research and doctoral-granting universities.<sup>67</sup>

### Administration

Faculty members in public institutions who served as department chairs in 1998–99 received higher than average pay (Table 6).<sup>68</sup> As in 1992–93, this pattern did not hold in independent institutions overall, but did apply to chairs in independent research universities and in comprehensives.<sup>69</sup>

### Correlational Analyses

Table 7 shows the intercorrelations between salary and teaching, research, and

**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
<b>Public</b>				
All Four-Year	\$64,366	463	\$82,650	2,078
Research	71,257	723	91,831	3,627
Doctoral	58,353	843	73,157	2,233
Comprehensive	53,335	475	62,022	1,306
Other Four-Year	96,938	4,335	136,858	13,361
<b>Independent</b>				
All Four-Year	63,744	878	63,070	1,834
Research	87,427	2,100	109,816	6,251
Doctoral	68,064	2,231	68,802	6,146
Comprehensive	53,733	1,071	60,071	1,930
Liberal Arts	47,373	870	48,738	1,203
Other Four-Year	65,596	3,523	49,523	3,477

Source: NSOPF 1999.

administration by type of institution for 1992–93 and 1998–99. These results, though suggestive, are less reliable than the multivariate analyses that follow and should be interpreted cautiously. Across all types of institutions, public and independent, measures of time and effort allocated to teaching—except for independent study contact hours—were inversely related to pay. Teaching graduate students was positively related to pay; teaching undergraduate students was not. Scholarly productivity—measured by publications and grant activity—showed a high, positive relationship to basic salary. Time spent on research was modestly related to higher pay. These patterns varied somewhat by type of institution, save for public two-year colleges.

Some types of institutions showed a modest shift away from this focus on research and scholarship, but elsewhere the relationship remained as strong as ever. Among public institutions, the effect of time spent on research on pay declined marginally since 1992–93. The positive relationship between publishing productivity and pay increased in research universities and in “other” four-year institutions, and decreased in doctoral-granting and comprehensive colleges and universities. Teaching activity was still negatively related to pay at all

publics—even public two-year colleges showed a small negative correlation. The correlation between publications and pay decreased for the two most teaching-oriented types of independent institutions—comprehensives and liberal arts colleges.

### Summary

Teaching activity and productivity were negative correlates of faculty pay; research and scholarly productivity were positive correlates of faculty pay—both with a few exceptions. These patterns resembled the patterns reported for NSOPF-88 and NSOPF-93, though time spent on research may have had a smaller effect on pay for NSOPF-99.

### FACULTY ACTIVITIES AND PAY: MULTIVARIATE ANALYSES

Bivariate relationships do not examine other factors in pay, such as seniority, highest degree attaining, and being a department chair. I therefore examined semi-log regression models to estimate the effects of teaching and research more accurately, using the logarithmic transformation of basic salary [hereafter  $\log(\text{basic salary})$ ] as the criterion. Using the same predictors and analytical procedures

**Table 7****Correlations Between Faculty Workload with Basic Salary, by Type of Institution**

	1	2	3	4	5	6	7	8	9
<b>Public</b>									
All Four-Year									
1999	-.39	-.12	.09	-.35	.22	.13	.54	.22	.17
1993	-.28	-.13	.06	-.20	.21	.17	.38	.20	.14
Research									
1999	-.33	-.09	.09	-.22	.14	.06	.53	.19	.18
1993	-.20	-.09	.01	-.12	.15	.08	.32	.12	.14
Doctoral									
1999	-.32	-.24	.01	-.08	.10	.06	.28	.08	.23
1993	-.34	-.06	.10	-.15	.20	.19	.46	.20	.33
Comprehensive									
1999	-.20	-.13	-.08	-.11	.11	.00	.22	.04	.14
1993	-.25	-.13	.02	-.10	.07	.11	.27	.08	.20
Other Four-Year									
1999	-.43	.21	.05	-.35	.12	-.10	.65	.06	.25
1993	-.34	-.14	.11	-.40	.25	.04	.48	.16	.29
Public Two-Year									
1999	-.10	-.11	-.06	NA	NA	.04	.10	.00	.04
1993	-.11	-.05	.03	NA	NA	.04	.11	.00	.09
<b>Independent</b>									
All Four-Year									
1999	-.39	-.28	.10	-.35	.23	.30	.50	.28	-.01
1993	-.45	-.18	.04	-.43	.36	.38	.47	.33	.01
Research									
1999	-.31	-.06	.09	-.21	.06	.02	.43	.13	.17
1993	-.30	.04	.12	-.27	.23	.20	.40	.29	.05
Doctoral									
1999	-.34	-.26	.00	-.26	.30	.02	.31	.03	.01
1993	-.22	-.23	-.14	-.15	.36	.12	.33	.01	.09
Comprehensive									
1999	-.12	-.27	-.08	-.18	.23	.08	.13	.03	.11
1993	-.24	-.10	.07	-.28	.20	.25	.37	.16	.06
Liberal Arts									
1999	-.17	-.16	-.01	NA	NA	.26	.28	.01	.04
1993	-.13	-.18	.01	NA	NA	.26	.44	.12	.10
Other Four-Year									
1999	-.33	-.22	.16	-.13	-.17	.13	.30	.35	-.15
1993	-.57	.06	-.01	-.44	.09	.08	.26	.19	.22

