Beyond the Rhetoric: Trends in the Relative Value of Teaching and Research in Faculty Salaries

Fairweather, James Steven.

The Journal of Higher Education, Volume 76, Number 4, July/August 2005, pp. 401-422 (Article)

Published by The Ohio State University Press
DOI: 10.1353/jhe.2005.0027

James S. Fairweather

Beyond the Rhetoric: Trends in the Relative Value of Teaching and Research in Faculty Salaries

In 1990, Ernest Boyer argued in *Scholarship Reconsidered* for a renewed commitment to college teaching by recasting instruction as a form of scholarship. He intended to enhance the visibility of teaching on college campuses and to reduce what he saw as an overemphasis on traditional faculty scholarly publication (scholarship of discovery) (Boyer, 1990). Boyer's work appeared at a time when a dramatic recasting of teaching seemed essential. Traditional scholarly productivity in various forms had become an almost universal expectation for promotion and tenure at all types of 4-year colleges and universities (Bok, 1992; Massy & Wilger, 1995; Trow, 1984). In the late 1980s and early 1990s, it also dominated the internal and external academic labor markets (Winston, 1994). During this time, research consistently showed scholarly productivity as the strongest correlate of faculty pay. Teaching was typically unrelated to or a negative factor in faculty compensation. According to the 1987–1988 and 1992–1993 National Surveys of Postsecondary Faculty (NSOPF-88 and NSOPF-93), faculty who taught less and published more received the highest average salaries regardless of type of 4-year institution or academic discipline (Fairweather, 1994, 1996, 1997).

Boyer's seminal work unquestionably influenced the policy conversation within and outside of academe. Efforts such as Gene Rice's American Association of Higher Education Forum on Faculty Roles and Rewards have led to many reforms in the assessment of faculty work

James S. Fairweather is Professor of Higher, Adult, and Lifelong Education at Michigan State University. His interests focus on faculty work and higher education policy.

The Journal of Higher Education, Vol. 76, No. 4 (July/August 2005)

(Braskamp & Ory, 1994; Glassick, Huber, & Maeroff, 1997). Legislative policies in Ohio, South Carolina, Tennessee, and many other states now tie some public university resources to a commitment to teaching and learning (Banta, 1986; Burke & Serban, 1998). Federal agencies, such as the National Science Foundation (NSF), and independent foundations, such as the Bush Foundation, have invested heavily in undergraduate education and professional development for teaching. The NSF has gone so far as to require aspiring grantees to demonstrate how their proposed research work will improve teaching and learning.

The past decade also has seen increasing evidence about the effectiveness of active and collaborative instructional practices in improving student learning as well as about faculty development strategies to encourage the use of these practices by college teachers (Bruffee, 1993; Seldin & Associates, 1990; Wankat, 2002). Many colleges and universities have established centers for teaching and learning for this purpose (Rice, Sorcinelli, & Austin, 2000). Braxton, Luckey, and Helland (2002) found evidence that some institutions are starting to define expectations for faculty scholarship more consistently with institutional mission (p. 103). Johnstone (1993) has led the call for colleges and universities to focus on efficiently increasing student learning outputs rather than focusing exclusively on faculty instructional inputs.

In the past decade, we also have learned that research universities, often the most criticized for paying inadequate attention to undergraduate teaching (Bok, 1992), vary in their origins and in their policies toward instruction and scholarship. Some have been research-oriented for decades; others evolved from a commitment to public service and only recently have focused heavily on research and scholarship. These historical differences are reflected in differing commitments to teaching and learning (Fairweather & Beach, 2002; Geiger & Feller, 1995). Indeed, some land-grant research universities, including the University of Wisconsin-Madison, Michigan State University, and the Pennsylvania State University through the new NSF Center for the Integration of Research, Teaching, and Learning and other initiatives, are leading efforts to promote effective instructional practices.

Yet countervailing forces remain. Some have argued that a national labor market for faculty based primarily on enhancing prestige through research productivity persists (Fairweather, 1995; Trow, 1984; Winston, 1994). In this national labor market, "administrators and faculty in all types of institutions therefore use similar research-oriented criteria in hiring and in rewarding existing faculty" (Fairweather, 1997, p. 43). Despite evidence of broader definitions of acceptable forms of scholarship, traditional published research remains the coin of the realm for promo-

tion and tenure decisions in most 4-year institutions (Braxton, Luckey, & Helland, 2002, p. 104). We also have seen growing utilization of part-time faculty and non-tenure track staff to teach increasing numbers of undergraduate students (Baldwin & Chronister, 2001; Finkelstein, Seal, & Schuster, 1998), which has raised concerns about the importance that colleges and universities place on undergraduate teaching and learning.

This article examines whether the decade-long push for greater commitment to teaching and learning and to restoring the balance between teaching and research is reflected in a key reward—faculty pay. Has the monetary value of teaching increased in the past 5 years? Does this pattern vary by type of institution?

Perspectives on Faculty Pay

Theories of faculty pay can be categorized into pay as either a function of (a) market competition or (b) institutional forces (Hansen, 1986, pp. 87–88; Twigg, Valentine, & Elias, 2002).[1] Market models attribute changes in faculty salaries at least in part to supply and demand (Bowen & Sosa, 1989, pp. 145–149). Two schools of thought drive the market model. One school emphasizes an emerging national labor market based principally on research and scholarly prestige (Winston, 1994). Institutions of all types value prospective and current faculty who show research promise or who produce high levels of scholarship. In contrast, the market segmentation school holds that teaching-oriented institutions pay their most productive and highest quality teachers more than they pay faculty members who publish and obtain external funding. Research universities pay their faculty in line with research productivity. According to Breneman and Youn (1988), "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 rewards" (p. 3).

Some economists believe that pay is an expression of institutional norms and values regardless of espoused mission (Getz & Siegfried, 1991, pp. 265–266; Levin, 1991). From this point of view, "institutions that actually value teaching will pay their productive teachers the most, whereas institutions valuing research will pay their productive researchers the most" (Fairweather, 1997, p. 44).

Hearn (1999) recast these theories of faculty pay in terms of institutional policy. According to Hearn, institutional leaders can simply rely on the national market to set salaries. Alternatively, they can use salaries to *decrease* the effects of markets, such as by taking into

account seniority and internal measures of merit. Establishing career ladders with standardized salary levels for each step is an approach used by the University of California system, among others. Finally, institutional leaders can set salary policies to "elevate teaching and public service as criteria for salary adjustments" (Hearn, 1999, p. 160).

Study Purpose

The purpose of this study is to determine whether the value of teaching in the academic marketplace has increased between 1992–1993 (NSOPF-93) and 1998–1999 (NSOPF-99). This paper identifies the correlates of faculty pay in 1998–1999 and compares them with those in 1992–1993. The specific research questions are:

1. What is the relative value of teaching and research in faculty pay in 1993 and 1999?
2. Has the relative value of teaching and research in faculty pay changed between 1993 and 1999?

