Economics Departmental Rankings: Research Incentives, Constraints, and Efficiency

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A large recent literature on rankings of United States economics departments has appeared since Daniel Fusfeld's 1956 study. Fusfeld examined the origins of papers given at the American Economic Association annual meetings. The Fusfeld article can be interpreted as providing a basis for ranking the quality of departments, although he was also concerned with the "openness" of the AEA annual meetings.

Since Fusfeld's article, there have been many studies aimed directly at ranking economics departments. These studies have taken two tacks: first, there have been several opinion surveys directed at department heads and senior professors, the American Council on Education rankings being particularly well-known (these surveys were conducted in 1975 by Francis Boddy, in 1969 by Kenneth Roose and C. J. Anderson, and in 1966 by Alan Cartter). The difficulties with such survey results are known to economists and need not be detailed here, except to note that lags in the dissemination of the information regarding changes in quality are likely to be substantial.

A second type of study has based departmental rankings on publication of faculty members in, or Ph.D. graduates of, the various departments in top journals. This paper presents new research results of the latter type. As in the most similar previous work by Albert Niemi (1975) and V. Kerry Smith and Steven Gold (1976), rankings of departments presented here are based on (standardized) page counts of articles published in twenty-four top journals.[1]

Ranking departments in terms of recent pages published serves two related functions for faculty and students. Faculty job searchers can use such rankings as a low-information-cost proxy for the quality of the research environment at particular institutions. For students, such rankings are suggestive of the "currentness" of faculty skills and knowledge. Moreover, the student will be interested in job opportunities upon completion of Ph.D. work, and such rankings may be indicative of those opportunities, perhaps directly, but also importantly due to the greater expected quality of dissertation research in top-ranked departments.

However this paper goes beyond this, establishing new methodological and empirical approaches to school-quality assessment. In addition to page counts (for the recent 1974–78 inclusive period), the various departments were surveyed regarding teaching load, teaching and research assistance, secretarial resources, student/faculty ratios, and so on.[2] As a consequence, insights can be obtained, not only on absolute departmental quality, but also on quality relative to constraints on publishing and incentives to publish. That is, while ability no doubt varies greatly among departments, costs and returns to publication relative to other academ-

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[1]Many high-quality new "specialty" journals—such as the *Journal of Econometrics*, *Journal of Environmental Economics and Management*, *Journal of Monetary Economics*, and *Journal of Urban Economics*—are not incorporated in our analysis. It is unlikely that rankings at the high end would be much affected, but in the lower two-thirds or so of schools, for which one article more or less might alter rankings somewhat, this omission could matter. The page counts were converted to *AER*-equivalent length pages by examination of typical comparative words per page. As with the issue of which journals to include, this conversion had little effect except for lesser-ranking schools.

[2]The survey questionnaire was sent to 200 departments: 119 departments responded. There appeared to be no survey response bias with respect to either size or previous quality rankings.

ic pursuits are also likely to vary (at any rate, economists should be looking for relative price effects of this sort).

In Section I, the departmental rankings based on *AER*-equivalent size pages in total and per faculty member are presented. In both ranking schemes, the top 240 schools are presented, including many non-Ph.D.-granting departments, which previously have not been considered. Table 3 compares the existing rankings resulting from different methodologies and from the same methodologies over lengthy time periods. The latter allows inference of the extent of relative quality change among departments.

Section II considers publication constraints and incentives, shedding light on questions of whether departments are publishing more or less than expected given resources. Interpretation of the reduced-form results is seen to be difficult with a mix of efficiency, omitted variables and talent differences confounding the analysis.

I. Departmental Rankings

In Tables 1 and 2 rankings are presented of the 240 schools whose faculty members published the most pages in the top twenty-four journals over the 1974–78 period.[3] Table 1 presents rankings based on total pages while Table 2 shows pages per faculty member:[4] both tables are instructive, though for different reasons. The total page publication is indicative of the overall "pool" of current expertise at an institution, while the per faculty member rankings are suggestive of average individual expertise.[5] Thus, a relatively small but high-quality department such as Rochester might not fare nearly as well on total page counts (14th) as it would on pages per faculty member (5th). Both types of rankings are valuable in that a prospective student or faculty member with general interests may lean toward departments ranked highly on total pages, whereas students or faculty with already narrowly defined interests may care more about pages per faculty member performance of those departments known to have specialties in his or her area of interest.

Turning to the findings, for the 1974–78 period, the University of Chicago emerges as number one in both schemes.[6] Other than this, considerable variability is observed in comparisons between the tables as seen in the case of Rochester. As an example at the opposite extreme from that of Rochester, Wisconsin-Madison is ranked fourth in total pages, but thirteenth in per faculty member pages.

In both Tables 1 and 2, Ph.D.-granting schools are preceded by an asterisk and, not surprisingly, most top-ranked schools offer Ph.D. degrees. However, Swarthmore (33rd in Table 2) and other schools not offering that degree do publish significantly.

A question that immediately arises in looking at the results in Tables 1 and 2 is the extent to which such rankings are stable over time or regardless of ranking methodology. Table 3 can be used to investigate these questions for the top-ranked schools.[7] The schools listed in column 1 of Table 3 are the

[3] The journals included are *American Economic Review*, *Econometrica*, *Economic Development and Cultural Change*, *Economic Inquiry*, *Economic Journal*, *Economica*, *Industrial and Labor Relations Review*, *International Economic Review*, *Journal of Business*, *Journal of Economic History*, *Journal of Economic Theory*, *Journal of Finance*, *Journal of Human Resources*, *Journal of Law and Economics*, *Journal of Money, Credit, and Banking*, *Journal of Political Economy*, *Journal of Regional Science*, *Journal of the American Statistical Association*, *National Tax Journal*, *Oxford Economic Papers*, *Quarterly Journal of Economics*, *Review of Economic Studies*, *Review of Economics and Statistics*, *Southern Economic Journal*.