Source: NSOPF 1993, NSOPF 1999.

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 1998.

9 = Department chair.

NA = Not applicable or not available.

as in 1992–93 permitted comparisons over time. Almost identical to 1992–93, the regression models accounted for between 38 and 62 percent of the variance in log(basic salary) for faculty in four-year institutions, and 23 percent in public two-year colleges (Table 8). For analyses by program area, the model accounted for between 43 and 60 percent of the variance in log(basic salary) (Table 9)—slightly lower than the comparable figures in 1992–93 (49 and 72 percent, respectively). The following 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 graduate students were the three strongest behavioral predictors of pay in public research universities. Spending more hours teaching in the classroom showed a slight negative relation to pay (Table 8). Pay and publishing, the only significant behavioral predictor, were positively related in independent research universities.

Pay and spending more time on research and less on teaching—including hours spent in the classroom—were positively related in public doctoral-granting universities, though publishing was not. Pay and publishing, teaching graduate students, and spending less time on classroom teaching were positively related in independent doctoral-granting universities. In public comprehensives, spending more time on research and less on teaching, teaching graduate students, and publishing predicted higher pay. The first two factors predicted higher pay in independent comprehensives.

The highest pay at liberal arts colleges went to faculty members who spent more time on research and less on teaching, and who published. Publishing and spending more hours in class per week were positively related with pay in public “other” four-year institutions, the only type of institution showing a positive effect for classroom instruction. No behavioral measures were related with pay in independent “other” four-year institutions.

Collective bargaining, seniority, and highest degree had the greatest effects on pay in public two-year colleges, but faculty members who spent more time on research and less on

classroom instruction received slightly higher pay than their colleagues.

Public research universities, public comprehensives, and independent liberal arts colleges showed no changes in these results since NSOPF-93. Independent doctoral-granting universities and “other” four-year institutions showed one change: spending more time on research and less on teaching was no longer a significant factor in pay. Pay and publishing were no longer related, while pay and spending more hours in the classroom was now negatively related in public doctoral-granting universities, independent comprehensives, and public two-year colleges. Other significant predictors remained unchanged between NSOPF-93 and NSOPF-99.

Independent research universities showed the most substantial change over time. Publishing still dominated, but spending more time on research and less on teaching, grant activity, and teaching graduate students no longer affected pay significantly.

### Program Area

Pay and publishing were positively related in all fields except business and fine arts.<sup>70</sup> Spending more time on research and less on teaching predicted higher pay in business, education, health sciences, the humanities, social sciences, and other fields. Teaching only graduate students reflected higher pay in education, the fine arts, the humanities, natural sciences, social sciences, and other fields. Spending fewer hours in class per week predicted higher pay in business, engineering, the humanities, natural sciences, and other fields. Pay and being a PI were positively related in the health sciences. These results approximate our findings for NSOPF-93.

### Change over Time

Table 10 summarizes the results of four key behavioral predictors of basic salary for NSOPF-88, NSOPF-93, and NSOPF-99. The negative relationship between pay and spending more time in the classroom increased between the earlier studies and NSOPF-99. Publishing, teaching graduate students, and spending more time on research and less on teaching remained powerful predictors of pay, but their importance across types of institution decreased slightly between 1992–93 and 1998–99.

