E C O N O M I C S B U L L E T I N

The return of publications for economics faculty

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Abstract

This study uses comprehensive panel data to determine the effect of publications on the salaries of full−time economics faculty in nine midwestern universities. The data set allows us to control not only the volume but also the quality of publications. Recent developments in the ISI−Web of science enable us to divide total citations per faculty member into citations by others and self−citations. Since none of the traditional measures (citations, publication indexes, total article pages) when used individually fully accounts for all research output, all available measures should be used. Our findings indicate that average number of article−pages published in The American Economic Review (AER) are likely to increase salary by %1.3 to %1.9 per year. Neither self−citations nor publications in non−ranked journals appears to affect salary.

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What are the quantifiable reward for publishing an article in the AER? What if the same article appeared in an alternative journal? Does an article affect salary if it remains unpublished? Questions regarding the effect of publications on academic salaries have been posed since the 1960s, and a number of empirical studies since then confirmed the now widely accepted opinion that publications have a positive impact on salary. The relative magnitude of that impact, however, is to dispute, mostly due to pervasive measurement problems. The objective of this study is to improve estimation by reducing measurement error. We do this by combining factors that previous studies investigated separately: the structure of salaries in academe, the impact of publications on salary, the quality of publications as measured by citation frequency, journal reputation, and, finally the problematic determination of objective measure of quality in the context of academic research.

Because rankings are frequently used to assess the quality of economics journals, departments, and academicians, this paper on the rewards of publication deals with the problem of ranking. We provide an overview of the prevalent ranking methods and the rationales for considering them adequate measures of quality. We then incorporate the standard methodologies into the salary model in order to determine whether academic activity indexes used to rank departments and journals are related to salary, and whether these methodologies for determining quality fully account for all academic activity.

1 Salaries and Research Activity

Almost all previous studies have agreed that publications, citations, by colleagues, quality of education, and teaching ability have a positive effect on earnings (e.g., Daniel S. Hamermesh et al., 1982 Johnson, and Weisbrod, 1982, Melichar, 1965, 1968; Siegfried and White, 1973; Katz 1973; Tuckman and Leahey, 1975; Tuckman, Gapinski, and Hageman, 1977; Hansen, Weisbrod, and Strauss, 1978). These studies have differed, however, in their estimation of relative weights of each factor.

Studies using data from a national survey of faculty conducted between 1972 and 1973 by the American Council of Education (ACE) in 1972-1973, were limited to using only approximate measures of research activity (Tuckman and Leahey, 1975; Tuckman, Gapinski, and Hageman, 1977). Other studies used total number of publications as a measure of professional activity (Katz, 1973; Siegfried and White, 1973; Hansen, Weisbrod, and Strauss, 1978) while ignoring the quality and length of publications. Other studies limited the number of faculty publications by accounting for article published in a few leading journals or during a 3-5 year time span. Most authors recognized the need to account for quality and length of publications, but few of them incorporated

a quality index in their models.

Hamermesh, Johnson, and Weisbrod (1982) suggested measuring the quality of scholarly research by the total number of citations. This method was later criticized because citation measures included self-citations and credited only the first author in a co-authored publication. Recent changes in the way citations are recorded avoid both problems.

The key to determining academic research quality lies in assessing the quality of scholarly publications. The most common way of accounting for differences in quality has been to separate publications into distinct categories and/or consider only those articles appearing in the highest rated journals in the field.

While our study incorporates techniques from previous studies, it improves upon them by attempting to account for all publications in terms of quality as well as length.

One variable that we exclude because of data unavailability is teaching performance. This variable appears hard to model for many reasons. Katz, after interviewing department chairs, concluded that under graduate student evaluations were viewed with skepticism and thus promoted to use of graduate students as a measure of teaching quality. Siegfried and White used student ratings, while Tuckman et al., used teaching awards as a proxy for teaching quality. With the exception of the latter study, the rest found teaching performance to be insignificant in the determination of salaries.