[4] The number of faculty members at each school was determined largely with reference to Wyn Owen (1977), although additional sources were consulted as necessary for completeness.

[5] A difficulty with this interpretation relates to the prolific "superstar" who pulls up an entire departmental average. No corrections were made for this phenomenon.

[6] Since university affiliation was often all that was available, departments in universities having strong economics-oriented business schools will look relatively better on pages per economics department faculty member. The large difference between Chicago and other schools on per faculty member rankings may in part be due to this, although Stanford and other schools will also be affected favorably.

[7] Similar tables for Level II and Level III schools (ACE definitions) are available from the authors.

TABLE 1—*AER*-EQUIVALENT-SIZED PAGES IN THE TOP TWENTY-FOUR JOURNALS, 1974–78, BY SCHOOL

1	*Chicago	2247 94	61	*UC-Santa Barbara	188 21	122	Santa Clara	45 98	184	Latrobe	19 34
2	*Harvard	2007 11	62	*Syracuse	181 09	123	UC-Santa Cruz	45 53	185	Lowell	18.94
3	*Stanford	1747 38	63	Dartmouth	180 94	124	Indiana (of Penn)	45 41	186	Old Dominion	18 70
4	*Wis -Madison	1349 21	64	*Georgia State	179 78	125	Clemson	45 05	187	Bard	18.42
5	*Penn	1287.36	65	*Oregon	179.59	126	Hamilton	43 69	188	Wellesley	18.13
6	*MIT	1088.90	66	*Boston	179 14	127	*Clark	43.06	189	Manchester	17 51
7	*Yale	978.29	67	*Pittsburgh	178 20	128	UNC-Greensboro	42 79	190	Cal State-Hayward	17 29
8	*UCLA	958 90	68	*Kansas	170 94	129	Puget Sound	41 38	191	Madison	17 29
9	*UC-Berkeley	946 98	69	*Utah	169.11	130	Florida Atlantic	41 05	192	Monash College	17 29
10	*Princeton	891 39	70	*Hawaii	168 11	131	Oberlin	41 04	193	*Bryn Mawr	16.88
11	*Northwestern	858 58	71	*Cal Tech	165 75	132	Bowdin	40.80	194	Cal State-Humboldt	16.67
12	*Michigan	768 41	72	*South Carolina	162 12	133	Tulsa	37 63			
13	*Washington	703 72	73	*Tulane	159 01	134	Marquette	37 37	195	Catholic	16 57
14	*Rochester	692 92	74	*Temple	156 07	135	Oregon State	37 10	196	*Utah State	16 06
15	*Ill -Urbana	687 78	75	*George Washington	154 99	136	Miss. State	37 05	197	Colby College	15 84
16	*UNC-Chapel Hill	686 00	76	Miami	150 21	137	Missouri-St. Louis	36 44	198	Cal State-Long Beach	15 57
17	*Columbia	681 36	77	Swarthmore	148 60	138	Williams	36 23			
18	*New York	674 01	78	*Kentucky	148 24	139	San Jose	36 08	199	*New School	15 47
19	*Ohio State	621 32	79	*American	144 50	140	Missouri-KC	34 03	200	Long Island	14 95
20	*Minnesota	608.63	80	*New Mexico	134 06	141	Union College	33 45	201	UPSALA College	14 95
21	*Cornell	605 49	81	*Washington-St Louis	126 61	142	Coe College	32 80	202	Cal State-Chico	14 82
22	*Virginia	584 16				143	Bowling Green	32 10	203	Lawrence	14 71
23	*Purdue	509 11	82	*LSU	122 00	144	Carleton	31 90	204	Wichita State	14 25
24	*Maryland-College Park	494 49	83	*North Carolina State	120 72	145	S. Florida	31 46	205	Virginia Military Inst	14 13
						146	St Thomas	31 41			
25	*Penn State	464 90	84	*Wyoming	116 17	147	Wright State	31.04	206	Birmingham	12 50
26	*VPI	455 98	85	*Georgetown	111 78	148	North Florida	30 68	207	John Carrol	12 37