If the value of teaching is increasing, we should find stronger, positive relationships between teaching-related behaviors and pay; decreased (or at least not increased) value placed on traditional scholarly productivity; and increased evidence of a segmented market with distinct patterns of pay between teaching- and research-oriented institutions.

National Survey Data

I used the 1998–1999 National Survey of Postsecondary Faculty (NSOPF-99), sponsored by the National Center for Education Statistics, to examine the current relationships between teaching, research, and faculty pay. I compared results with findings from the 1992–1993 survey (NSOPF-93). This article focuses on the 6,482 and 10,626 full-time, tenure-track faculty in 4-year colleges and universities responding to the survey in 1998–1999 and 1992–1993, respectively. The respective individual faculty response rates were 92% and 87%. Weights were calculated so that the statistical estimates would represent the population of faculty within the universe of 4-year institutions.

Study Variables

To permit comparisons between 1992–1993 and 1998–1999, I selected comparable variables from NSOPF-93 and NSOPF-99. Relevant

measures include the dependent variable, independent teaching and research variables, and control variables.[2]

Dependent Variable

As in previous analyses of NSOPF-93 (Fairweather, 1997), I used *basic salary* from the academic institution as the measure of pay. 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 [or 1992–93] academic year." Basic salary excludes supplemental income, such as monies from summer teaching or funded research and from consulting. To permit accurate comparisons between 1992–1993 and 1998–1999, I converted the basic salary for 1992–1993 into constant 1998 dollars by dividing the Bureau of Labor Statistics 1998 Consumer Price Index CPI value (163.0) by the 1992 CPI value (140.3) and multiplying the result times the 1992 basic salary. Multivariate analyses used the log transformation of basic salary in constant 1998 dollars and took length of contract (9- or 12-month) into account. Consistent with other econometric studies (e.g., Fairweather, 1995), the log transformation of basic salary stabilizes the variance in the error term and thus better fits the underlying assumptions of regression analysis.

Independent Variables: Teaching and Research

Based on previous research (Baldridge, Curtis, Ecker, & Riley, 1978; Bayer, 1973; Fairweather, 1999; Fulton & Trow, 1974; Marsh & Hattie, 2002), including the analysis of NSOPF-93 (Fairweather, 1997), I included three measures of teaching-related activities and workloads. A measure of instructional input based on time spent on classroom teaching was *hours spent in the classroom per week*. To account for the *type of student taught*, for all courses taught during the semester under study (fall 1992 for NSOPF-93 and fall 1998 for NSOPF-99) I classified the focus of classroom instruction into a 3-point scale: (1) taught undergraduate students only, (2) taught both graduate and undergraduate students, and (3) taught graduate students only. To account for the primary instructional approach used in classroom teaching and as a proxy for instructional quality, I included whether the faculty member showed *evidence of collaborative instruction* during the courses taught in the semester under study (0 = no, 1 = yes). Research indicates that faculty members who use collaborative or active learning approaches achieve higher levels of student learning than those using passive instructional techniques (Bruffee, 1993; Goodsell, Maher, & Tinto, 1992; Wankat,

2002; Weimer, 1990, 1996). I deemed a faculty member to demonstrate use of collaborative instruction when he or she used any of the following instructional methods as the primary instructional approach in at least one course during the semester under study: apprenticeship, internship, field work, or field trips; role playing, simulation, or other performances; group projects; or cooperative learning groups. I also included faculty members not using one of these primary instructional methods if they made extensive use of student evaluations of each other's work in their courses, a principal ingredient in collaborative teaching and learning. Although better than simple measures of instructional quality, this proxy for instructional practice is admittedly imperfect, omitting many dimensions of instructional quality.

The study included two measures of research and scholarly activity and productivity used in previous research (Baldridge et al., 1978; Fairweather, 1994, 1997; Ladd, 1979). *Total refereed publications during the career*, including articles, chapters in edited volumes, textbooks, other books, monographs, and reviews of books and articles, is the most commonly used measure of traditional scholarly productivity. I excluded from this measure "giving performances in the fine or applied arts" because of the low reliability of these estimates. I also included whether the respondent was a *principal or co-principal investigator (PI) on an externally funded project during fall 1998 [or fall 1992]* (0 = no, 1 = yes).

Control Variables

I included several control variables, each potentially related to faculty pay, to obtain more accurate estimates of the relationships between faculty pay, teaching, and research (Blau, 1973; Fairweather, 1994, 1996, 1997; Fulton & Trow, 1974; Gordon & Morton, 1974). Institutional level factors influencing faculty pay include *source of control* (0 = private, 1 = public) and *institutional wealth* (defined here as Educational and General Expenditures divided by FTE enrollment). Including *institutional wealth* both controls for overall per pupil expenditures and serves as a proxy for distinct subcategories within the Carnegie typology (e.g., Liberal Arts I and II). A structural factor in faculty pay at the individual level is the *length of contract* (0 = 9-month, 1 = 12-month). Pay also varies by *academic discipline*. NSOPF-93 and NSOPF-99 grouped faculty respondents into 10 program areas: agriculture/home economics, business, education, engineering, fine arts, health sciences, humanities, natural sciences, social sciences, and other fields. I also included

whether or not the respondent served as a *department chair* during fall 1998 (or fall 1992) (0 = no, 1 = yes) as a measure of administrative service likely to affect pay.

Personal characteristics also affect salary (Daymont & Andrisani, 1984; Fairweather, 1994, 1997; Gordon & Morton, 1974; Moore, 1993; Parcel & Mueller, 1983). Characteristics included in this study were *seniority* (*years since attained the highest degree*), *gender* (0 = female, 1 = male), *race/ethnicity* (0 = nonminority, 1 = minority), and *highest degree attained* (0= less than Ph.D./highest professional degree, 1 = Ph.D./highest professional degree). Finally, for the equation comparing 1992–1993 with 1998–1999, I included a dummy variable signifying the *year of the survey* (0 = NSOPF-93, 1 = NSOPF-99). Table 1 lists the study variables and the abbreviated forms used in the analyses.

