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Assessing Assessments of Economics Departments

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Nearly all rankings of economics departments have been based either on surveys of the opinions of selected members of the profession or on tabulations of publications in top journals garnered by members of each department.[1] The rankings based on surveys have, until recently, tended to be the standard to which publication rankings were compared. In most cases, these two methods yield fairly similar rankings. Frequent changes in techniques for measuring publication output have emerged, in part, as an attempt to reconcile differences in the rankings. Publication tabulations have made adjustments for different numbers of pages published, for different sizes of pages published, for different numbers of faculty members in each department, for different time periods of analysis, for different assessments of the quality of the journal in which each article was published, and for differences in the method of identifying the institutional affiliation of each author. Nevertheless, differences in the rankings have remained.

One important reason for the differences in the rankings is that surveys generally measure subjective impressions of the net stock of depreciable research capital (the current reputation) of an economics department whereas publication tabulations imprecisely measure some of the major flows likely to be added to the depreciating research stock of capital belonging to members of a department. Since not all publications are successful, in the sense that they enhance the reputation of the individual and his or her department, the flow of publications is only imperfectly correlated with additions to the stock of capital. It is perhaps reasonable to expect that departments with large stocks of capital per faculty member (based primarily on previous publications) would also generate large flows of publica-

tion output per capita since otherwise the capital stock would diminish due to depreciation overwhelming investment. Differences, however, can emerge based on differential success rates of publications or behavior changes of individuals within a department, due perhaps to age or tenure. The differences become exaggerated when much of the output from younger faculty members is in the form of journal articles while the research output from more established faculty members may include a larger percentage of books, monographs, conference proceedings, and the like, much of which will not be captured by traditional journal publication tabulations.

While department rankings based on publication tabulations may have value for some uses, especially in comparing institutions according to their recent output flows in order, say, to predict the direction in which a department's capital stock is moving, it can be useful for other purposes to rank departments on the basis of existing capital stocks. Apart from the use of surveys, there is another less subjective way to account for the stock of research capital created by members of a department. It is possible to collect citation statistics for individual economists and to aggregate these statistics to determine the overall impact of a faculty's writings on the profession. The use of citations should enable one to measure the still undepreciated value of the stock of publications authored by the faculty and should help to provide a relatively more objective measure than one derived from surveys of the opinions of members of the profession.

In this study, we calculate many different rankings of economics departments; some are based on publication tabulations and some on citation tabulations. The correlations between these rankings are probably as important as the rankings themselves, since they illustrate some of the

differences alluded to above. The correlations between the rankings suggest that the differences in rankings due to confusion between stocks and flows are greater than differences due to variation in the number of faculty members in each department, or due to different weights which might be attached to the research output of the members of an economics department. These results should allow greater precision, at lower cost, on the part of those planning to conduct rankings in the future.

As a by-product of calculating department rankings, we were able to obtain a distribution of publishing and citation performances for over 3000 economists. We believe the publication of this distribution will interest many economists concerned with their individual performance relative to others in the profession. And, by popular demand, we list the top performances in publishing articles and garnering citations.

1. Previous Studies

The most well known of the survey approaches to ranking economics departments are the studies by Cartter (1966), Roose and Anderson (1970), Boddy (1975), and Ladd and Lipsett (1979). The rankings from the surveys appear to have been fairly stable over time and are well-summarized in Owen and Cross (1982).

During the past decade and a half, there has been an outpouring of articles reporting publication tabulations. Among the earliest tabulations were those by Siegfried (1972), Moore (1973), and Frankena and Bhatia (1972, 1973). Most of the early studies simply did article counts in a limited number of what were perceived to be leading economics journals. Although some of those studies made allowances for differences in article

length and differences in the size of faculty, such corrections were fairly uncommon.

One result which stood out in the early studies was that publication rankings differed somewhat from the rankings obtained from surveys. The oftentimes implicit conclusion was that here was one more case demonstrating the failings of survey techniques when "hard" data were available. In fact, of course, the different ranking schemes were measuring different things, both of which are interesting and useful.