**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
<b>Public</b>														
Research	R square = .55		N (unweighted) = 1391											
Beta	.140	.122	.013		.057		.187	.083	.001	.002		-.002		.076
Beta-Std.	.147	.243	.390		.068		.145	.061	.061	.221		-.037		.096
P Level	.0001	.0001	.0001		.001		.0001	.001	.005	.0001		.05		.0001
Doctoral	R square = .51		N (unweighted) = 496											
Beta	.076	.117	.015				.226	.151	.002			-.005		
Beta-Std.	.079	.267	.511				.222	.150	.184			-.073		
P Level	.05	.0001	.0001				.0001	.0001	.0001			.05		
Comprehensive	R square = .39		N (unweighted) = 1258											
Beta	.086	.088	.013			.055	.172	.086	.001	.001				.079
Beta-Std.	.085	.241	.480			.102	.244	.088	.084	.058				.082
P Level	.001	.0001	.0001			.0001	.0001	.001	.001	.05				.001
Other Four-Year	R square = .62		N (unweighted) = 121											
Beta		.252					.512			.003		.015		
Beta-Std.		.269					.343			.464		.206		
P Level		.0001					.0001			.0001		.01		
Two-Year	R square = .23		N (unweighted) = 1463											
Beta	.068	NA	.010	.047	.034	.155	.125		.001			-.001		NA
Beta-Std.	.075	NA	.340	.056	.058	.246	.170		.076			-.050		NA
P Level	.01	NA	.0001	.05	.05	.0001	.0001		.01			.05		NA
<b>Independent</b>														
Research	R square = .38		N (unweighted) = 311											
Beta		.118	.014					.142		.001				
Beta-Std.		.210	.376					.114		.206				
P Level		.0001	.0001					.01		.001				
Doctoral	R square = .47		N (unweighted) = 214											
Beta		.155	.016							.001		-.012		.168
Beta-std.		.317	.434							.121		-.151		.207
P Level		.0001	.0001							.05		.01		.001
Comprehensive	R square = .39		N (unweighted) = 439											
Beta		.093	.013	.070	.137	.174			.001			-.009		.173
Beta-std.		.215	.379	.099	.166	.215			.101			-.134		.168
P Level		.0001	.0001	.01	.0001	.0001			.01			.001		.0001
Liberal Arts	R square = .41		N (unweighted) = 432											
Beta		.075	.014				.218		.002	.002		-.006		NA
Beta-std.		.182	.527				.338		.160	.129		-.144		NA
P Level		.0001	.0001				.0001		.0001	.001		.001		NA
Other Four-Year	R square = .40		N (unweighted) = 90											
Beta		.150	.012	.209	-.239		.331							
Beta-std.		.283	.343	.234	-.270		.273							
P Level		.01	.01	.05	.01		.05							

Source: NSOPF 1999.

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.

R Square = Adjusted R Square.

NA = Not Applicable.

**Table 9**

**Significant Predictors of Log(Basic Salary), by Program Area—Four-Year Institutions**

Program Area	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Agriculture/</b>														
<b>Home Economics</b>	R square = .55		N (unweighted) = 113											
Beta		.126		.015				.181			.002			
Beta-Std.		.188		.494				.173			.225			
P Level		.05		.0001				.05			.01			
<b>Business</b>														
	R square = .43		N (unweighted) = 370											
Beta		.145		.008				.186		.002				-.008
Beta-Std.		.253		.304				.257		.230				-.146
P Level		.0001		.0001				.0001		.0001				.001
<b>Education</b>														
	R square = .56		N (unweighted) = 462											
Beta		.062		.075	.015	.036	.074	.223		.001	.001			.058
Beta-Std.		.067		.113	.512	.067	.135	.269		.118	.119			.096
P Level		.05		.001	.0001	.05	.0001	.0001		.01	.01			.01
<b>Engineering</b>														
	R square = .60		N (unweighted) = 291											
Beta		.179	.088		.010			.196			.001			-.011
Beta-Std.		.170	.129		.344			.226			.274			-.199
P Level		.0001	.01		.0001			.0001			.0001			.0001
<b>Fine Arts</b>														
	R square = .46		N (unweighted) = 325											
Beta		.123	.063		.014			.153	.131					.273
Beta-Std.		.153	.112		.483			.275	.170					.241
P Level		.001	.05		.0001			.0001	.001					.0001
<b>Health</b>														
	R square = .49		N (unweighted) = 514											
Beta				.013		.079	-.101	.267		.003	.002	.105		
Beta-Std.				.269		.079	-.092	.192		.229	.184	.104		
P Level				.0001		.05	.01	.0001		.0001	.0001	.01		
<b>Humanities</b>														
	R square = .52		N (unweighted) = 745											
Beta		.054	-.048	.018			.051	.263		.001	.001			-.006
Beta-Std.		.084	-.073	.607			.077	.248		.079	.080			-.084
P Level		.01	.05	.0001			.01	.0001		.01	.01			.01
<b>Natural Sciences</b>														
	R square = .55		N (unweighted) = 968											
Beta		.151	.088		.011	.054		.176	.054		.003			-.006
Beta-Std.		.151	.125		.342	.054		.114	.048		.347			-.096
P Level		.0001	.0001		.0001	.05		.0001	.05		.0001			.001
<b>Social Sciences</b>														
	R square = .60		N (unweighted) = 637											
Beta				.013		.048		.193		.001	.003			.104
Beta-Std.				.367		.059		.110		.110	.424			.104
P Level				.0001		.05		.0001		.001	.0001			.001
<b>Other Fields</b>														
	R square = .47		N (unweighted) = 475											
Beta		.117		.018				.168		.002	.001			-.008
Beta-Std.		.146		.469				.162		.119	.089			-.108
P Level		.001		.0001				.0001		.01	.05			.01

Source: NSOPF 1999.