Model

The primary focus of this research is on the relationships between teaching and research behaviors with faculty pay and on comparing

TABLE 1
Study Variables

SALARY	Basic salary in constant 1998 dollars
PUBLIC	Source of control (institution)
INWEALTH	Institutional wealth
AGRICULTURE	Program area: Agriculture
BUSINESS	Program area: Business
EDUCATION	Program area: Education
ENGINEERING	Program area: Engineering
FINE ARTS	Program area: Fine Arts
HEALTH	Program area: Health Sciences
HUMANITIES	Program area: Humanities
NATSCI	Program area: Natural Science
SOCSCI	Program area: Social Science
CONTRACT	Length of contract
YRSSHD	Years since attained highest degree
MINORITY	Member of an ethnic or racial minority
MALE	Gender
HD	Highest degree Ph.D.
CHAIR	Department chair
CLASSHR	Hours spent in the classroom per week
TYPESTS	Type of students taught
COLLABORATE	Use of collaborative instruction
TOTPUBS	Total refereed publications, career
PI	Principal investigator on a funded research project

these relationships over time. Accurate estimates of these relationships require including the control variables and squared terms to estimate potential diminishing returns in multivariate models. Squared terms were included in the model for all continuous variables. The equation examined for both NSOPF-93 and NSOPF-99 was:

LOG (SALARY) = INTERCEPT + b1PUBLIC + b2INWEALTH + b3INWEALTH^2 + b4AGRICULTURE + b5BUSINESS + b6EDUCATION + b7ENGINEERING + b8FINE ARTS + b9HEALTH + b10HUMANITIES + b11NATSCI + b12SOCSCI + b13CONTRACT + b14YRSSHD + b15YRSSHD^2 + b16MINORITY + b17MALE + b18HD + b19CHAIR + b20CLASSHR + b21CLASSHR^2 + b22TYPESTS + b23COLLABORATE + b24TOTPUBS + b25TOTPUBS^2 + b26PI + e.[3]

For faculty in liberal arts colleges, *source of control* (PUBLIC) did not apply and was omitted from the regression analyses. Similarly, too few faculty members in liberal arts colleges held positions in *agriculture* and *engineering* to permit accurate estimates, which required removing the two disciplines from the liberal arts college equations.

Methods

To answer the first research question, I carried out semi-log regressions. First, I normalized the NSOPF-99 and NSOPF-93 weights by dividing the weight by the average weight in 4-year institutions. This procedure maintains the correct weighting of the respondent in the sample to represent the population while correcting the standard deviation to permit statistical comparisons that are more accurate. Next, for 1992–1993 and 1998–1999 I regressed the log of basic salary on the independent and control variables separately by type of institution based on the 1994 Carnegie typology (Research University, Doctoral University, Comprehensive College and University, Liberal Arts College). Initial tests of the model showed the estimates of regression coefficients were unbiased. A study of residuals showed no evidence of heteroskedasticity. Additional tests showed no evidence of multi-collinearity. I also calculated the contribution of teaching and research variables to the variance explained in faculty pay for both 1992–1993 and 1998–1999 and compared the two. In addition, to examine changes in diminishing returns over time I examined the effect on faculty pay of hours in class per week and publishing productivity at the mean for 1992–1993 and 1998–1999.[4]

To examine the second research question—changes in the value of teaching and research in faculty pay over time—I used a Chow test

(Gujarati, 1995) to compare the 1993 and 1999 equations separately by institutional type. The Chow test provides an overall test of equivalence between equations. However, it does not examine changes in specific relationships between teaching and research behaviors with pay. Accordingly, I also formed pooled groups across 1993 and 1999 by type of institution (e.g., Research University 1992–1993 with Research University 1998–1999) and added dummy variables incorporating year (1993 or 1999) into the equations. Use of these dummy variables in the pooled equations permitted testing the equivalence of regression coefficients for each teaching and research variable over time. Finally, I examined the change in estimated increase or decrease in salary of an additional publication and an additional hour spent in the classroom between 1992–1993 and 1998–1999.[5]

Results

Table 2 shows the means and variances for study variables separately for 1992–1993 and 1998–1999. Table 3 shows the regressions of the logarithmic transformation of basic salary [hereafter log(basic salary)] on various control variables and teaching and research variables separately for 1992–1993 and 1998–1999. I used the same predictors and analytical procedures to permit direct comparisons between 1992–1993 and 1998–1999. Table 4 shows the diminishing returns for classroom teaching and career publishing for 1992–1993 and 1998–1999. Based on the dummy variable pooled equation, Table 5 shows the *t*-test results comparing the 1992–1993 and 1998–1999 regression coefficients for teaching and research variables. The presentation and discussion of results focuses on the relative importance of faculty teaching and research variables on pay.

Research Question 1

The regression models accounted for between 47% and 67% of the variance in log(basic salary) in 1992–1993, and between 41% and 54% of the variance in log(basic salary) in 1998–1999. Teaching and research behaviors contributed significantly to the variance explained in pay for faculty in all four types of institutions in both 1992–1993 and 1998–1999.[6] Table 3 shows that *hours spent in the classroom per week* (CLASSHR) was significantly, negatively related to pay in research, doctoral-granting, and comprehensive colleges and universities in both 1992–1993 and 1998–1999. In liberal arts colleges, *hours spent in the*

TABLE 2

Means and variances, by type of institution and year (standard deviations in parentheses)