27	*Michigan State	389 12	86	*Oklahoma	108 17	149	Montana	30 66	208	Central Oklahoma	12.37
28	*Carnegie-Mellon	387 55	87	*Arizona	108 05	150	*New Hampshire	30 05	209	*Montana State	12 07
29	*Florida	376.05	88	*Auburn	100 04	151	*UC-Irvine	29.94	210	West Georgia	12.04
30	*Texas A&M	354 98	89	*Colorado	98 16	152	New Orleans	29 60	211	Bristol	12.00
31	*Texas-Austin	345 67	90	*Case Western	93 65	153	Emory	29 53	212	Wooster	12 00
32	*Brown	335.00	91	*SUNY-Albany	91 72	154	*Claremont	29 52	213	Bloomfield	11 61
33	*UC-San Diego	332 38	92	Wesleyan	90 36	155	Missouri-Rolla	29 21	214	Western Washington	11 17
34	*Georgia	330 94	93	*Cincinnati	83.03	156	Ithaca College	29 04			
35	*Rutgers	318 58	94	*UC-Riverside	78 59	157	*Notre Dame	28 52	215	Cal State-San Diego	10 85
36	*CUNY	317 96	95	Amherst	78 50	158	Ohio	27 18	216	S W Memphis	10 82
37	*USC	316 49	96	Georgia Tech	77 55	159	*Kent State	27 06	217	Eastern Michigan	10 63
38	*Houston	314 88	97	*Connecticut	76 41	160	Virginia Commonwealth	26 98	218	North Dakota	10 01
39	*Iowa	310 75	98	*Northeastern	76 20				219	New England	9 58
40	*Duke	305 14	99	Nevada	75 81	161	Cal State-Fullerton	26 28	220	Luther College	9.48
41	*Johns Hopkins	303 94	100	S Illinois	73 85	162	*Mississippi	25 93	221	Texas Arlington	9 28
42	*Indiana	300 05	101	Oklahoma State	72 58	163	Portland	25.56	222	Eckerd	9 07
43	*Iowa State	299.34	102	Mass -Boston	70 30	164	*Colorado-Denver	25 00	223	Western Illinois	9 07
44	*SMU	263 67	103	*Tufts	70 15	165	Holy Cross	24 80	224	Whitman College	8 98
45	*SUNY-Buffalo	251 90	104	Cal State-Northridge	70 07	166	*St Louis	24 44	225	Loyola	8 77
46	*Boston College	243 13	105	*Nebraska	69 40	167	*Kansas State	24 25	226	Bucknell	8 59
47	*SUNY-Stony Brook	242.26	106	*Alabama	68 33	168	William and Mary	24.18	227	Cal State-San Bernadino	8 59
48	*Vanderbilt	236 36	107	*Tennessee	63 49	169	East Carolina	23 73			
49	*Rice	229 96	108	*Colorado State	61 48	170	San Francisco State	23 38	228	Chapman	8 47
50	*Mass -Amherst	229 71	109	*West Virginia	61 42	171	Vassar	22 66	229	UNC-Charlotte	8 25
51	*SUNY-Binghamton	228 34	110	Illinois State	60 95	172	*Ill Inst Tech	22 33	230	Wis -Whitewater	8 25
			111	Clarkson	60 47	173	Texas-Dallas	22 19	231	Cal Poly State	8 08
52	Delaware	226 87	112	N Illinois	56 01	174	Wis -Parkside	22 00	232	Roosevelt	7.78
53	*Wis -Milwaukee	226 02	113	George Mason	53 91	175	Maine	21 64	233	Bloomsburg	7.73
54	*Arizona State	223 68	114	SUNY-Geneseo	53 34	176	Memphis State	20 85	234	S E Mass	7.42
55	*Ill -Chicago Circle	218 43	115	*Lehigh	50 15	177	Wis -Oshkosh	20 73	235	Bentley	7.22
56	*Missouri-Columbia	216.89	116	Vermont	59.27	178	Western Michigan	20 66	236	St Cloud State College	7.22
			117	*Rhode Island	49.02	179	Worcester Polytech	20 65			
57	*Florida State	216.46	118	Mount Holyoke	48 76	180	SUNY-Brockport	20 48	237	Baruch	7.02
58	*UC-Davis	212 55	119	Cal State-LA	46 62	181	Occidental	20 41	238	Russell Sage College	7.02
59	*Wayne State	208 90	120	*Texas Tech	46 56	182	Brigham Young	19 87	239	Conn.-Hartford	6.73
60	*Washington State	193 43	121	Cleveland State	46 36	183	*Fordham	19 53	240	Grinnell	6.61