2 Rankings

Over the last few decades, numerous articles in academic economics journals have addressed the problem of ranking economics departments, journals, and faculty. The ranking methods used in these articles fall into one of the following three categories: (1) opinion-derived rankings, based on surveys of several academicians in the field (Malouin and Outerville, 1987); (2) citation-derived rankings, based on the number of times a journal or economist is cited (Davis and Papanek, 1984; Blair et al. 1986); and (3) quantity rankings, based on the number of pages published per professor or department and generally weighted by the quality of journals (Graves et al., 1982). Most of these published evaluations have been criticized for the subjectivity of the ranking methods.

Opinion-based rankings were considered largely inaccurate and, for the most part, biased. Rankings based on citation calculation raised the question of whether citation quantity could be considered a reasonable indicator of pro-

fessor quality. Furthermore, critics quickly asserted that the same weight to self-citations as to citations by others and that crediting only the first author of a multi-authored publications seriously flawed the method. Quantity rankings used only publications in "leading journals" and excluded alternative forms of publication. But while the list of "leading journals" often included as many as 25 and was proven to be heavily biased toward theoretically oriented journals (Hawkins et al., 1973). Yet, most critics of quality rankings have neglected to consider the irrelevance of a method's alleged subjectivity to a rating's ultimate effects on *real* variables. In terms of prestige, there is little doubt that subjective ratings are of relevance. This study attempts to investigate whether quality ratings affect *real* variables such as salary.

3 Data, Preliminary Analysis, and Model

We collected detailed information on salaries and the publication activities of economics faculty from the nine big midwestern universities. Unlike previous studies that used cross-sectional data, we have compiled a panel data consisting of the 1991-1992, 1995-1996, and 1998-1999 academic years in an attempt to control for unobserved individual effects.

1. ***Salary.*** This is our dependent variable. We measured it as the total gross salary received by the economics faculties from the employing institution during the above academic years. We did not collect information on outside grants, consulting fees, or other sources of income (Assuming that these do not affect the salary decisions).[1] In our regressions, salary appears in logarithmic form (LOGSALARY). [2]
2. ***Publications.*** Data on research activity was collected by using a combination of faculty *vitas* and the Econlit database. This database provides a comprehensive list of publications since 1969 and gives full credit to each author for co-authored articles. Publications are measured as number of pages per author. We sorted them into three categories:
   (i) *Articles in journals* (TOTARTPG) includes articles appearing in all academic journals- national, regional, and specialty. The number of comments and replies are also included wheras reviews and corrections are not. We added the square of this term (TOTARTPGSQ) into our regression in order to capture possible diminishing effect.
   (ii) *Other publications* (TOTOTHER) includes books, textbooks, edited books, articles in collective volumes, book chapters, book reviews, gov-

[1] The same assumption was explicitly made by Tuckman et al. (1977) and implicitly by all others.

[2] We tried the level salary first, but a Ramsey RESET test revealed functional form misspecification.

ernment documents, conference proceedings and working papers.

(iii) *Non-ranked publications* (TOTNONRNK) includes articles published in journals that received a weight of zero in our citation-based ranking. Using citation accounts of 800 journals from the Social Science Citation Index (excluding medical, psychology, and some law journals), following we ranked them according to number of total cites. Table 1 lists some of the highest-ranking journals and compares them to the rankings of Liebowitz and Palmer.

3. ***Publication Index***(PUBLINDX). Our purpose in constructing a publication index was not to develop an index more accurate than those used in previous studies, the point rather was to reconstruct and index previously used to rank both department and journals in order to evaluate how current perceptions of quality affect academic salaries. The publication index was constructed by multiplying the number of pages per person (*pp.article*) by the weight of the journal (W) in which the article was published as given by table 1; we then summed this product over all publications:

$$\sum_{i=1}^{N}\sum_{j=1}^{J}\frac{pp.article_{[i]}}{authors}\times\frac{W_j}{100},$$

where $i = 1, 2, ...N$ (total articles published), $j = 1, 2, ...J$ (journal in which article was published).