	Research		Doctoral		Comprehensive		Liberal Arts	
	92-93	98-99	92-93	98-99	92-93	98-99	92-93	98-99
SALARY	73147 (43567)	76210 (34666)	58306 (20553)	61752 (24000)	52033 (15603)	54239 (18314)	46056 (14801)	47686 (16337)
LOG (SALARY)	11.12 (.39)	11.16 (.41)	10.92 (.33)	10.97 (.33)	10.82 (.28)	10.86 (.29)	10.69 (.30)	10.73 (.29)
PUBLIC	.79 (.41)	.78 (.42)	.66 (.47)	.75 (.44)	.74 (.44)	.73. (.45)	NA	NA
IN WEALTH	24239 (18450)	30985 (47814)	13243 (7418)	16238 (12678)	8853 (4967)	11306 (3907)	15654 (6678)	17936 (7886)
AGRICULTURE	.05 (.22)	.05 (.21)	.02 (.14)	.01 (.12)	.01 (.12)	.01 (.10)	NA	NA
BUSINESS	.05 (.21)	.05 (.21)	.09 (.28)	.08 (.27)	.11 (.31)	.10 (.31)	.06 (.23)	.07 (.25)
EDUCATION	.05 (.22)	.06 (.25)	.08 (.28)	.07 (.27)	.12 (.32)	.13 (.34)	.05 (.21)	.10 (.31)
ENGINEERING	.09 (.29)	.09 (.29)	.06 (.24)	.08 (.27)	.03 (.17)	.04 (.19)	NA	NA
FINE ARTS	.05 (.21)	.05 (.22)	.05 (.22)	.07 (.26)	.07 (.26)	.08 (.28)	.12 (.33)	.11 (.32)
HEALTH	.16 (.36)	.16 (.37)	.09 (.29)	.10 (.31)	.06 (.24)	.06 (.24)	.04 (.20)	.05 (.22)
HUMANITIES	.11 (.31)	.12 (.33)	.12 (.33)	.14 (.35)	.15 (.36)	.16 (.37)	.22 (.42)	.25 (.44)
NAT SCI	.22 (.41)	.23 (.42)	.21 (.41)	.20 (.40)	.19 (.39)	.19 (.40)	.22 (.41)	.17 (.38)
SOC SCI	.12 (.33)	.12 (.33)	.14 (.34)	.13 (.34)	.13 (.34)	.13 (.34)	.18 (.38)	.17 (.39)
CONTACT	.37 (.48)	.19 (.40)	.27 (.44)	.13 (.34)	.16 (.37)	.09 (.30)	.19 (.39)	.13 (.35)
YRSSHD	18.67 (10.22)	19.71 (10.82)	16.97 (9.84)	17.82 (10.30)	16.28 (9.29)	17.34 (10.13)	16.13 (9.79)	15.89 (10.79)
MINORITY	.11 (.32)	.15 (.36)	.12 (.33)	.15 (.36)	.14 (.35)	.16 (.37)	.09 (.29)	.11 (.32)
MALE	.81 (.39)	.75 (.44)	.77 (.42)	.72 (.45)	.70 (.46)	.65 (.48)	.65 (.48)	.65 (.49)
HD	.93 (.26)	.93 (.26)	.90 (.30)	.90 (.30)	.80 (.40)	.81 (.40)	.72 (.45)	.76 (.44)
CHAIR	.10 (.30)	.09 (.29)	.14 (.35)	.11 (.31)	.15 (.36)	.10 (.31)	.30 (.46)	.25 (.44)
CLASS HR	6.38 (6.40)	6.24 (6.04)	8.14 (6.58)	7.85 (5.55)	10.64 (6.20)	10.51 (6.00)	10.98 (6.17)	11.13 (6.52)
TYPESTS	1.96 (.86)	1.88 (.85)	1.67 (.78)	1.70 (.78)	1.35 (.62)	1.37 (.63)	1.09 (.35)	1.15 (.45)
COLLABORATE	.19 (.39)	.31 (.47)	.23 (.42)	.29 (.46)	.32 (.47)	.38 (.49)	.36 (.48)	.33 (.48)
TOTPUBS	41.80 (55.52)	49.67 (53.62)	22.30 (33.18)	30.14 (37.58)	11.56 (27.35)	14.77 (22.49)	10.05 (22.86)	12.21 (22.21)
PI	.48 (.50)	.39 (.49)	.27 (.45)	.23 (.42)	.12 (.33)	.11 (.31)	.12 (.32)	.07 (.27)

SOURCES: NSOPF–93, NSOPF–99

NA = Not applicable or too few cases for reliable estimate.

classroom per week was not significantly related to pay in 1992–1993 but was slightly negatively related to pay in 1998–1999.

In all types of institutions, in 1992–1993 and in 1998–1999 the *type of student taught* (TYPESTS) significantly affected pay. Teaching only graduate students was positively related to pay, whereas teaching only undergraduates was negatively related to it. *Evidence of collaborative instruction* (COLLABORATE) by a faculty member was unrelated to pay across type of institution and years.

For both 1992–1993 and 1998–1999, *total refereed publications for the career* (TOTPUBS) was strongly, positively related to faculty pay for each type of institution. Being a *principal investigator* (PI) on a funded research project was modestly, positively related to pay in research universities and unrelated to pay in the other types of colleges and universities.

Table 4 examines potential diminishing returns for *hours spent in the classroom per week* (CLASSHR) and *refereed publications for the career* (TOTPUBS). For both 1992–1993 and 1998–1999, the results show diminishing negative returns for classroom teaching and diminishing positive returns for publishing. Yet in very few cases—2% at most, usually less—did classroom teaching become a positive factor in pay or publishing become negatively related to pay. In 1992–1993, a faculty member in a research university had to teach almost 23 hours per week before the additional hour per week spent in the classroom was financially rewarded. This level of productivity applied only to about 3% of all faculty members in that type of institution. By 1998–1999, the comparable number had increased to more than 29 hours per week and the percentage attaining that level of productivity had declined to less than 1%. In contrast, in 1992–1993, each refereed publication was positively rewarded in pay until the almost absurd level of 426, at which point each additional publication adversely affected pay. This level of productivity applied to a tiny fraction of faculty members in research universities. In 1998–1999 the "tipping point"—that is, the point at which the returns of publishing started to turn negative ("0 return" in Table 4)—was substantially smaller (276 publications) but the percentage of faculty affected was also infinitesimal.

Although the absolute level of productivity obviously differed, the pattern for faculty in liberal arts colleges, the most teaching-oriented of the institutions studied, was most like that of the research universities. The tipping point at which an added hour spent in the classroom teaching resulted in higher pay *rose* from about 26 hours in 1992–1993 (2.2% of liberal arts college faculty reached this level of productivity) to about 48 hours in 1998–1999 (less than 1%). The tipping point at which the

returns to an additional publication became negatively related to pay declined substantially from approximately 245 in 1992–1993 to about 88 in 1998–1999, although in both cases the percentage of faculty affected was very small.

In contrast to faculty in research universities and liberal arts colleges, those in doctoral-granting and comprehensive institutions required *fewer* hours spent in the classroom in 1998–1999 than in 1992–1993 for the return on an extra hour spent in the classroom to turn positive (from about 39 hours to 31 hours per week in doctoral-granting universities, about 36 hours to 29 hours in comprehensives). Similar to those in the other two types of institutions, for faculty in doctoral-granting and comprehensive institutions the tipping point at which the dollar value of an additional publication turned negative also declined substantially between 1992–1993 and 1998–1999 (from about 180 to 134 in doctoral-granting universities, about 240 to 140 in comprehensives). These shifts, however, affected only a tiny fraction of the faculty in comprehensives and doctoral-granting universities. In sum, in 1998–1999 for the vast majority of faculty *irrespective of institutional type* teaching an additional hour remained a negative factor in pay and publishing an extra article a positive factor in pay.

Research Question 2

Statistical comparisons (i.e., Chow tests) show that for each type of institution the equations derived from 1992–1993 data differ significantly from those derived from 1998–1999 data.[7] These overall tests are affected by changes in average basic salary and control variables over time, which limit their utility in determining relative changes in the effects of teaching and research variables on pay. Table 5 shows the results of *t* tests to compare the coefficients for teaching and research variables between 1998–1999 and 1992–1993. Here I used a more liberal minimum criterion for significance—$p < .10$—to identify possible trends for future study.