- 1 = On a 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 = Taught only graduate students.
- Beta-Std. = Standardized regression coefficient.  
 R Square = Adjusted R Square.  
 NA = Not Applicable.

## CONCLUSION

Scholarly productivity and research remained important determinants of faculty pay in NSOPF-99. This finding may reflect a national labor market, whose adherents believe that research and scholarly productivity are universally valued and affect pay irrespective of institutional mission, or the pursuit of prestige by local institutions. The slight decrease in the effect of publishing on

pay in a few types of institutions since 1992–93 may—or may not—portend a trend toward market segmentation, whose advocates claim that institutions with different missions pay their faculties in line with these distinct missions.

Spending more time on teaching, particularly classroom instruction, usually meant lower pay. The evidence does not suggest that teaching will emerge as a positive factor in pay on a national level any time soon.

**Table 10**

### Summary: Significant Key Teaching and Research Predictors of Log(Basic Salary),<sup>1</sup> Over Time, by Type of Institution

	Class Hours/Week			Taught Grad. Students Only			More Research/ Less Teaching			Publications (career)		
	1988	1993	1999	1988	1993	1999	1988	1993	1999	1988	1993	1999
<b>Public</b>												
Research		--	-	++	+++	+++	+	+++	++	+++	+++	+++
Doctoral	+		-	+++	++		+++	+++	+++	+++	+++	
Comprehensive	+++			+++	+	+++	++	+++	+++	+++	+++	+
Other	NA		++	NA			NA			NA	+++	+++
Two-year			-	NA	NA	NA		+++	+		++	
<b>Independent</b>												
Research				+++	+			+		+++	+	+++
Doctoral		-	--		+++	+++		+++		++	++	+
Comprehensive	---		---	+++	+++	+++	+++	+++	++	+	++	
Liberal Arts	--		---	NA	NA	NA	+++	+++	+++	+++	+++	+++
Other		--		--				++		++		

Source: NSOPF 1988, NSOPF 1993, NSOPF 1999.

+ = significant positive predictor,  $p < .05$ .

++ = significant positive predictor,  $p < .01$ .

+++ = significant positive predictor,  $p < .001$ .

- = significant negative predictor,  $p < .05$ .

-- = significant negative predictor,  $p < .01$ .

--- = significant negative predictor,  $p < .001$ .

<sup>1</sup> The analyses for NSOPF-93 and NSOPF-99 used the logarithmic transformation of basic salary. For NSOPF-88 the criterion was the raw basic salary.

Blank cell = not significantly related to basic salary.

NA = Not Applicable.



## NOTES

<sup>1</sup> Fairweather, 1994, 1996, 1997. The data came from the 1987-88 and 1992-93 National Surveys of Postsecondary Faculty (NSOPF-88 and NSOPF-93).

<sup>2</sup> Braskamp and Ory, 1994; Glassick, Huber, and Maeroff, 1997. Eugene Rice's American Association of Higher Education Forum on Faculty Roles and Rewards was one such effort.

<sup>3</sup> Banta, 1986.

<sup>4</sup> Johnstone, 1993.

<sup>5</sup> Brufee, 1993; Seldin and associates, 1990; Wankat, 2002.

<sup>6</sup> Rice, Sorcinelli, and Austin, 2000.

<sup>7</sup> Bok, 1992.

<sup>8</sup> Fairweather and Beach, 2002; Geiger and Feller, 1995.

<sup>9</sup> Fairweather, 1995; Trow, 1984; Winston, 1994.

<sup>10</sup> Fairweather, 1997, 43.

<sup>11</sup> Baldwin and Chronister, 2001; Finkelstein, Seal, and Schuster, 1998.

<sup>12</sup> Hansen, 1986, 87-88.

<sup>13</sup> Winston, 1984.

<sup>14</sup> Breneman and Youn, 1988, 3.

<sup>15</sup> Getz and Siegfried, 1991, 265-266; Levin, 1991.

<sup>16</sup> Fairweather, 1997, 44.

<sup>17</sup> Hearn, 1999.