4. ***Citations.*** The reputation of researchers is often measured by number of times their works been cited. Citations were collected from the ISI Web of Science site and drawn from the Social Sciences Citation Index database. Efforts were made to account for every citations per scholar by searching both with and without the scholar's middle initial [3] . To reduce the risk of mistakenly tallying of like-named authors when searching without initials, we cross referenced the cited journals for author names and addresses, since most publications list the institutional address of the researcher). We divided total citations into two parts: self-citations (SELFCITES) and citations by others (OTHCITES). We added the square of citations by others to control for possible diminishing effect (OTHCITESSQ).
5. ***Female.*** It is used to check for the possibility of discrimination in salary determinations since previous studies have reported such findings.
6. ***Universities.*** We generated a categorical variable for each university to account for department-specific factors.
7. ***Top 10.*** We combined several published rankings of economics depart-

[3] Due to personal preferences or recording practices, the ratio of author citations *without* the author's middle initial to citations *with* the middle initial vary widely. A note of caution therefore to future researchers: using one of either search criterion is likely to underestimate the citation counts for at least a substantial part of the sample.

ment to construct a list of 10 universities considered to be the best (see table 2). This variable received a value of one for having received a Ph.D. from a Top10 university and intended to capture the quality of education.

8. ***Chair.*** This variable took a value of one if an individual has served as a department chair on a given time interval.

Summary statistics are displayed in Table 3.

Pooled Ordinary Least Squares (POLS) and Fixed Effects (FE) model were fitted to the data. The regression results from a POLS aimed at assessing the general behavior of the variables in the model. The FE model controlled for the possibility of unobservable factors that may influence the explanatory variables.

4 Findings

Table 4 presents the results obtained by two different regressions. These results indicate that most variables have expected signs and that most publication variables are statistically significant. Both Our publication-index and article-pages variables suggest that 10 article pages in *the American Econmic Review* (AER) are expected to increase the salary by approximately 1.3 % according to POLS and 1.9% according to the FE. The average salary 1999 salary $93,229 would thus increase an additional $1,251 according to POLS and $1,762 according to FE. If an article is cited by others 50 times, POLS and FE estimate an approximate salary increase of 2% and 3.5% respectively. The statistical significance of all three measures- namely the publication index, total article pages, and citations- suggests that none of these measures by itself fully accounts for all research output.

According to POLS, the other forms of publications described above do seem to affect salary. Publications at non-ranked journals and self citations do not appear to affect salary according to results obtained by both regressions.

We find no evidence of discrimination on the basis of gender. However, this may well be due to the very small number of women faculty in the sample (only 21, or 8.4%, of the sample).

Having received a PH.D. from one of the 10 best universities in the country does not appear to affect the academic salaries of economics faculty.

However, having served as department chair implies predicted a salary increase of about 12% to 17%.

5 Concluding Comments

This paper estimates economics faculty salaries by using a panel data from nine big midwestern universities by systematically considering several facts related to publications and citations. Publications, we conclude, have a positive and diminishing effect on salaries. Furthermore, quality of publication is a significant determinant of salary. Publication indexes, our result indicate, do not fully account for the all publication quantity and quality in salary determination as indicated by the significance of such variables as article-pages and citations by others, but publication indexes still influence salaries significantly. Therefore we accept only with reservations ratings of departments and academicians that do not employ a more comprehensive measure of publication activity.

Two limitations of the paper should be discussed. (1) It can reasonably be argued that the ranking of the Ph.D.-granting department at the time when the faculty member was hired is more relevant than its the current ranking. Observed salaries might be a function of old rankings. Using rankings of the Ph.D.-granting departments at the time of first hire could rectify this potential factor. We tried to mitigate such possible discrepancies by using several different rankings at various points in time. (2) We did not use AER-equivalent pages in accounting for length of articles as is customary in most studies about ratings. In this sense, we consider our publication measures imprecise to a slight degree but nevertheless useful.