Importantly, the relationship between *hours spent in the classroom per week* and pay was substantially *more* negative in 1998–1999 than 1992–1993 in the two most teaching-oriented institutions. This decline was strongly statistically significant in comprehensive colleges and universities and not quite statistically significant in liberal arts colleges. The relationship between *type of students taught* and pay did not vary significantly over time in any type of institution. In research universities, the *use of collaborative instruction* in the classroom was significantly more negatively related to pay in 1998–1999 than in 1992–1993. It was

TABLE 3

Semi-log regression, basic salary in constant 1998 dollars (log), by type of institution and year (standardized estimate in parentheses)

	Research		Doctoral		Comprehensive		Liberal Arts	
	92-93	98-99	92-93	98-99	92-93	98-99	92-93	98-99
INTERCEPT	10.27 (0)***	10.53 (0)***	10.34 (0)***	10.43 (0)***	9.95 (0)***	10.21 (0)***	9.90 (0)***	10.27 (0)***
Control Variables								
PUBLIC	.02 (.02)	−.06 (−.06)**	−.04 (−.06)**	−.03 (−.04)	.17 (.27)***	.08 (.13)***	NA	NA
IN WEALTH	6.07E6 (.22)**	2.70E6 (.22)***	1.09E5 (.24)***	3.39E6 (.11)	3.39E5 (.61)***	1.96E5 (.27)***	2.28E5 (.51)***	−4.80E6 (−.13)
IN WEALTH^2	−1.53E11(−.04)	−3.30E12(−.17)***	−9.75E11(−.09)	9.00E12 (.03)	4.94E10 (−.43)***	−4.76E10 (−.19)**	−9.51E11 (−.08)	3.83E10 (.46)***
AGRICULTURE	−.11 (−.06)**	−.04 (−.02)	−.08 (−.03)	−.12 (−.04)	−.03 (−.01)	−.02 (−.01)	NA	NA
BUSINESS	.21 (.12)***	.21(.11)***	.19 (.17)***	.28 (.22)***	.15 (.16)***	.17 (.19)***	.00 (.00)	.10 (.09)*
EDUCATION	−.14 (−.09)***	−.17 (−.11)***	−.12 (−.11)***	−.10 (−.08)**	−.07 (−.08)***	−.06 (−07)**	−.00 (−.00)	−.12 (−.12)**
ENGINEERING	.07 (.06)*	.03 (.02)	.06 (.05)*	.10 (.08)**	.10 (.06)***	.06 (.04)	NA	NA
FINE ARTS	−.11 (−.07)**	−.13 (−.08)***	−.09 (−.07)**	−.12 (−.10)**	−.06 (−.05)***	−.06 (−.06)**	−.04 (−.04)	−.10 (−.12)*
HEALTH	.14 (.12)***	.09 (.08)***	−.05 (−.04)	.06 (.05)	.04 (.03)	.04 (.03)	.13 (.09)***	−.02 (−.02)
HUMANITIES	−16. (−.14)***	−.20 (−.17)***	−.16 (−.17)***	−.13 (−.13)***	−.10 (−.12)***	−.08 (−.10)***	−.06 (−.08)*	−.11 (−.16)**
NATSCI	−.08 (−.09)**	−.06 (−.07)**	−.12 (−.16)***	.01 (.01)	−.05 (−.06)**	−.05 (−.06)*	−.04 (−.05)	−.10 (−.13)**
SOCSCI	−.09 (−.08)**	−.07 (−.06)**	−.11 (−.12)***	−.06 (−.06)	−.04 (−.06)**	−.04 (−.05)	−.02 (−.02)	−.09 (−.12)*
CONTRACT	.12 (.15)***	.09 (.09)***	.10 (.13)***	.07 (.08)**	.06 (.08)***	.07 (.07)***	.02 (.03)	−.02 (−.02)
YRSSHD	.02 (.68)***	.02 (.55)***	.02 (.61)***	.02 (.71)***	.02 (.72)***	.02 (.88)***	.02 (.67)***	.02 (.91)***
YRSSHD^2	−2.60E4 (−.29)***	−1.63E4 (−.19)**	−1.55E4 (−.18)**	−2.10E4 (−.25)*	−2.54E4(−.31)***	−3.28E4 (−.44)***	−1.54E4 (.20)*	−3.38E4 (−.47)***
MINORITY	.03 (.03)	.01 (.01)	−.01 (−.02)	.05 (.06)*	−.01 (−.01)	−.02 (−.03)	.09 (.08)***	−.04 (−.04)
MALE	.09 (.10)***	.03 (.04)*	.04 (.06)**	.00 (.00)	.04 (.07)***	.03 (.04)*	.03 (.05)*	.04 (.07)*
HD	.15 (.10)***	.16 (.11)***	.17 (.16)***	.14 (.14)***	.20 (.28)***	.17 (.23)***	.18 (.27)***	.17 (.26)***
CHAIR	.09 (.08)***	.09 (.06)***	.10 (.11)***	.11 (.10)***	.05 (.07)***	.05 (.05)**	.01 (.02)	.03 (.04)

TABLE 3 (*Continued*)

Semi-log regression, basic salary in constant 1998 dollars (log), by type of institution and year (standardized estimate in parentheses)

	Research		Doctoral		Comprehensive		Liberal Arts	
	92-93	98-99	92-93	98-99	92-93	98-99	92-93	98-99
Teaching and Research Variables								
CLASSHR	−.01 (−.19)***	−.01 (−.13)***	−.01 (−.20)***	−.01 (−.22)***	−.004 (−.08)**	−.01 (−.24)***	−.003 (−.06)	−.01 (−.18)*
CLASSHR^2	2.47E4 (.17)***	1.53E4 (.09)**	1.34E4 (.14)***	2.35E4 (.12)	4.90E5 (.06)*	2.05E4 (.17)***	5.92E5 (.07)	8.43E5 (.12)
TYPESTS	.04 (.10)***	.02 (.05)**	.04 (.11)***	.04 (.11)***	.03 (.07)***	.05 (.11)***	.05 (.06)**	.08 (.12)***
COLLABORATE	.03 (.03)	−.02 (−.02)	−.01 (−.01)	.02 (.02)	−.00 (−.01)	.02 (.03)	−.01 (−.02)	.01 (.02)
TOTPUBS	1.62E-3(.24)***	2.76E-3(.36)***	3.53E-3 (.35)***	2.54E-3(.29)***	2.14E-3 (.21)***	1.26E-3(.10)**	2.84E-3(.21)***	3.97E−3(.30)***
TOTPUBS^2	−1.90E6(.07)	−5.00E6 (−.14)**	−9.78E6(−.18)***	−9.43E6 (−.19)**	−3.14E6 (−.10)***	−4.51E6 (−.05)	−5.81E6 (−.07)	−2.26E5 (−.22)***
PI	.06 (.08)***	.04 (.05)*	.01 (.01)	−.03 (−.04)	.01 (.01)	−.01 (−.01)	.01 (.01)	.05 (.05)
ADJUSTED R^2	.59	.54	.58	.52	.47	.41	.67	.52
N	1135	1877	1314	767	2981	1837	699	480

SOURCES: NSOPE–93, NSOPF–99

NA = Not applicable or too few cases for reliable estimate.