<sup>18</sup> Hearn, 1999, 160.

<sup>19</sup> The National Center for Education Statistics sponsored these studies.

<sup>20</sup> I included respondents with faculty status, full-time appointment, and tenured or on the tenure track. I added to this group full-time community college faculty whose institutions did not have a tenure system.

<sup>21</sup> NSOPF-99 originally contacted 960 public and independent colleges and universities and obtained an 85.3 percent institutional response rate. The surveyors stratified this sample of institutions by the latest version of the Carnegie typology (Carnegie Foundation for the Advancement of Teaching, 2001) while providing links to the 1994 Carnegie classification used in this analysis. Surveyors drew a random sample of faculty from participating institutions. Of the original 28,576 sampled faculty members, 19,213 were eligible and 17,600 responded (a 91.6 percent unweighted individual response rate and an 83.2 percent weighted individual 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. Specifically, weights were 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 post-secondary institutions, and the probability of a faculty member being selected from the population of faculty within his or her institution.

<sup>22</sup> The measure of basic salary was based on faculty responses to the question, "What is your basic salary from this institution for the 1998-99 academic year." Our prior analyses used the same measure (Fairweather, 1994, 1997).

<sup>23</sup> Fairweather, 1995.

<sup>24</sup> NSOPF-99 replaced missing values with imputed values purportedly to make analyses easier. This process can distort results, so I deleted all imputed values based on estimates other than direct imputes—imputed values using actual responses to related survey questions.

<sup>25</sup> Previous studies using one or more of these measures include: Baldrige, Curtis, Ecker, and Riley, 1978; Bayer, 1973; Fairweather, 1994, 1997; Fulton and Trow, 1974.

<sup>26</sup> As before I excluded "giving performances in the fine or applied arts" from the definitions of publications because of the low reliability of these estimates (Fairweather, 1997).

<sup>27</sup> Previous studies using one or more of these measures include: Baldrige et al., 1978; Fairweather, 1994, 1997; Ladd, 1979.

<sup>28</sup> Blau, 1973; Fairweather, 1994, 1996, 1997; Fulton and Trow, 1974; Gordon and Morton, 1974.

<sup>29</sup> High paying field was scored as follows: 1 = program areas with average salaries above the overall mean (business, engineering, health sciences), 0 = program areas with average salaries at the overall mean (agriculture/home economics, natural sciences, social sciences, other fields), -1 = program areas with salaries below the overall mean (education, fine arts, humanities).

<sup>30</sup> Daymont and Andrisani, 1984; Fairweather, 1994, 1997; Gordon and Morton, 1974; Moore, 1993; Parcel and Mueller, 1983.

<sup>31</sup> *More research/less teaching* goes from 100 to -100. The former represents 100 percent time allocated to research; the latter represents 100 percent time allocated to teaching.

<sup>32</sup> For respondents from two- and four-year institutions respectively, I normalized the NSOPF-99 weights by dividing the weight by the average weight in the respondent category (two- or four-year institution). This procedure maintains the correct weighting of the respondent in the sample to represent the population while correcting the standard deviation to permit more accurate statistical comparisons.

<sup>33</sup> I used the global F-test from a one-way analysis of variance as the initial test for a bivariate

relationship between basic salary and indicators of faculty work. When the F-test indicated a statistically significant relationship between a measure of faculty work and basic salary, I carried out the Tukey-Kramer (HSD) test for multiple mean comparisons. This procedure, which modifies the desired level of significance to take into account the total number of mean comparisons, permitted me to find the specific paired relationships contributing to the significant overall F-test result.

<sup>34</sup> I used the 1994 Carnegie classification to permit comparisons between 1988, 1993, and 1998. I omitted *independent study hours per week* from the semi-log regression analyses by program area because it did not show any effect in the regressions by type of institution.

<sup>35</sup> Fairweather, 1994, 1997.

<sup>36</sup> All four-year institutions:  $F(4, 5826) = 242.5$ ,  $p < .0001$ . All paired mean comparisons were significantly different at  $p < .001$ .

<sup>37</sup>  $F(4, 4088) = 193.3$ ,  $p < .0001$ . All paired mean comparisons were significantly different at least at  $p < .01$ .

<sup>38</sup>  $F(4, 1733) = 137.0$ ,  $p < .0001$ . All paired mean comparisons were significantly different at least at  $p < .05$  with one exception: basic salary for doctoral-granting universities did not differ significantly from basic salary at other four-year institutions.

<sup>39</sup> Faculty in agriculture/home economics and business had similar average salaries. But the smaller standard error for business faculty resulted in a statistical difference with the overall mean. The larger standard error for agriculture/home economics meant it was not significantly different from the overall average.