Note * Indicates Ph D program

TABLE 2—PAGES PER ECONOMICS DEPARTMENT FACULTY MEMBER IN THE TOP TWENTY-FOUR JOURNALS, 1974–78, BY SCHOOL

1	*Chicago	97.74	63	*Arizona State	9 32	125	Bloomfield College	3 87	185	W Washington	1.40
2	*Stanford	58.25	64	*Washington State	9 21	126	*Connecticut	3 82	186	Oregon State	1.37
3	*Harvard	51 46	65	*Cal Tech	9 21	127	SUNY-Geneseo	3 81	187	Reed	1 37
4	*UCLA	40 39	66	*Vanderbilt	9 09	128	Clemson	3 75	188	Cal State-Chico	1 35
5	*Rochester	38 50	67	Delaware	9 07	129	Upsala College	3 74	189	Madison College	1 33
6	*MIT	35 13	68	Dartmouth	9 05	130	Union College	3 72	190	Grinnell	1 32
7	*Penn	33.01	69	*Missouri-Columbia	9.04	131	Miss. State	3.71	191	*New School	1 29
8	*NYU	32 10	70	Amherst	8 72	132	*W Virginia	3 41	192	New Orleans	1 29
9	*Northwestern	31 80	71	*Kansas	8 55	133	George Mason	3.37	193	Augustana College	1 26
10	*Columbia	30.97	72	*S Carolina	8 53	134	Cleveland State	3 31	194	*New Hampshire	1 25
11	*UC-Berkeley	28 71	73	*SUNY-Binghamton	8 46	135	*Nebraska	3.30	195	Cal State-San Bernadino	1.23
12	*Princeton	27 86	74	Nevada	8 42	136	UC-Santa Cruz	3 25			
13	*Wis -Madison	27 53	75	*Wyoming	8 30	137	*Alabama	3.10	196	*Fordham	1 22
14	*Texas A&M	25.36	76	Vermont	8.21	138	*Lehigh	3 07	197	W Michigan	1 22
15	*CUNY	22 71	77	*Wayne State	8 03	139	Missouri-St. Louis	3 04	198	Catholic	1 18
16	*Minnesota	22.54	78	Carleton	7 98	140	Illinois State	2 90	199	Memphis State	1 16
17	*Brown	22.30	79	Mass.-Boston	7 92	141	*Bryn Mawr	2 81	200	Brigham Young	1 10
18	*Virginia	21.64	80	*New Mexico	7 89	142	*N Carolina State	2.74	201	Wooster	1 09
19	*Carnegie-Mellon	21 53	81	*Case Western	7.80	143	*St Louis	2 72	202	Bucknell	1.07
20	*Purdue	21.21	82	*Georgia State	7 49	144	Emory	2 68	203	SUNY-Potsdam	1 06
21	*Cornell	20 81	83	*UC-Irvine	7 49	145	*Tennessee	2 54	204	Wichita State	1 02
22	*Yale	20 88	84	*Pittsburgh	7 42	146	Clarkson	2 52	205	North Dakota	1 00
23	*North Carolina	20 78	85	*Mass -Amherst	7 41	147	Manchester	2 50	206	SUNY-Purchase	98
24	*UC-San Diego	20 77	86	*Hawaii	7.31	148	N. Illinois	2 33	207	Loyola	97
25	*Washington	20 70	87	Hamilton	7 28	149	*Claremont	2 27	208	Bloomsburg State College	97
26	*VPI	20 26	88	*Oklahoma	7 21	150	Vassar	2 27			
27	*Houston	19 61	89	*LSU	7 18	151	SW Memphis	2 16	209	Westminster	86
28	*Georgia	19 47	90	Auburn	7 15	152	Bowling Green	2 14	210	Texas Arlington	84
29	*Johns Hopkins	19 00	91	*Tufts	7 08	153	Williams	2 13	211	Cal State-Long Beach	82
30	*Maryland	19 00	92	*Washington-St Louis	6 98	154	Cal State-L A	2 12	212	Puget Sound	.81
31	*Michigan	17 87	93	Worcester Polytech	6.88	155	Skidmore	2 11	213	Luther College	79
32	*Rice	17 69	94	Oberlin	6 84	156	SUNY-Brockport	2.05	214	*Kansas State	78
33	*USC	17 58	95	*UC-Riverside	6 55	157	UNC-Greensboro	2 04	215	St Lawrence	78
34	Swarthmore	16 51	96	John Carrol	6 16	158	*Ill Inst Tech.	2 03	216	Cal State-Bakersfield	77
35	*Tulane	15.90	97	North Florida	6 09	159	Wellesley College	2 01			
36	*Iowa	15.54	98	*Iowa State	5 91	160	Maine	1 97	217	Chapman College	77
37	*Ohio State	15.15	99	Florida Atlantic	5.86	161	William and Mary	1 86	218	Babson College	77
38	*Penn State	14 53	100	Ithaca College	5 81	162	S. Mass	1.85	219	W Illinois	76
39	*Texas Austin	14.40	101	*Kentucky	5 49	163	Portland	1 83	220	UNC-Charlotte	.69
40	*SUNY-Stony Brook	14 25	102	Coe College	5 47	164	Whitman College	1.80	221	SUNY-Oswego	.67
41	*UC-Davis	14 17	103	*George Washington	5.34	165	Cal State-Hayward	1.73	222	S Conn. State College	65
42	*Ill.-Urbana	13 48	104	*So Illinois	5 28	166	Wis -Oshkosh	1.73			
43	*SMU	13 18	105	*Boston	5 12	167	*Texas Tech	1 72	223	*Utah State	54
44	*Boston College	12.80	106	Bowdin	5 10	168	San Francisco State	1.66	224	St John's	51
45	*Duke	12.21	107	*Northeastern	5.07	169	St Bonaventure	1.64	225	Cal State-Fresno	51
46	*SUNY-Buffalo	12 00	108	*Temple	5.03	170	*Mississippi	1.53	226	St Michael's College	51
47	*Oregon	11 97	109	*Colorado-Denver	5.00	171	W Georgia	1 51	227	Wis.-River Falls	50
48	*Rutgers	11 80	110	Lawrence	4 90	172	*Notre Dame	1.50	228	Queens College	48
49	*American	11 12	111	San Jose State	4 88	173	Virginia Commonwealth	1 50	229	San Diego State	47
50	Wis -Parkside	11 00	112	Missouri-Rolla	4.87				230	Maryland Baltimore County	47
51	*Wis -Milwaukee	10 76	113	*Clark	4 78	174	Cal State-Fullerton	1 46			
52	Miami	10 73	114	*Colorado	4 67				231	*Montana State	.46
53	*Indiana	10 72	115	*SUNY-Albany	4 95	175	Minn.-Duluth	1.45	232	Brandeis	45
54	*Utah	10.57	116	*Rhode Island	4.46	176	Old Dominion	1 44	233	Akron	.44
55	*Michigan State	10.52	117	*Arizona	4 32	177	Ohio U.	1 43	234	NY Inst Tech	40
56	*Syracuse	10.06	118	Missouri-KC	4 25	178	S Florida	1 43	235	Central Michigan	40
57	Wesleyan	10.00	119	Marquette	4 15	179	*Colorado State	1 43	236	Sagamon	36
58	*Ill -Chicago Circle	9 93	120	*Cincinnati	4.15	180	Chicago State	1.43	237	Hofstra	.36
59	*UC-Santa Barbara	9 91	121	*Georgetown	4.14	181	Merrimack	1 43	238	*Arkansas	.35
60	*Florida	9 90	122	Cal State-Northridge	4 14	182	*Kent State	1 42	239	Miami (Ohio)	.35
61	Mt Holyoke	9 75	123	Oklahoma State	4 03	183	VMI	1 41	240	Wake Forest	.34
62	*Florida State	9.41	124	Santa Clara	3 88	184	Russell Sage College	1 40			