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Table 1. Citation-Based Ranking of Economic Journals

About 800 journals were ranked according to the number of cites recorded by the Social Sciences Citation Index.
Lieboweitz and Palmer (1984) ranked journals the same way, and their rankings are provided on the last column for comparison.
For illustration purpose, this table provides weights for only some of the journals in the 800-journal list.

JOURNAL	**TOTAL CITES -1998**	**Weight -1998**	*Weight* **-1980**
AMERICAN ECONOMIC REVIEW	8999	100	100
ECONOMETRICA	7943	88.27	71.51
JOURNAL OF POLITICAL ECONOMY	6697	74.42	78.45
QUARTERLY JOURNAL OF ECONOMICS	4138	45.98	29.13
YALE LAW JOURNAL	3821	42.46	1.66
JOURNAL OF FINANCE	3791	42.13	31.93
ACADEMY OF MANAGEMENT JOURNAL	3459	38.44	
ADMINISTRATIVE SCIENCE QUARTERLY	3362	37.36	
AMERICAN POLITICAL SCIENCE REVIEW	3252	36.14	
JOURNAL OF CONSUMER RESEARCH	2762	30.69	
JOURNAL OF FINANCIAL ECONOMICS	2676	29.74	8.02
JOURNAL OF MARKETING	2654	29.49	
JOURNAL OF MARKETING RESEARCH	2548	28.31	
ECONOMIC JOURNAL	2540	28.23	26.64
JOURNAL OF ECONOMIC THEORY	2514	27.94	19.75
JOURNAL OF ECONOMETRICS	2479	27.55	
REVIEW OF ECONOMIC STUDIES	2411	26.79	29.5
REVIEW OF ECONOMICS AND STATISTICS	2331	25.9	
STANFORD LAW REVIEW	2263	25.15	
STRATEGIC MANAGEMENT JOURNAL	2253	25.04	
MICHIGAN LAW REVIEW	2072	23.02	21.89
HARVARD BUSINESS REVIEW	2008	22.31	
UNIVERSITY OF CHICAGO LAW REVIEW	1899	21.1	
JOURNAL OF MONETARY ECONOMICS	1860	20.67	7.43
JOURNAL OF SOCIAL ISSUES	1836	20.4	
AMERICAN JOURNAL OF AGRICULTURAL ECONOMICS	1812	20.14	16.78
AMERICAN JOURNAL OF POLITICAL SCIENCE	1608	17.87	
JOURNAL OF ECONOMIC PERSPECTIVES	1583	17.59	
JOURNAL OF LAW & ECONOMICS	1580	17.56	15.25
HUMAN RELATIONS	1548	17.2	
JOURNAL OF ECONOMIC LITERATURE	1530	17	10.01
JOURNAL OF PUBLIC ECONOMICS	1437	15.97	
WORLD DEVELOPMENT	1408	15.65	5.88
DEMOGRAPHY	1394	15.49	15.79
JOURNAL OF LEGAL STUDIES	1250	13.89	7.28
ENVIRONMENT AND PLANNING A	1249	13.88	
EUROPEAN ECONOMIC REVIEW	1243	13.81	3.15
ECONOMIST	1168	12.98	
JOURNAL OF ENVIRON. ECON AND MANAGEMENT	1152	12.8	
INTERNATIONAL ECONOMIC REVIEW	1113	12.37	16.75
JOURNAL OF HUMAN RESOURCES	1113	12.37	8.44
JOURNAL OF BUSINESS	1083	12.03	13.11
JOURNAL OF MANAGEMENT	1063	11.81	
RAND JOURNAL OF ECONOMICS	1039	11.55	

Continued.

Table 1. Concluded.