<sup>40</sup> Public institutions:  $F(9, 4076) = 77.2$ ,  $p < .0001$ . Independent institutions:  $F(9, 1720) = 30.3$ ,  $p < .0001$ .

<sup>41</sup> Test for overall difference among program areas:  $F(9, 5806) = 105.3$ ,  $p < .0001$ . Many paired mean comparisons were significantly different at least at  $p < .05$ . The following mean comparisons did not differ significantly: agriculture/home economics with business, education, natural science, social science, and other fields; business with engineering, natural science, social science, and other fields; education with fine arts and humanities; engineering with natural science and social science; fine arts with humanities; natural science with social science and other fields; and social science with other fields.

<sup>42</sup> Tests for overall difference among quartiles of percent time spent on teaching:  $F(3, 1734) = 99.0$ ,  $p < .0001$  for independent institutions,  $F(3, 4089) = 249.2$ ,  $p < .0001$  for public institutions.

<sup>43</sup> All paired mean comparisons were significantly different at  $p < .001$  with higher average salaries associated with the quartile of time spent on teaching

in descending order. There was one exception: basic salary did not vary significantly between the third and fourth quartile.

<sup>44</sup> All paired mean comparisons were significantly different at  $p < .001$  with higher average salaries associated with the quartile of time spent on teaching in descending order.

<sup>45</sup> Tests for overall difference among quartiles of percent time spent on teaching by type of public institution:  $F(3, 1748) = 68.5$ ,  $p < .0001$  for research universities;  $F(3, 572) = 28.4$ ,  $p < .0001$  for doctoral-granting universities;  $F(3, 1414) = 22.0$ ,  $p < .0001$  for comprehensive institutions;  $F(3, 165) = 12.1$ ,  $p < .0001$  for other four-year institutions.

<sup>46</sup> Research universities: All paired mean comparisons were significantly different at  $p < .001$  with higher average salaries associated with the quartile of time spent on teaching in descending order. There was one exception: basic salary did not vary significantly between the third and fourth quartile.

Doctoral-granting universities: All paired mean comparisons were significantly different at  $p < .001$  with higher average salaries associated with the quartile of time spent on teaching in descending order. There were two exceptions: basic salary did not vary significantly between the second and fourth quartile and between the third and fourth quartile.

Comprehensive colleges and universities: All paired mean comparisons were significantly different at  $p < .01$  with higher average salaries associated with the quartile of time spent on teaching in descending order. There was one exception: basic salary did not vary significantly between the third and fourth quartile.

Other four-year institutions: Paired mean comparisons between the first and third quartiles ( $p < .001$ ), first and fourth ( $p < .001$ ), and first and second ( $p < .05$ ) were significantly different.

<sup>47</sup> Tests for overall difference among quartiles of percent time spent on teaching by type of independent institution:  $F(3, 405) = 12.9$ ,  $p < .0001$  for research universities;  $F(3, 240) = 8.4$ ,  $p < .0001$  for doctoral-granting universities;  $F(3, 474) = 4.5$ ,  $p < .01$  for comprehensive institutions. Research universities: Paired mean comparisons showed significantly higher salaries for faculty in the lowest quartile (less than 35 percent of time spent on teaching) versus the faculty in each subsequent quartile ( $p < .001$ ). Doctoral-granting universities: Paired mean comparisons showed significantly higher salaries for faculty in the lowest quartile versus faculty in the third (55 to 70 percent time spent on teaching) and the fourth (more than 70 percent) quartiles ( $p < .001$ ), respectively. Comprehensive colleges and universities: Paired mean comparisons showed significantly higher salaries for faculty in the lowest quartile versus the faculty in the fourth ( $p < .05$ ) and third quartiles ( $p < .01$ ), respectively.

<sup>48</sup> Test for overall difference among quartiles of percent time spent on teaching:  $F(3, 121) = 4.7, p < .01$ . Faculty in the lowest quartile of time spent on teaching (less than 35 percent) had significantly higher salaries than those in the highest quartile (more than 70 percent) ( $p < .01$ ).

<sup>49</sup> Test for overall difference among quartiles of percent time spent on teaching:  $F(3, 478) = 10.7, p < .0001$ . Faculty in the second (35 to 54 percent) and third (55 to 70 percent) quartiles of time spent on teaching, respectively, received significantly more pay than colleagues in the highest quartile (more than 70 percent) ( $p < .001$ ).