Later publication tabulations have refined the earlier ones in many ways. Not only have article length and faculty size been incorporated into most of the recent studies, but adjustments have also been made to allow for changes in institutional affiliation, to allow for co-authorship, and to allow for differences in the perceived quality of the journals in which the articles were published [See Niemi (1975), Smith and Gold (1975), Bell and Seater (1978), and more recently Graves, Marchand and Thompson (1982)]. The results presented in the next few sections, besides including citation data, contain all of these adjustments.

To our knowledge, only one published paper has ranked departments using citations. Davis and Papanek (1984) ranked 122 U.S. institutions according to citations received in 1978 and 1981. Their results, though similar to some of our citation rankings, differ from our overall results in several important respects. First, we include some major departments in Canada and the U.K. as well as a few groups of academic economists not in economics departments. Second, we examine the co-authorship problem associated with the use of citations. Finally, and most importantly, we

present much more than just department rankings based on citations. Unlike any of the studies mentioned above, we explicitly compare publication and citation performance for a consistent group of departments over a similar time period, and check the stability of the performances for various reasonable changes in the weighting of these performances.

2. Publications as Depreciable Research Capital

It is instructive, and we believe realistic, to assume that successful publications are a form of depreciable research capital, perhaps best conceptualized as a stock of brand name capital derived from the influence of the publications. Each publication by an individual has an impact on the profession (perhaps zero) and the larger that impact, the greater is that person's stock of brand name capital. The brand name of a department, then, increases as the capital of the individual increases.

The depreciation of research capital is clearly demonstrated by the temporal pattern of citations. Examining a measure of "cited half-life" found in the Social Science Citation Index (SSCI, vol. 6, p. 31A), defined as the "number of journal publication years from the current year going back whose articles have accounted for 50% of the total citations received in a given year", it is obvious that articles depreciate over time.[2] In fact, more detailed analysis indicates that cites to a cohort of articles rise dramatically for 3 years after publication, peak in the fourth through seventh years, and fall gradually thereafter.[3] Therefore, individuals who fail to continue publishing after an initial spurt of activity will find their contribution to department research capital through publication diminished (they can, of course, improve department capital by engaging in complementary activities which help other researchers, such as thesis supervision or administration).

We assume in our analysis that the number of cites received by members of a department during a given year, while itself having a time dimension, is a good proxy for the research capital stock of a department.[4] We also assume that the research capital deriving from an individual's publications accrues to a department only so long as the individual remains affiliated with the department. This assumption provides the support for our use of individuals, and not locations, as the fundamental unit of analysis in our empirical work.[5]

This view of successful publications as research capital has several interesting implications. One implication concerns the optimal rewards for co-authored articles. Departments are complex organizations interested in maximizing more than just research capital. One way for departments to maximize the value of research (and hence their brand names) resulting from any given expenditure of resources is through the proper reward structure, which is to pay each author his marginal product. This means that for an equally co-authored paper, each author should receive 50% of the value that would have been received if the paper had been individually authored. The quality or quantity benefits (if any) of co-authorship would be internalized by the authors in their own private calculus, allowing them to capture for themselves the gains from specialization and division of labor. Short of some motivation other than maximizing research output (and most chairmen with whom we have spoken claim that their reasons for awarding merit pay are based primarily on this objective) the interests of the department regarding co-authorship should be the same as the interests of the individual.[6] Otherwise, people will have an incentive to engage in co-authorship even when it reduces the total value of the research.[7]

The marginal and average market value of articles for different types of authors is another area in which the concept of depreciating research capital bears fruit. Tuckman and Leahey (1975) concluded that the market value of an additional article is less for an individual with many publications than for an individual with few publications, everything else equal. They also concluded that the higher an author's age, the lower the value of a new publication. Although these differential payments might at first seem inconsistent with the maximization of department research capital, it is, in fact, consistent with such goals: Authors with many publications have a large stock of capital, and naturally, the concomitant large amount of yearly depreciation associated with a large stock. Therefore, they must publish a relatively large number of articles merely to keep the capital stock from falling. With the research component of salary based on capital stock, the flow of articles should have no separate influence on salary except through its influence on the stock. Publications which serve to keep the capital stock from falling will not be rewarded with salary increases and we would expect to see the research component of salary fall for individuals whose research capital is depreciating, everything else equal. Publication counts reflect (an estimate of) gross investments, but the research component of salary increments is, in our model, related to net investment.[8]