E^n = 10 to the nth power.

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

TABLE 4

Estimated effect on faculty pay (in constant 1998 dollars) of hours spent in the classroom and career publications at the mean, by type of institution and year

	Research		Doctoral		Comprehensive		Liberal Arts	
	92-3	98-9	92-3	98-9	92-3	98-9	92-3	98-9
CLASSHR								
Effect[a]	−.011***	−.009***	−.010***	−.014***	−.004***	−.016***	−.003	−.008**
SE[b]	.002	.002	.001	.003	.0009	.001	.002	.003
0 Return[c]	22.86	29.38	38.84	31.32	36.33	29.22	25.89	48.40
% Cases	2.7%	0.9%	0.8%	0.7%	0.7%	1.3%	2.2%	0.5%
TOTPUBS								
Effect[a]	.002***	.003***	.004***	.003***	.002***	.001***	.003***	.004***
SE[b]	.0003	.0002	.0004	.0004	.0003	.0004	.0006	.0008
0 Return[c]	426.32	276.00	180.10	133.70	339.68	140.00	244.83	88.22
% Cases	0.0%	0.2%	0.7%	2.4%	0.1%	0.3%	0.2%	1.6%

SOURCES: NSOPF–93, NSOPF–99

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

[a]Effect = $b_1 + 2b_2 X$ where b_1 is the semi-log regression coefficient for X and b_2 is the semi-log regression coefficient for X^2 taken from Table 3.

[b]The standard error of the estimate is the square root of $(S_{11} + 4XS_{12} + 4X^2S_{22})$ where S_{11} is the variance of b_1, S_{22} is the variance of b_2, and S_{12} is the covariance of b_1 b_2 (Aiken & West, 1991, p. 64).

[c]Value of X when $b_1 + 2b_2 X = 0$.

significantly more positively related to pay in comprehensives, however, and slightly (though not significantly) more positively related to pay in doctoral universities and liberal arts colleges.

In research universities, publishing was more strongly, positively related to pay in 1998–1999 than in 1992–1993. It was significantly *less* related to pay in comprehensives, though, and more or less unchanged in the other two types of institutions. The relationship between being a *principal investigator* on a funded research project was mostly unchanged over time with one exception: It was more negatively related with pay in comprehensive institutions in 1998–1999 than in 1992–1993.

Table 6 shows the estimated change in salary of an additional publication and an additional hour spent in the classroom teaching for 1992–1993 and 1998–1998 in constant 1998 dollars. The results are mixed. Across all types of institutions, faculty members spending an extra hour in the classroom lost more money in 1998–1999 than in 1992–1993. The teaching-oriented institutions showed the most dramatic decline in the value of an additional hour spent in the classroom teaching. Not surprisingly, publishing an additional article is worth more in 1998–1999 than in 1992–1993 for faculty members in research universities. More surprisingly, the same result held true for liberal arts

TABLE 5
T-test comparisons for teaching and research coefficients, 1999 verses 1993, by type of institution[a]

	Research	Doctoral	Comprehensive	Liberal Arts
CLASSHR	.58	−.98	−3.52****	−1.17
TYPESTS	−1.36	.03	1.28	.85
COLLABORATE	−1.81*	.99	1.64*	.91
TOTPUBS	2.09**	−1.38	−1.71*	.97
PI	−.85	−1.66*	.51	1.09

SOURCES: NSOPF–93, NSOPF–99
* = p < .10, ** = p < .05, *** = p < . 01, **** = p < .001
[a]T-test comparisons are two-tailed. A positive sign indicates that the absolute value of the coefficient for 1999 is greater than the absolute value of the coefficient for 1993. A negative sign indicates the reverse.

colleges. Publishing an additional article was worth *less* in 1998–1999 than in 1992–1993 for faculty members in doctoral-granting and comprehensive colleges and universities.

Discussion and Conclusions

Do the 5-year trends in faculty pay reflect the changes in the relative value of teaching and research in the academic labor market? In particular, are the relationships between teaching behaviors and pay more positive and the relationships between research productivity and pay less powerful (or at least unchanged)? Are institutions paying their faculty more in line with their espoused missions? The regression results show that spending more hours teaching in the classroom continues to be related to a lower basic salary for faculty members in research, doctoral-granting, and comprehensive universities. For liberal arts colleges, the most teaching-oriented of all institutions, in 1998–1999 hours spent in the classroom changed from a neutral to a negative factor in pay. Although spending more time in the classroom teaching shows evidence of diminishing negative returns, only a handful of faculty members across types of institution ever see higher pay for spending an additional hour in the classroom. Faculty members seeking higher salaries are still better off teaching graduate students instead of undergraduate students regardless of the type of institution in which they work. Using the more effective but labor-intensive collaborative teaching techniques has little effect on pay regardless of the type of institution.

TABLE 6

Estimated effect on faculty pay (in constant 1998 dollars) of an additional hour spent in the classroom and an additional career publication at the mean, by type of institution and year

	Research		Doctoral		Comprehensive		Liberal Arts	
	92-3	98-9	92-3	98-9	92-3	98-9	92-3	98-9
CLASSHR	–$728	–$758	–$580	–$614	–$208	–$540	–$138	–$474
TOTPUBS	$119	$211	$206	$157	$111	$68	$131	$190

SOURCES: NSOPF–93, NSOPF–99

The *t*-test results show that spending more hours in the classroom became more negatively related to pay between 1992–1993 and 1998–1999 in comprehensive institutions and (somewhat less so) in liberal arts colleges. This relationship remained substantially unchanged in the other two types of institutions. The relationship between type of students taught and pay did not change over time in any type of institution. Although using collaborative instructional approaches became significantly more negatively related to pay over 5 years in research universities, it was significantly more positively related to pay in comprehensives. Trends in doctoral-granting universities and liberal arts colleges were also positive, although not significantly so.

The regression results showed that publishing productivity continued as a significant positive factor in pay at all types of institutions. Although diminishing positive returns were evident, publishing an additional refereed article seldom cost any faculty member pay. In 1992–1993 and in 1998–1999, being a principal investigator on a research project was an important factor in pay only at research universities.

The *t*-test results show that publishing has become an even stronger positive predictor of pay in research universities. In contrast, the relationship between publishing and pay at comprehensives, although still significantly positive, shows signs of decreasing in importance over time. The relationship between publishing and pay remained relatively constant over time at doctoral-granting universities and at liberal arts colleges. Being a principal investigator on a grant at a research university meant about the same in 1998–1999 as it did in 1992–1993. The relationship between being a principal investigator on a grant and pay was lower in 1998–1999 than in 1992–1993 at comprehensive colleges and universities, although in both years being a principal investigator was not significantly related to pay.