<sup>50</sup> Tests for overall difference among quartiles of hours in class per week:  $F(3, 1734) = 104.1, p < .0001$  for independent institutions,  $F(3, 4089) = 129.1, p < .0001$  for public institutions. Independent universities: All paired mean comparisons were significantly different at  $p < .001$  with higher average salaries associated with the quartile of hours spent in the classroom in descending order. Public institutions: All paired mean comparisons were significantly different at a minimum of  $p < .01$  with higher average salaries associated with the quartile of hours spent in the classroom in descending order. There was one exception: average basic salaries in the third (9 to 11 hours) and fourth (more than 11 hours) quartiles did not vary significantly.

<sup>51</sup> Tests for overall difference among quartiles of hours in class per week by type of public institution:  $F(3, 1748) = 37.9, p < .0001$  for research universities;  $F(3, 572) = 18.5, p < .0001$  for doctoral-granting universities;  $F(3, 1414) = 16.6, p < .0001$  for comprehensive institutions. Research universities: Paired mean comparisons showed significantly higher salaries for faculty spending less than 6 hours in class per week versus colleagues who spent 6 to 8, 9 to 11, and more than 11 hours, respectively, in class ( $p < .001$ ). Doctoral-granting universities: Paired mean comparisons showed significantly higher salaries for faculty spending less than 6 hours in class per week versus those who spent 6 to 8, 9 to 11, and more than 11 hours, respectively, in class ( $p < .001$ ). Comprehensive colleges and universities: Paired mean comparisons showed significantly higher salaries for faculty spending less than 6 hours ( $p < .001$ ) and between 6 and 8 hours ( $p < .01$ ), respectively, in class per week, versus faculty who spent 9 to 11, and more than 11 hours in class.

<sup>52</sup> Tests for overall difference among quartiles of hours in class per week by type of independent institution:  $F(3, 240) = 10.6, p < .0001$  for doctoral-granting universities;  $F(3, 474) = 14.5, p < .0001$  for comprehensive institutions;  $F(3, 478) = 10.6, p < .0001$  in liberal arts colleges;  $F(3, 121) = 5.9, p < .001$  in other four-year institutions. Doctoral-granting universities: Paired mean comparisons showed significantly higher salaries for faculty spending less than 6 hours in class per week versus

faculty who spent 6 to 8 ( $p < .01$ ), 9 to 11 ( $p < .001$ ), and more than 11 hours ( $p < .01$ ). Comprehensive colleges and universities: Paired in class mean comparisons showed significantly higher salaries for faculty spending less than 6 hours in class per week versus colleagues who spent 9 to 11 ( $p < .01$ ) and more than 11 hours ( $p < .01$ ) in class. Liberal arts colleges: Paired mean comparisons showed that faculty spending more than 11 hours in class per week earned lower salaries than colleagues who spent less than 6 ( $p < .05$ ), 6 to 8 ( $p < .001$ ), and 9 to 11 ( $p < .001$ ) in class hours, respectively. Other four-year institutions: Paired mean comparisons showed that faculty who spent less than 6 hours in class per week earned higher pay than faculty who spent 6 to 8 hours ( $p < .01$ ) and more than 11 hours ( $p < .01$ ), respectively, in class.

<sup>53</sup> Tests for overall difference among quartiles of independent study contact hours:  $F(3, 1734) = 10.8, p < .0001$  for independent institutions,  $F(3, 4089) = 8.8, p < .0001$  for public institutions.

<sup>54</sup> For both public and independent institutions, paired mean comparisons showed that faculty generating more than 7 independent study contacts hours received more pay than their counterparts in all other quartiles at a minimum of  $p < .05$ .

<sup>55</sup>  $F(3, 474) = 3.5, p < .05$ .

<sup>56</sup>  $F(3, 1748) = 3.2, p < .05$ .

<sup>57</sup>  $F(2, 1735) = 117.6, p < .0001$  for independent institutions;  $F(2, 4090) = 183.9, p < .0001$  for public institutions.

<sup>58</sup> Independent institutions:  $F(2, 241) = 14.3, p < .0001$  for doctoral-granting universities;  $F(2, 475) = 14.5, p < .0001$  for comprehensive colleges and universities. Public institutions:  $F(2, 1749) = 47.5, p < .0001$  for research universities;  $F(2, 573) = 3.4, p < .05$  for doctoral-granting universities;  $F(2, 1415) = 11.8, p < .0001$  for comprehensive colleges and universities.

<sup>59</sup>  $F(2, 406) = 9.6, p < .0001$  for independent research universities;  $F(2, 122) = 8.9, p < .001$  for independent other four-year institutions;  $F(2, 166) = 12.1, p < .0001$  for public other four-year institutions.