A slightly different explanation is required to explain the lower market values of articles written by older scholars[9]. To the extent that age is associated with the cessation of academic employment, departments will be unable to capture the entire stream of influence created by productive scholars who are now approaching retirement. This effect of age truncates the expected stream of influence associated with research capital, and makes the present value of an article recently published by elderly faculty worth

less than one published by an individual with a longer expected future. One would expect, then, that older authors would contract with younger authors to exchange publication ownership for other items of value, or else they would decrease their production of this type of research capital (Tuckman and Leahey, p. 966, cite evidence that older academics do engage in less research).

3. Data

Data for this study were collected by hand from the SSCI for each of the individuals listed as a member of one of the economics departments in the university catalogs of over 100 major academic institutions in 1981-82. To broaden the study, some schools from Canada and England were included along with U.S. schools, as well as several groups of economists not housed in economics departments[10]. The measures of flows and stocks derived for each individual were then attributed to the institution employing that individual in 1981-82, regardless of where the individual was employed when the flows were produced or when the galleys were proofread. This decision was made in accord with our earlier assumption that individuals can take their capital with them when they change locations[11]. Given our assumption that yearly citations proxy capital stock, and because flows are generally more variable over time than are stocks, we based the measurement of flows (publications) on a four year interval, whereas a single year was used to measure the stock.[12]

This study is unusual in using individuals as the initial data points; nearly every other publication tabulation of which we are aware begins by scanning top-rated journals first and collecting individuals' publication lists from those journals.[13] In our case, data collection was simplified because

our research assistants began with a list of names derived from 1981-82 university catalogs,[14] and for each economist could then collect citation or publication data, including such information as the citing journal, article length and co-authorship, for various years from the source data in the SSCI.[15] This procedure had the additional feature of allowing us to include publication data for many more journals than had been included in previous studies. The SSCI contains information from over 4,300 social science journals and well over 100 economics journals, including virtually all the important ones.

4. Citation Tabulations

The capital stock or reputation of an economics department was measured using citations received in 1981 by each of its members. We recognize that citations are not always the mark of a good piece of research nor are they always indicative than an individual is still capable of making a research contribution to his or her department. A large literature examines the strengths and weaknesses of using citations as indicators of quality or influence (notable discussions are available in Stigler and Friedland [1975] and Brown and Gardner [1983]). We can briefly note the criticisms often made of attempts to use citations as proxies for quality: (1) Some cites are due to authors currying favor with those being cited or (2) attempting to make the article topical by citing other popular fields or articles; (3) negative citations are not distinguished from positive cites; (4) many high quality papers aren't cited much; (5) authors include gratuitous self-cites; (6) citations are a function of the age of an article; (7) papers that become part of "received doctrine" are often mentioned but not cited. Each of these criticisms has well-known rejoinders, the nature of these exchanges being humorously illustrated in the following quote from Leamer (1981):

> Many of you will conjure up reasons why the number of citations should be ignored. There are fads; there are self-citations; there are citation conspiracies; there are derogatory citations; there are bribes to editors and referees; there are sycophantic students; and there are subjects capable of direct understanding only by the few. But why didn't your papers start fads; why don't you publish more and cite yourself; why did your conspiracies fail; why don't you become an editor; why don't your students care about your welfare; and why do you insist on writing about obscure issues?

Since quality (like beauty) cannot be objectively evaluated, we prefer to think of citations as measuring influence, although our own belief is that influence and quality are positively correlated. The first 3 numbered criticisms of citations mentioned above are due to the quality-influence distinction where the article or author being cited is influential but not of high quality. The fourth and sixth criticisms are also due to the quality-influence link but they assert that high quality articles are not influential. These criticisms obviously strike at the heart of the citation controversy, and there is clearly some validity to them. We cannot, however, in performing a study of this sort, hope to judge the quality of all works, and must resort, therefore, to using some proxy, even if imperfect.