Note. * Indicates Ph D program

TABLE 3—COMPARATIVE RANKINGS OF TOP SCHOOLS

School	GMT 74–78 Total Pages	GMT 74–78 Per Fac Member	Boddy ACE 1975	Ladd-Lipsett 1979	Smith-Gold 70–74	Niemi 70–74	Moore 58–71	Moore 58–68	Hogan 60–69	Siegfried 60–69	Roose-Anderson ACE 1964	Cartter ACE 1964	Yotopoulos 50–59	Cleary-Edwards 50–54	Fusfeld 50–54
Chicago	1	1	1*	3	1	2	2	2	2	1	3	3	2	4	3
Harvard	2	3	1*	1	3	1	1	1	1	2	1*	1	1	8	1
MIT	6	6	1*	2	8	6	4	3	3	3	1*	2	4	2	11
Yale	7	21	4	4	17	3	3	4	4	4	4	4	10	9	5
UC-Berkeley	9	11	5*	5	7	9	5	5	6	5	5	5	3	1	2
Stanford	3	2	5*	6	6	5	6	6	8	7	7*	6	5	3	9
Princeton	10	12	7	7	12	8	8	8	7	8	6	7	12	12	
Penn	5	7	8		13	7	7	7	12	6	7*	14		11	10
North-western	11	9	9*		11	13	14	15	16	15	12*	12		15	7
Minnesota	20	16	9*		19	16	16	16	13	23	7*	11			12
Wisconsin-Madison	4	13	9*	9	16	4	9	11*	10	11	11	10	8	10	14
UCLA	8	4	12*		10	10	13	12	17	17	14*	16	11	7	
Columbia	17	10	13*		23	27	12	13	5	10	12*	9	6		4
Michigan	12	29	13*	8	30	12	10	10		12	7*	8	7	5	6
Rochester	14	5	13*		5	15	19	21		18	16	26			
Johns Hopkins	40	28*	16*		25	34	21	18	9	19	17	15	13	6	
Carnegie-Mellon	28	18	17*		2	11	11	9	11	9	14*	13	9	16	
Brown	32	17	18*		9	18	18	20*		16	18*	17			
Cornell	21	20	18*		24	24	20	17	14	20	18*	18			

Note. * Indicates a tie

top-ranked schools in the well-known Boddy ACE survey with their rankings, many being ties, in column 4. The rankings in the present update study are given in columns 2 and 3 of this table while other rankings of these schools are shown, with the dates of the study period, in the remaining columns of Table 3.

The methods used to rank departments have varied widely: 1) Fusfeld's 1956 pioneering piece noted that authors from 15 schools delivered 114 of the 210 papers at the annual meetings during 1950–54 (73 percent of the academic total); 2) Frank Cleary and Daniel Edwards (1960) looked at *AER* pages by affiliation and school of terminal degree; 3) the three American Council on Education Surveys (Cartter, 1964; Roose-Anderson, 1969; Boddy, 1975) of department chairpersons, senior and junior scholars asked them to judge institutional reputations of both faculty and graduate programs; 4) Pan Yotopoulos (1961) and John Siegfried (1972) increased the number of journals considered. The former added the *QJE* and *JPE* to the *AER* count, while the latter included additionally *Econometrica*, the *Review of Economics and Statistics* and thirteen regionally based journals; 5) William Moore (1973) related the ACE rankings and changes in them to publications and publication changes; 6) Hogan (1973), using the Siegfried journals, examined publishing performance as it related to the graduate school which trained the authors; 7) Niemi (1975) expanded the study to more journals, weighting the top six journals more heavily for comparative purposes and examined changes between his 1970–74 period and earlier work based on the 1960–69 period; 8) Smith and Gold (1976) took the Niemi study and looked at pages per faculty member, but concluded that such an adjustment mattered little; and 9) Everett Ladd and Seymour Lipsett (1979) surveyed several thousand economists in a study similar in spirit to the ACE studies.

In perusing Table 3 several trends are apparent, looking from right to left along rows. Looking at the directly comparable ACE rankings which employ the same methodology in all periods, Chicago, Stanford, Penn, Northwestern, UCLA, and Rochester appear to be improving in relative position. Columbia, Michigan and Carnegie-Mellon

appear to be declining slightly while the remaining top schools have been little affected by time. Not too much should be made of these changes given the nature of the data.

Some fairly large differences in our rankings from the various ACE rankings are evident. The following schools appeared to rise strongly in ranking, based on recent publications per faculty member: Chicago, Stanford, UCLA, and Rochester. Similar gainers in total pages of publications were Chicago, Stanford, Penn, Wisconsin-Madison, and UCLA. Recent declines, on the basis of either measure, were registered by MIT, Yale, Berkeley, Princeton, Minnesota, Johns Hopkins, and Carnegie-Mellon.