These results suggest that teaching remains a negative factor in pay. Spending more time on classroom teaching remains negatively related to

pay, with the trend worsening most rapidly in institutions whose central mission focuses on teaching. Teaching undergraduates is as undervalued as ever.

More encouragingly, the use of collaborative instruction increased over time at all types of institutions (except in liberal arts colleges, where it remained stable). Overall, about one third of all faculty members now claim to make at least some use of collaborative instruction in their classrooms. Perhaps colleges and universities are encouraging their faculties to use more effective instructional techniques. These efforts may be acknowledged in promotion and tenure or in other forms of rewards not studied here. Yet greater use of collaborative instruction is still not reflected in higher pay at any type of institution.

Although publishing remains the strongest behavioral predictor of pay across types of institution, some trends point toward possible change. The value of publishing in faculty pay has stabilized in doctoral-granting universities and in liberal arts colleges. It has declined in comprehensive institutions.

In sum, despite decade-long efforts to enhance the value of teaching in 4-year colleges and universities, this study shows that spending more time on teaching, particularly classroom instruction, still means lower pay. Traditional scholarly productivity remains the strongest behavioral predictor of faculty pay, although some trends suggest that its importance in pay may be stabilizing or even slightly decreasing.

Despite some trends to the contrary, these results are mostly consistent with Massy's (2003) claim that research remains highly valued in teaching-oriented institutions despite their espoused missions. The declining monetary value of classroom instruction across types of institution should give us all pause to consider the fit between our rhetoric about the value of teaching and the rewards actually accrued by faculty who teach the most. Especially troubling is the declining value of classroom teaching over time in teaching-oriented institutions. Although some scholars and institutional leaders claim that faculty attempt to integrate teaching and research in their work lives (Colbeck, 1998), patterns in faculty pay suggest that institutional decision-makers treat teaching and research as discrete categories of work when assigning salaries. Whether intentional or not, the aggregate consequences of these individual decisions about salaries seemingly set teaching in opposition to research when it comes to the monetary value that institutions place on these activities.

More positively, some evidence suggests a slight decrease in or at least a leveling off of the relationship between scholarly productivity and pay, although not enough to declare a trend. The slight increase in

the size of the regression coefficient for hours spent on classroom teaching and pay in research universities over time is perhaps indicative that these prominent institutions may eventually begin valuing teaching more than they do now.

On the surface, the descriptive data support the concept of a segmented market. Faculty members in teaching-oriented institutions spend more time on teaching and produce fewer publications than do their colleagues in research-oriented universities. Yet the more complex analyses support a different conclusion. At this time, we can say that, when patterns in the estimated effect on faculty pay of hours spent in the classroom and career publications for liberal arts colleges are similar to those for research universities, the evidence in favor of a segmented market is slim. Whether the slight decrease in the effect of publishing on pay in some types of institutions since 1992–1993 reflects a trend toward market segmentation must await further study. The negative relationship between classroom teaching and pay across types of institution is consistent either with a national market or with institutional policies and practices (intentional or not) rewarding research more than teaching. It is not consistent with a segmented market.

These findings strongly suggest that institutional leaders should not expect the academic marketplace to increase the value of teaching on its own, even in institutions with an espoused teaching mission. Instead, the strategy suggested by Hearn (1999) and Levin (1991) may prove fruitful: Use salaries to counteract the trends in the marketplace rather than to reinforce them. If such salary strategies prove impossible, which may well be the case in research-oriented institutions, institutional leaders may view alternative forms of reward as a counterforce to salaries. Supporting promotion and tenure criteria that give greater weight to teaching is particularly relevant here. In any case, the evidence strongly suggests that without intentional institutional intervention to counteract market forces, we should not expect teaching to emerge as a positive factor in pay on a national level any time soon.

Notes

[1]Factors outside the control of academic institutions, such as state funding formulae (Hansen, 1986), also can affect faculty salaries but are beyond the scope of this study.

[2]NSOPF-99 replaced missing values with imputed values to make analyses easier. This process can distort results, so I deleted all imputed values based on estimates other than direct imputes—i.e., imputed values using actual responses to related survey questions.

[3]The appropriate procedure for evaluating the effects of program area on faculty pay is to include dummy variables for 9 of the 10 program areas, the 10th being evaluated as part of the test of significance for the intercept. For this study, I omitted *other fields* from the equation.

[4]The effect of variables that might be associated with diminishing returns was calculated using the formula: Effect = $b_1 + 2b_2X$, where b_1 was the semi-log regression coefficient and b_2 the semi-log regression coefficient for the squared term (Aiken & West, 1991, p. 73). The value of X was calculated at the mean.

[5]Estimating the increase or decrease in basic salary of an additional publication and an additional hour spent in the classroom, evaluated at the mean, involved the following steps: calculating the mean of basic salary in constant 1998 dollars separately by year and by type of institution, taking the log of mean basic salary, adding the unstandardized semi-log regression coefficient for total publications (or for hours spent in the classroom) to the log of mean basic salary, taking the antilog of this result, and subtracting the difference from the mean salary.

[6]All F-tests were significant at $p < .001$. For 1992–1993, the decrease in model R^2 when removing teaching and research variables is as follows: .072 for Research Universities ($F = 28.81$, df = 7, 1107), .096 for Doctoral-granting Universities ($F = 41.52$, df = 7, 1286), .017 for Comprehensive Colleges and Universities ($F = 13.50$, df = 7, 2953), and .030 for Liberal Arts Colleges ($F = 8.78$, df = 7, 675). For 1998–1999, the decrease in model R^2 when removing teaching and research variables is as follows: .055 for Research Universities ($F = 31.44$, df = 7, 1849), .042 for Doctoral-granting Universities ($F = 9.23$, df = 7, 739), .022 for Comprehensive Colleges and Universities ($F = 9.52$, df = 7, 1809), and .048 for Liberal Arts Colleges ($F = 6.43$, df = 7, 456).

[7]Research Universities ($F = 13.27$, df = 27, 2956, $p < .001$), Doctoral-granting Universities ($F = 11.96$, df = 27, 2027, $p < .001$), Comprehensive Colleges and Universities ($F = 15.54$, df = 27, 4764, $p < .001$), Liberal Arts Colleges ($F = 10.17$, df = 27, 1125, $p < .001$).

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage Publications.

Baldridge, J. V., Curtis, D., Ecker, G., & Riley, G. (1978). *Policy making and effective leadership*. San Francisco: Jossey-Bass.

Baldwin, R., & Chronister, J. (2001). *Teaching without tenure: Policies and practices for a new era*. Baltimore: Johns Hopkins University Press.

Banta, T. (Ed.). (1986). *Performance funding in higher education: A critical analysis of Tennessee's experience*. Boulder, CO: National Center for Higher Education Management Systems.