We do not suggest that citations can or should be used as the sole measure of a paper's quality independent of a serious reading. We would suggest, however, that it often would be illuminating for those who consider a paper with few cites to be of high calibre, to ask why it has not generated more cites. The possibility that papers become too well-known to receive cites would be very serious for studies of this kind since it implies that articles of perceived high quality and influence would not be cited. We doubt, however, that any but a very small number of articles is so treated. Perhaps a more serious omission is that citations may not fully

reflect the impact on the profession of the oral tradition which has emerged at some institutions (perhaps best personified by the case of Aaron Director).

It is difficult to say whether the fifth criticism of citation measures, having to do with self citations, is really a problem. Many self citations truly represent the influence that former work of an author has had on his present work. Cost considerations required that we use only one definition of influence, however, and so we chose to delete all self cites in our tabulation. This decision seems more in line with our view and those of our colleagues. The removal of self cites is incomplete, however, because we can identify and remove self cites for only the first author of a co-authored article.

There have been several attempts to assess the association of citation counts with other perceptions of quality. The Institute for Scientific Information (which publishes the SSCI) examined the 1961 citations received by the 1962 and 1963 Nobel prize winners in the sciences and contrasted them with the citations received by other members of their disciplines (Garfield, 1977). The Nobel winners had 30 times more cites than the average of their field, and the citation rates per published paper were twice as high as average. Similar results were found for all Nobel science winners from 1950-1977. In 1977 the ISI compiled a list of the 250 most highly cited scientific authors. Seventeen percent had won Nobel prizes, and over 60% had been elected to a national academy of science. Other researchers have found that citation counts correlated well with estimates of quality found in subjective surveys (e.g. Clark 1954). A glance at the economists receiving the greatest number of citations in our sample (table 5) should, we believe, verify this association for our readers.[16]

4.1 Co-Authorship and Citation

The data on citations were taken from the 1982 SSCI which reported citations from 1981 publications. That source lists all citations from the SSCI universe of journals to anything every written, be it a book, a conference paper, a monograph, an unpublished working paper, or another journal article, regardless of when it was written. Hence, one of the major problems with publication tabulations--that they measure only recent journal publications and not other important work--is sidestepped. The most serious drawback with using citation data is that they are available for only the first author of co-authored works. Even this problem is probably not serious, however, so long as the data are used to rank departments rather than individuals. Much co-authoring is done within a single economics department, and it doesn't matter in this case to which member of the department the citation is attributed. Even among co-authors from different institutions (e.g., Liebowitz-Palmer) or from different departments within a given institution, what a department gains from one team of co-authors it is likely to lose on another. Although the latter effect probably does not result in a complete cancellation across all economics departments, we expect that it greatly reduces the possible measurement error.[17]

4.2 Total Versus Per Capita Measures

When calculating department rankings, one always has the choice of ranking them on a per capita or total basis. Such rankings would have different meanings and values to different people. For example, an undergraduate contemplating graduate study in economics, but unsure of his future field of specialization, will need to be concerned with size of the department and the breadth of coverage of fields in order to ensure that he

will be able to find a faculty member interested in his possible dissertation topic. A measure of total or per capita research capital, the number of faculty, and some additional measure of variance in research capital per capita should provide this information. Similarly, if one wanted to know which department was having the greatest influence on other members of the profession, total research capital would suffice. Finally, an individual interested in becoming a faculty member of a department might wish to know the department's average level of research capital so that he might know how much prestige the average member of the faculty generated which might rub off on him by association. We suspect that the audience for this paper fits into the third category primarily, and for this reason, and in the interest of conserving space, we present primarily the per capita results here. It is relatively easy, however, to make use of department sizes as provided in the primed columns of Tables 1 and 2 in order to obtain rankings based on totals.