JOURNAL OF BUSINESS & ECONOMIC STATISTICS	988	10.98	
INDUSTRIAL & LABOR RELATIONS REVIEW	983	10.92	7.92
WORLD POLITICS	976	10.85	
JOURNAL OF HEALTH ECONOMICS	957	10.63	
ECONOMICS LETTERS	930	10.33	4.45
POPULATION AND DEVELOPMENT REVIEW	888	9.87	11.59
RESEARCH IN ORGANIZATIONAL BEHAVIOR	888	9.87	
JOURNAL OF INTERNATIONAL BUSINESS STUDIES	883	9.81	
PUBLIC CHOICE	871	9.68	5.34
JOURNAL OF POLITICS	857	9.52	
JOURNAL OF INTERNATIONAL ECONOMICS	838	9.31	4.9
URBAN STUDIES	836	9.29	5.83
JOURNAL OF MONEY CREDIT AND BANKING	834	9.27	9.32
ECONOMICA	825	9.17	14.19
JOURNAL OF URBAN ECONOMICS	787	8.75	5.51
JOURNAL OF ECONOMIC HISTORY	737	8.19	10.26
JOURNAL OF LABOR ECONOMICS	733	8.15	
LAND ECONOMICS	730	8.11	6.86
JOURNAL OF CRIMINAL LAW & CRIMINOLOGY	723	8.03	
SOCIAL SCIENCE QUARTERLY	719	7.99	7.95
JOURNAL OF DEVELOPMENT ECONOMICS	707	7.86	
REGIONAL STUDIES	703	7.81	8.22
JOURNAL OF ECONOMIC BEHAVIOR & ORGANIZATION	698	7.76	
ECONOMIC INQUIRY	684	7.6	
MONTHLY LABOR REVIEW	669	7.43	14.86
JOURNAL OF MANAGEMENT STUDIES	654	7.27	
SOUTHERN ECONOMIC JOURNAL	646	7.18	11.05
JOURNAL OF ECONOMIC DYNAMICS & CONTROL	636	7.07	
OXFORD BULLETIN OF ECONOMICS AND STATISTICS	617	6.86	
HEALTH EDUCATION RESEARCH	606	6.73	
JOURNAL OF BANKING & FINANCE	602	6.69	
JOURNAL OF ACCOUNTING RESEARCH	601	6.68	6.84
ECONOMIC DEVELOPMENT AND CULTURAL CHANGE	597	6.63	8.22
LAW AND CONTEMPORARY PROBLEMS	589	6.55	
POPULATION STUDIES-A JOURNAL OF DEMOGRAPHY	589	6.55	
OXFORD ECONOMIC PAPERS-NEW SERIES	582	6.47	6.79
APPLIED ECONOMICS	578	6.42	
CANADIAN JOURNAL OF ECONOMICS	556	6.18	5.54
REVIEW OF FINANCIAL STUDIES	547	6.08	
ECONOMIC HISTORY REVIEW	545	6.06	9.62
HEALTH ECONOMICS	544	6.05	
ANNALS OF THE AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE	542	6.02	
INDUSTRIAL RELATIONS	542	6.02	6.35
JOURNAL OF THE AMERICAN PLANNING ASSOCIATION	540	6	
TRANSPORTATION SCIENCE	528	5.87	
ECONOMIC GEOGRAPHY	504	5.6	7.06
NATIONAL TAX JOURNAL	502	5.58	8.73

Table 2. Ranking of Economics Departments

	US News and World Report '98	Gourman Report '97	Ehrenberg Hurst '96	Dusansky Vernon Fall '95	Scott Mitias Fall '94	Conroy Dusansky Fall '92	Golden et al. '86	Davis Papanek 78-81	Graves et al. 74-78
1	Harvard	Chicago	Chicago	Princeton	Harvard	Princeton	Chicago	Chicago	Chicago
2	MIT	MIT	Harvard	Harvard	Chicago	MIT	Johns Hopkins	Harvard	Harvard
3	Stanford	Harvard	MIT	MIT	Pennsylvania	Northwestern	Rochester	MIT	Stanford
4	Princeton	Princeton	Stanford	Pennsylvania	MIT	Chicago	Stanford	Stanford	Wisconsin-Madison
5	UC-Berkeley	Stanford	Princeton	Northwestern	Northwestern	Harvard	Harvard	Princeton	Pennsylvania
6	Chicago	Yale	Yale	NYU	Stanford	UC-Berkeley	Cornell	Yale	MIT
7	Yale	UC- Berkeley	UC-Berkeley	Boston University	Princeton	UC-San Diego	UC-Berkeley	Pennsylvania	Yale
8	Northwestern	Pennsylvania	Pennsylvania	Yale	Michigan	Boston University	MIT	Wisconsin-Madison	UCLA
9	Pennsylvania	Northwestern	Northwestern	Stanford	UC-Berkeley	Yale	Columbia	Columbia	UC-Berkeley
10	Minnesota	Minnesota	Minnesota	UC-San Diego	UCLA	Pennsylvania	VPI	UC-Berkeley	Princeton
	Wisconsin-Madison					NYU			