Bayer, A. E. (1973). Teaching faculty in academe: 1972–1973. *ACE Research Reports, 8,* 1–68.

Blau, P. M. (1973). *The organization of academic work*. New York: John Wiley and Sons.

Bok, D. (1992). Reclaiming the public trust. *Change, 24,* 12–19.

Bowen, W. G., & Sosa, J. A. (1989). *Prospects for faculty in the arts and sciences*. Princeton, NJ: Princeton University Press.

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Braskamp, L., & Ory, J. (1994). *Assessing faculty work: Enhancing individual and institutional performance*. San Francisco: Jossey-Bass.

Braxton, J. M., Luckey, W., & Helland, P. (2002). *Institutionalizing a broader view of scholarship through Boyer's four domains* (ASHE-ERIC Higher Education Report, Vol. 29, No. 2). San Francisco: Jossey-Bass/John Wiley Periodicals.

Breneman, D. W., & Youn, T. I. K. (1988). *Academic labor markets and careers*. New York: Falmer Press.

Bruffee, K. A. (1993). *Collaborative learning: Higher education, interdependence, and the authority of knowledge*. Baltimore: Johns Hopkins University Press.

Burke, J. S., & Serban, A. M. (Eds.). (1998). *Performance funding for public higher education: Fad or trend?* San Francisco: Jossey-Bass.

Colbeck, C. (1998). Merging in a seamless blend: How faculty integrate teaching and research. *Journal of Higher Education, 69,* 647–671.

Daymont, T., & Andrisani, P. (1984). Job preferences, college major and the gender gap in earnings. *Journal of Human Resources, 19,* 408–428.

Fairweather, J. S. (1994). The value of teaching, research, and service. In H. Wechsler (Ed.), *The NEA 1994 almanac of higher education* (pp. 39–58). Washington, DC: National Education Association.

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

Fairweather, J. S. (1996). *Faculty work and public trust: Restoring the value of teaching and public service in American academic life*. Boston: Allyn and Bacon.

Fairweather, J. S. (1997). The value of teaching, research, and service. In H. Wechsler (Ed.), public.

The NEA 1997 almanac of higher education (pp. 43–62). Washington, DC: National Education Association.

Fairweather, J. S. (1999). The highly productive faculty member: Confronting the mythologies of faculty work. In W. G. Tierney (Ed.), *Faculty productivity: Facts, fictions, and issues* (pp. 55–98). New York: Falmer Press.

Fairweather, J. S., & Beach, A. (2002). Variations in faculty work at research universities: Implications for state and institutional policy. *Review of Higher Education, 26,* 97-115.

Finkelstein, M., Seal, R., & Schuster, J. (1998). *The new academic generation: A profession in transition*. Baltimore: Johns Hopkins University Press.

Fulton, O., & Trow, M. (1974). Research activity in American higher education. *Sociology of Education, 47,* 29–73.

Geiger, R., & Feller, I. (1995). The dispersion of academic research in the 1980s. *Journal of Higher Education, 66,* 336–360.

Getz, M., & Siegfried, J. J. (1991). Costs and productivity in American colleges and universities. In C. J. Clotfelter, R. G. Ehrenberg, M. Getz, & J. J. Siegfried (Eds.), *Economic challenges in higher education* (pp. 261–392). Chicago: University of Chicago Press.

Glassick, C., Huber, M., & Maeroff, G. (1997). *Scholarship assessed: Evaluation of the professoriate*. San Francisco: Jossey-Bass.

Goodsell, A. S., Maher, M., & Tinto, V. (1992). *Collaborative learning: A source book for higher education*. University Park, PA: National Center on Postsecondary Teaching, Learning and Assessment.

Gordon, N., & Morton, T. (1974). Faculty salaries: Is there discrimination by sex, race and discipline? *American Economic Review, 64,* 419–427.

Gujarati, D. N. (1995). *Basic econometrics* (3rd ed.). New York: McGraw-Hill.

Hansen, W.L. (1986). Changes in faculty salaries. In H. R. Bowen & J. H. Schuster

(Eds.), *American professors: A national resource imperiled* (pp. 80–112). New York: Oxford University Press.

Hearn, J. (1999). Faculty salary structures in research universities: Implications for productivity. In W. G. Tierney (Ed.), *Faculty productivity: Facts, fictions, and issues* (pp. 123–174). New York: Falmer Press.

Johnstone, D. B. (1993). The cost of higher education: Worldwide issues and trends for the 1990s. In P. Altbach & D. B. Johnstone (Eds.), *The funding of higher education: International perspectives* (pp. 3–24). New York: Garland Press.

Ladd, E. C., Jr. (1979). The work experience of American college professors: Some data and an argument. *Current Issues in Higher Education*. Washington, DC: American Association of Higher Education.

Levin, H. M. (1991). Raising productivity in higher education. *Journal of Higher Education, 62,* 241–262.

Marsh, H. W., & Hattie, J. (2002). The relation between research productivity and teaching effectiveness. *Journal of Higher Education, 73,* 603–641.

Massy, W. F. (2003). *Honoring the trust: Quality and cost containment in higher education*. Bolton, Mass.: Anker.

Massy, W. F., & Wilger, A. (1995). Improving productivity: What faculty think about it—and its effect on quality. *Change, 27,* 10–21.

Moore, N. (1993). Faculty salary equity: Issues in regression model selection. *Research in Higher Education, 34,* 107–126.

Parcel, T. L., & Mueller, C. W. (1983). *Ascription and labor markets: Race and sex differences in earnings*. New York: Academic Press.

Rice, R. E., Sorcinelli, M. D., & Austin, A. (2000). *Heeding new voices: Academic careers for a new generation*. Washington, DC: American Association for Higher Education.

Seldin, P., & Associates (1990). *How administrators can improve teaching: Moving from talk to action in higher education*. San Francisco: Jossey-Bass.

Trow, M. A. (1984). The analysis of status. In B. Clark (Ed.), *Perspectives in higher education: Eight disciplinary and comparative views* (pp. 132–164). Berkeley, CA: University of California Press.

Twigg, N. W., Valentine, S. R., & Elias, R. Z. (2002). A comparison of salary compression models and pay allocation in academia over time. *Review of Higher Education, 26,* 81–96.

Wankat, P. (2002). *The effective, efficient professor: Teaching, scholarship and service*. Boston: Allyn and Bacon.

Weimer, M. (1990). *Improving college teaching: Strategies for developing instructional effectiveness*. San Francisco: Jossey-Bass.

Weimer, M. (1996). *Teaching on solid ground: Using scholarship to improve teaching*. San Francisco: Jossey-Bass.

Winston, G. K. (1994). The decline in undergraduate teaching: Moral failure or market pressure? *Change*, *26*, 8–15.