These results, while not without interest, should be interpreted with caution since not all articles are of equal merit, and since selection of either a larger or smaller set of journals could alter the outcomes somewhat. Additionally, current research effort may differ substantially from that represented by publications between 1974 and 1978, for which actual work was probably conducted between 1972 and 1976. Still, the results are broadly consistent with publications per faculty member between 1970 and 1974, as seen in the Smith-Gold column, except for Stanford, Penn, UCLA, and Columbia who fared better in recent years and Yale, Berkeley, Carnegie-Mellon, and Brown who fared less well.

In some respects it would be surprising if the relative rankings of departments did not change much over time. Since publications, hence rankings, depend on relative prices which change over time (for example, tax revolts and required evidence of teaching effectiveness from legislators), one would expect changes in rankings. This is especially so in light of the high mobility of those who like to write and, as a consequence, seek out departments offering a productive environment.

II. Constraints and Incentives to Publication

In this section several issues regarding the impact of incentives and constraints are considered. The most obvious questions are related to the effect on publication—do high teaching loads and the like strongly inhibit publication, or are the effects minor? To what extent are the changing departmental rankings over time seen in the last section due to changing resource constraints facing departments? One can hardly fault a department whose ranking fell if that department had forced upon it relative price and resource constraints that gave the most productive faculty members an incentive to leave and discouraged publication relative to other activities of the department members who remained.

Research is only one dimension of this educational output, with teaching and institutional outputs also being produced in an academic setting:

$$(1) \qquad Q = f(R, T, S),$$

where Q is university output per faculty member. This output is a function of research per faculty member, R, teaching per faculty member, T, and institutional service per faculty member, S. Hence, one can envision equation (1) as describing an isoquant where equivalent overall output can result from different combinations of research, teaching and service. The amount of research output actually forthcoming by faculty member j at an economics department in university i becomes:

$$(2) \quad R_{i_j} = g\left(A_{R_j}, A_{T_j}, A_{S_j}; W_{R_i}, W_{T_i}, W_{S_i}; \bar{R}_i\right)$$

where R_{i_j} = pages per faculty member j at the ith university economics department,

$A_{R_j}, A_{T_j}, A_{S_j}$ = the individual-specific abilities in the research, teaching, and service areas, respectively,

$W_{R_i}, W_{T_i}, W_{S_i}$ = the department-specific relative remunerations to output of research, teaching, and service, respectively,

$\bar{R}_i$ = the vector of university-specific resource constraints facing faculty members engaged in research (secretarial, teaching, and research assistance, student/faculty ratios, teaching loads, and so on).

In order to simplify the preceding for purposes of empirical testing, we assume that service output exhibits little variation across

institutions—essentially similar committee structures exist everywhere. Moreover, since the relative abilities of individual faculty members at research and teaching are difficult to observe and measure, we shall assume them uniform within departments, or at least randomly distributed. These are, of course, strong assumptions, particularly the assumption that faculty members are equally adept at producing articles relative to teaching in all locations. Separate remunerations for research, teaching, and service are not given. However, if one makes the further assumption that research and teaching *quality* (not quantity) go hand-in-hand, then salary differentials will reflect a mix of research/teaching incentive and one salary figure can be used. An alternative would be to get individual-specific data on salary, pages per faculty member, teaching load and service load, and perform an hedonic regression of salary on the three types of output arriving at implicit wages for performance in the three areas. The gain from this procedure may be small, however, in that what is observable is not teaching quality, but rather hours of classroom contact.

With these simplifications, assumptions and caveats, the reduced-form equation to be estimated becomes:

$$(3)\quad R_i = a + \underset{(+)}{b}\, AVESAL + \underset{(-)}{c}\, AVEWK + \underset{(+)}{d}\, SECFAC + \underset{(-)}{e}\, SFRATIO + \underset{(+)}{f}\, SUPSER + \underset{(+)}{g}\, TA + \underset{(+)}{h}\, RA + u.$$

The expected signs of the coefficients are shown in parentheses. The independent variables are, respectively, average salaries, average teaching load in hours per week, secretary-to-faculty ratios, student-to-faculty ratios, support services (phone, photocopy, etc.), and teaching and research assistance. The variables are described more fully in Table 4 which gives means, standard deviations, and the simple correlation matrix. The statistics, especially the simple correlations, appear both plausible and interesting. These statistics, except for the publication performance variable, are the result of a survey we conducted in June 1979.

A. *The Results*

Two alternative specifications of the functional form of equation (3) are reported in Table 5 for the pages per faculty member dependent variable which is likely to be of primary interest. In addition to the independent variables already introduced in equation (3), the specifications are expanded to include as additional alternatives dummy variables for region in which the school is located and for presence of a Ph.D. program.[8]

In addition to the ordinary linear specification and the double-*log* specification reported here, the *log*-linear and linear-*log* specifications were run (the latter being deemed the more appropriate of the two a priori). These two specifications did not improve the fit when compared to their counterparts presented here: considering the same dependent variable, ordinary and adjusted R^2 were lower in each case. Moreover, the results were similar when the separate impacts of the independent variables were examined.

A further somewhat surprising finding was that salary by level worked better than did average salary in all regressions. The a priori suspicion had been that the effect of salary would be qualitatively similar across ranks, and that their correlation would preclude precise separate estimates in any event. These conjectures proved not to be the case, with separate effects differing: in particular, salaries of full professors appear to matter a great deal while salaries at lower ranks are virtually unrelated to publication performance (indeed, results suggest that, if anything, the relationship is inverse). This is consistent with the view that young aca-

[8]Earlier studies, dealing only with Ph.D.-granting departments, were unable to explore the difference the presence of a Ph.D. program might make in publication performance *ceteris paribus*.