Our list includes all universities appearing in the above top ten rankings.

Table 3. Summary Statistics

Variable	Variable Description	Years	Observations	Mean	Standard Deviation
SALARY (1999$)	Salary indexed for 1999 dollars (using the Consumer Price Index)	1992	210	85,386	26,394
		1995	226	87,395	26,965
		1999	211	93,229	28,680
PUBLINDX	Publication Index	1992	246	31.28	34.45
		1995	234	35.87	37.88
		1999	236	43.6	44.13
TOTARTPG	Total published article-pages per author	1992	245	129.7	123.52
		1995	233	156.07	145.06
		1999	235	194.71	166.1
TOTOTHER	Total pages per author of other publications	1992	245	178.23	393.11
		1995	233	231.45	545.37
		1999	235	309.28	765.11
TOTNRPG	Total article pages per author in non-ranked journals	1992	244	20.31	33.11
		1995	232	26.1	39.97
		1999	234	34.83	48.74
OTHCITES	Number of citations excluding self-citations	1992	256	197.23	298.07
		1995	244	219.66	297.1
		1999	246	248.98	344.18
SELFCITES	Number of self-citations	1992	256	11.04	16.42
		1995	244	14.14	20.57
		1999	246	16.16	24.34
CHAIR	=1 if department chair	1992	7	0.03	-
		1995	7	0.03	-
		1999	10	0.04	-
TOP 10	= 1 if Ph.D. was received in any one of the universities consistently ranked in the top 10	1992	152	0.67	-
		1995	153	0.67	-
		1999	175	0.74	-
FEMALE	=1 if female	1992	24	0.09	-
		1995	24	0.10	-
		1999	23	0.09	-

TABLE 4. Regression Analysis
Dependent Variable: LOG(SALARY)

Independent Variables	POLS	FE
TOTARTPG	0.0016464	0.0012878
	[0.0003463]**	[0.0003630]**
TOTARTPGSQ	-0.0000016	-0.0000012
	[0.0000004]**	[0.0000003]**
PUBLINDX	0.0010284	0.0024635
	[0.0005701]+	[0.0006993]**
OTHCITES	0.0004191	0.0007211
	[0.0001124]**	[0.0003538]*
OTHCITESSQ	-0.0000001	-0.0000005
	[0.0000000]**	[0.0000001]**
TOTOTH	0.0000741	0.0000478
	[0.0000359]*	[0.0000501]
TOTNONRNK	0.0000752	-0.0000049
	[0.0004889]	[0.0005481]
SELFCITES	-0.0008515	0.0000866
	[0.0007136]	[0.0015085]
FEMALE	-0.0592502	
	[0.0480023]	
TOP10	-0.0016968	
	[0.0438996]	
CHAIR	0.1216354	0.1788828
	[0.0518454]*	[0.0448093]**
Y95	0.0062166	0.0272711
	[0.0135715]	[0.0119770]*
Y99	0.0184283	0.0455945
	[0.0147393]	[0.0162584]**
UNIVERISITIES	Yes	No
CONSTANT	10.9406276	10.9672715
	[0.0503200]**	[0.0468648]**
OBSERVATIONS	616	616
R-SQUARED	0.47	0.43

Robust standard errors in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%