<sup>60</sup> Tests for overall difference among quartiles of percent of time spent on research and scholarship:  $F(3, 1734) = 57.0, p < .0001$  for independent institutions,  $F(3, 4089) = 24.5, p < .0001$  for public institutions. Independent institutions: All paired mean comparisons were significantly different at  $p < .001$  with higher average salaries associated with the quartile of percent time spent on research in ascending order. There was one exception: basic salary in the second lowest and lowest quartiles did not differ significantly. Public institutions: Paired mean comparisons between the salaries of faculty members in the highest quartile and of colleagues in each of the other three quartiles differed significantly ( $p < .001$ ).

<sup>61</sup>  $F(3, 1748) = 7.8, p < .0001$ . Significant differences were found for the following paired mean comparisons: fourth greater than third quartile ( $p < .001$ ) and second greater than third quartile ( $p < .05$ ).

<sup>62</sup>  $F(3, 478) = 14.4, p < .0001$ . Paired mean comparisons showed higher salaries for faculty in each of the top three quartiles versus faculty who spent less than five percent of their time on research showed (a minimum of  $p < .01$ ).

<sup>63</sup> Tests for overall difference among quartiles of career publications:  $F(3, 1734) = 158.2, p < .0001$  for independent institutions,  $F(3, 4089) = 356.6, p < .0001$  for public institutions. Independent institutions: All paired mean comparisons were significantly different at a minimum of  $p < .05$  with higher average salaries associated with the quartile of career publications in ascending order. Public institutions: All paired mean comparisons were significantly different at a minimum of  $p < .05$  with higher average salaries associated with the quartile of career publications in ascending order.

<sup>64</sup> Tests for overall difference among quartiles of average publications per year:  $F(3, 1734) = 76.3, p < .0001$  for independent institutions,  $F(3, 4089) = 116.1, p < .0001$  for public institutions. Independent institutions: All paired mean comparisons were significantly different at a minimum of  $p < .05$  with higher average salaries associated with the quartile of average publications per year in ascending order. Public institutions: All paired mean comparisons were significantly different at a minimum of  $p < .05$  with higher average salaries associated with the quartile of average publications per year in ascending order.

<sup>65</sup> *Career publications*: Independent institutions:  $F(3, 405) = 16.5, p < .0001$  for research universities;  $F(3, 240) = 8.0, p < .0001$  for doctoral-granting universities;  $F(3, 474) = 4.1, p < .01$  for comprehensive colleges and universities;  $F(3, 478) = 29.5, p < .0001$  for liberal arts colleges;  $F(3, 121) = 5.3, p < .01$  for other four-year institutions. Public institutions:  $F(3, 1748) = 151.0, p < .0001$  for research universities;  $F(3, 572) = 34.7, p < .0001$  for doctoral-granting universities;  $F(3, 1414) = 23.1, p < .0001$  for comprehensive colleges and universities;  $F(3, 165) = 15.1, p < .0001$  for other four-year institutions. *Average publications per year*: Independent institutions:  $F(3, 405) = 9.1, p < .0001$  for research universities;  $F(3, 478) = 3.8, p < .01$  for liberal arts colleges;  $F(3, 121) = 3.3, p < .05$  for other four-year institutions. Public institutions:  $F(3, 1748) = 40.8, p < .0001$  for research universities;  $F(3, 572) = 3.8, p < .01$  for doctoral-granting universities;  $F(3, 165) = 10.3, p < .0001$  for other four-year institutions.

<sup>66</sup>  $F(1, 1736) = 149.1, p < .0001$  for independent institutions;  $F(1, 4091) = 201.5, p < .0001$  at public institutions.

<sup>67</sup>  $F(1, 407) = 7.2, p < .01$  for independent research universities;  $F(1, 123) = 17.0, p < .0001$  for

independent other four-year institutions;  $F(1, 1750) = 67.5, p < .0001$  for public research universities;  $F(1, 574) = 4.0, p < .05$  for public doctoral-granting universities.

<sup>68</sup> For all public institutions:  $F(1, 4091) = 128.1, p < .0001$ . By type of public institution:  $F(1, 1750) = 56.9, p < .0001$  for research universities;  $F(1, 574) = 32.2, p < .0001$  for doctoral-granting universities;  $F(1, 1416) = 27.7, p < .0001$  for comprehensive colleges and universities;  $F(1, 167) = 10.8, p < .001$  for other four-year institutions.

<sup>69</sup>  $F(1, 407) = 11.8, p < .001$  for research universities;  $F(1, 476) = 6.4, p < .01$  for comprehensive colleges and universities.

<sup>70</sup> Recall that the estimate of career publications did not include exhibitions and performances, which most likely influenced this result for faculty in the fine arts.

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