TABLE 4—VARIABLES EMPLOYED AND SUMMARY STATISTICS

Variable	Mean	Standard Deviation	Description
CP	244.3	374.6	*AER*-equivalent total pages in the top 24 journals 1974–78, by institution
CPPFM	10.9	14.9	*AER*-equivalent pages per faculty member in the top 24 journals of 1974–78, by institution
AVESAL	$23,483	$2,478	Average salary in 1978–79, by institution (Full: $30,182±4,591; Associate: $22,563±2,480; Assistant: $17,865±1,803)
AVEWK	8.22	2.20	Average hours per week teaching (Full: 8.10±2.24; Associate: 8.21±2.30; Assistant: 8.34±2.26)
SECFAC	.19	.12	Average number of secretaries per faculty member (total number of secretaries averaged 4.315±5.37)
GPF	7.5	8.1	Graduate students per faculty member
UPF	87.9	70.7	Undergraduate students per faculty member
SUPSER	.42	.49	Quality of support services (long-distance phones, photocopying, etc.); 1 = above average; 0 = average or below
TA	.83	.37	Presence of teaching assistance (1 = yes; 0 = no)
RA	.60	.49	Presence of research assistance (1 = yes; 0 = no)
Ph.D.	.65	.53	Presence of Ph.D. program (1 = yes; 0 = no)
MT	.09	.28	Mountain Region (1 = yes; 0 = no)
ESC	.04	.18	East South Central Region (1 = yes; 0 = no)
WSC	.08	.25	West South Central Region (1 = yes; 0 = no)
NEWENG	.15	.35	New England Region (1 = yes; 0 = no)
ENC	.14	.33	East North Central Region (1 = yes; 0 = no)
SA	.18	.37	South Atlantic Region (1 = yes; 0 = no)
PAC	.13	.32	Pacific Region (1 = yes; 0 = no)
MA	.20	.39	Middle Atlantic Region (1 = yes; 0 = no)

Correlations:

CP	1										
CPPFM	.90	1									
AVESAL[a]	.45	.41	1								
AVEWK	−.30	−.39	−.54	1							
SECFAC	.35	.44	.15	−.30	1						
GPF	.06	.02	−.05	−.18	.12	1					
UPF	−.17	−.15	−.17	.03	−.05	.13	1				
SUPSER	.15	.14	.20	−.14	.31	.18	−.10	1			
TA	.24	.22	.37	−.34	.20	.07	−.14	.05	1		
RA	−.15	−.13	.09	.10	.02	.08	−.17	.18	.06	1	
Ph.D.	.35	.33	.43	−.33	.37	.07	−.07	.13	33	.07	1
MT	−.12	−.13	−.01	.07	−.01	−.07	−.00	.04	.14	.12	.15
ESC	−.05	−.07	.01	−.06	−.12	−.11	.04	−.07	.09	.06	.04
WSC	−.05	−.01	.02	.04	−.01	−.10	.09	−.17	.12	−.13	.12
NEWENG	.09	.02	.03	−.18	.08	.01	−.21	.05	−.01	−.02	.04
ENC	.08	.08	−.06	.07	−.08	.10	−.02	−.00	−.13	−.06	−.08
SA	−.10	−.08	.04	.00	−.01	.03	.05	.02	−.08	.18	−.09
PAC	.05	.11	−.21	.05	.14	−.11	−.02	−.06	.08	−.19	−.05
MA	.06	.08	.14	.01	−.09	.06	.06	−.00	−.10	.03	−.05

Note: *WNC* omitted in regressions.

[a]*SALPRO* was correlated .64 with *SALASSOC* and .36 with *SALASS*; the latter were correlated .65

TABLE 5—REGRESSION RESULTS EXPLAINING RESEARCH OUTPUT PER FACULTY MEMBER

Independent Variables:	Linear Case		Double-*Log* Case	
Variables	*CPPFM*	*CPPFM*	*LCPPFM*	*LCPPFM*
SALPRO	.001297	.001272	2.78169	2.09253
	(3.22; 3.58; .40)	(2.82; 3.51; .39)	(2.51; 17.4; .30)	(1.83; 13.1; .23)
SALASSOC	.000278	.000015	−.511687	−1.457057
	(.30; .57; .05)	(.02; .03; .00)	(.28; 3.10; .04)	(.81; 8.84; .12)
SALASS	−.000985	−.000854	.146993	−.585800
	(.93; 1.61; .12)	(.74; 1.39; .10)	(.09; .87; .01)	(.35; 3.46; .04)
AVEWK	−.33208	−.48727	−1.50843	−1.66284
	(.42; .25; .05)	(.60; .37; .07)	(2.44; 1.89; .29)	(2.69; 2.09; .32)
SECFAC	43.8582	39.7268	.549504	.268992
	(3.58; .75; .35)	(2.94; .68; .32)	(2.14; .60; .21)	(.98; .29; .10)
GPF	.00593	−.01836	−.02466	−.08135
	(.03; .00; 00)	(.10; .01; .01)	(.18; .02; .02)	(.59; .08; .06)
UPF	−.02495	−.02465	.01396	− 03982
	(1.29; .20; .12)	(1.19; .20; .12)	(.09; .04; .01)	(.25; .10; .03)
SUPSER	−.09999	.46290	.07661	.09255
	(.03; .00; .00)	(.15; .02; .02)	(1.39; .12; 13)	(1.73; .15; .15)
TA	1.13229	.97104	.08719	05917
	(.29; .09; .03)	(.23; .07; .02)	(1.18; .04; .11)	(.78; .03; .07)
RA	−2.8497	−1.9323	− 04888	−.03286
	(.98; .16; .09)	(.62; .11; .06)	(.88; .06; .08)	(.60; .04; 05)
Ph.D.		2.87891		.21846
		(.91; .17; .10)		(3.38; .22; .36)
MT		.09508		−.07633
		(.01; .00; .00)		(.59; .19; .07)
ESC		5.61937		.07508
		(.58; .02; .07)		(.44; .20; .05)
WSC		3.82758		.09348
		(.48; .02; .07)		(.66; .24; .08)
NEWENG		1.41152		−.00011
		(.20; .02; .03)		(.00; .00; .00)
ENC		8.98824		.11352
		(1.31; 11; .20)		(.95; .28; 13)
SA		3.29770		.00123
		(.49; .05; .08)		(.01; .00; .00)
PAC		9.16274		05251
		(.127; .10; .20)		(.41; .13; .06)
MA		5.91511		.09443
		(.89; .10; .16)		(.81; .21; .12)
Constant	−19.4145	−19.9578	−19.0533	6.6787
	(.96)	(.85)	(1.21)	(.39)
R^2	.41	.46	.49	.60
$\bar{R}^2$	.33	.31	.42	.48

Note: Numbers in parentheses are, respectively, *t*-values, elasticities, and *beta* coefficients of the (un)transformed variables.

demics pay a premium to associate with productive faculties. The salary variables are, however, difficult to interpret in a reduced-form expression of a simultaneous phenomenon—pay incentives lead to more publications (from an institution's viewpoint) while more publications lead to better pay (for each individual faculty member). To properly model this more complete system would require unavailable micro data. One interpretation is to argue that average salaries proxy for average departmental abilities which would appropriately be held constant in examining marginal products of other inputs into the production of publications.

Turning to the effects of those inputs, teaching load is seen to inhibit publications per faculty member with an elasticity rang-

ing from .25 to 1.66 depending on specification. The linear specifications suggest that teaching load exerts a relatively small effect in terms of significance, elasticity, or *beta* coefficient (the last criterion incorporating the extent of variation of the variable as well as its effect per unit change). Quite a different result is seen in the double-*log* specifications (and the other nonlinear specifications not reported) which show a large, significant elasticity and a *beta* coefficient indicating a pronounced negative impact of teaching load on publication performance.

The number of secretaries per faculty member is seen in the reduced-form equations of Table 5 to be positively related to publications, especially in the linear specifications. With the possible exception of the Ph.D. variable (which is quite significant, though small in magnitude in the double-*log* case) the remaining variables are nonsignificant. Presence of a teaching assistant has a consistent qualitative effect and narrow elasticity range across specifications, .06 to .09, but having a research assistant appears to inhibit research! (This may hardly be startling to those having experienced time-consuming RAs.)[9] The regional dummies are sometimes large in magnitude in the linear specification, but have invariably small elasticities ranging from .00 to .17, and are never significant relative to the omitted West North Central Category.

As an example of the value of the equations in Table 5, under strong assumptions of causation, some questions of efficiency can be explored by substituting a particular school's values for independent variables into an equation, we can estimate a predicted publication per faculty member value. This may be compared to the actual publication per faculty member to judge whether a school is performing better or worse than expected, given the constraints and incentives it faces.

[9]Thomas Mayer has offered an alternative explanation. If high-ranked programs offer relatively few research assistantships and a relatively large number of fellowships and lesser-ranked schools the opposite, then one would expect to see a negative coefficient here. This would be particularly true if the research assistantships in the lesser-ranked schools are de facto fellowships or scholarships.

This argument should not, however, be pushed too far since omitted variable bias (number of workshops, counseling duties, and so on may vary greatly), and talent differentials not captured in compensation by rank may be present. The explanatory power of the Table 5 equations suggests that their use as a measure of efficiency may be dubious for any particular school.

Another use of the equations, possibly of greater value, is to use the coefficients for guidance in "investing in quality." That is, if one's interest is to improve the per faculty member publication ranking of their department, would a dollar invested in reduced teaching load (as compared to, say, increased secretarial assistance) have a high or low marginal product? Again, caveats to the results apply, but some information relevant to such questions is better than none, the present effort being a first step.

III. Summary and Conclusions

The departmental rankings presented here for publication performance over the recent 1974–78 period provide, first, an update of earlier studies. Hence, guidance for prospective students and mobile faculty is available based on more recent data. However, the study goes beyond this in the rankings, considering both *AER*-equivalent total pages, and pages per faculty member as well as non-Ph.D.-granting schools. Moreover, trends in rankings are examined, holding methodology constant, and comparisons across methodologies are presented.

The findings regarding incentives and constraints suggest that salaries of full professors are strongly related to publication as are secretaries per faculty member, with teaching load being the most important inhibiting variable. Other variables such as Ph.D.-granting institution, teaching assistance, student/faculty ratios, and support services (with the exception of research assistance) had expected signs with significance varying with the specification. Regional effects appeared not to be pronounced, as gauged by significance and elasticity. These findings must be interpreted with caution in light of the reduced-form nature of the estimated regression model.

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