5. Citation Results

Table 1 presents the results of our citation tabulations. In all columns, the top score is always normalized to 100 and the scores of other schools are given as percentages of the top score. One of the goals of this paper is to examine the impact of various weightings on the rankings to determine whether a priori appeals for one weighting scheme over another are justified. We weight cites (and later publications) based on the expected impact of the journal doing the citing (publishing). In column 1, the citing journal's expected impact is derived from a measure based on cites per published character (column 2, Table 2, L-P 1983). Column 2 bases the rankings on total citations from economics journals giving each citation an equal weight.[18] In column 3, the citing journal's impact is based on a

TABLE 1: CITATION SCORES BASED ON VARIOUS WEIGHTING SCHEMES
(Ranks in Parenthesis for Columns 2-6)
[W-Weights Used]

		Per Capita					
		(1) W = cites / character	(2') distribution	(2) W=equal	(3) W=survey	(4) W= cites / article	(5) W=Grave's
1.	Chicago	100.0	12,9,7,1	100.0(1)	100.0(1)	100.0(1)	100.0(1
2.	MIT	60.9	11,16,8,7	63.3(2)	62.3(2)	65.6(2)	47.5(2
3.	Harvard	48.0	15,16,12,11	56.3(3)	51.0(4)	50.4(3)	46.4(3
4.	Stanford	47.2	8,14,9,6	53.1(4)	51.5(3)	50.4(4)	46.3(4
5.	Princeton	42.4	14,8,10,9	50.4(5)	47.1(5)	45.6(5)	38.0(5
6.	UCLA	39.6	8,9,4,9	38.9(6)	37.8(6)	39.4(6)	34.9(6
7.	Minnesota	30.3	3,12,9,8	29.8(7)	30.5(7)	30.8(7)	23.2(10
8.	Yale	27.6	5,21,17,15	28.3(9)	27.4(9)	27.0(9)	25.6(8
9.	Columbia	26.6	7,4,17,18	28.1(10)	26.9(10)	26.8(10)	23.9(9
10.	Northwestern	26.5	5,10,8,11	29.5(8)	29.0(8)	28.0(8)	26.4(7
11.	Rochester	25.5	4,4,3,9	26.8(12)	24.8(11)	25.7(11)	13.2(23
12.	Pennsylvania	22.6	7,13,11,19	27.0(11)	24.8(12)	24.0(12)	20.5(12
13.	Wisconsin - Madison	20.6	7,12,20,11	26.4(13)	24.2(13)	21.5(13)	22.0(11
14.	Carnegie-Mellon	20.3	0,10,2,9	15.1(24)	16.5(20)	18.4(16)	14.6(20
15.	Johns Hopkins	17.4	2,2,6,3	26.0(14)	21.5(14)	17.4(17)	17.7(15
16.	Berkeley	17.0	4,15,14,14	21.6(15)	20.5(16)	18.6(15)	15.4(17
17.	LSE	16.9	5,12,18,13	21.1(18)	20.8(15)	17.2(18)	19.2(13
18.	NYU	16.5	4,8,15,14	21.5(16)	19.4(17)	19.8(14)	15.9(16
19.	Michigan	16.1	3,19,18,13	21.2(17)	18.0(18)	16.3(19)	14.7(19
20.	Brown	15.8	0,7,3,7,	18.7(20)	17.4(19)	13.0(22)	17.8(14
21.	Virginia	15.6	1,8,14,4	15.6(21)	15.3(23)	15.9(20)	15.1(18
22.	UC-San Diego	12.5	1,3,10,5	15.6(22)	15.4(22)	11.5(24)	14.1(22
23.	U. Washington	12.5	1,10,12,11	15.3(23)	14.7(24)	11.2(25)	14.2(21
24.	VPI	12.1	2,7,10,8	21.1(19)	16.2(21)	13.4(21)	3.0(59
25.	British Columbia	11.0	1,11,16,12	13.9(26)	13.3(25)	10.4(26)	11.0(25
26.	Maryland	9.9	2,8,15,14	12.2(28)	10.7(29)	11.9(23)	8.0(35
27.	Cornell	9.5	1,8,11,5	14.6(25)	12.0(26)	9.8(28)	11.3(24
28.	Western Ontario	8.7	2,8,16,26	8.9(41)	8.9(35)	7.9(33)	7.1(38
29.	Taxes A&M	8.6	0,8,10,12	10.5(33)	9.9(31)	9.7(29)	9.0(30
30.	Queen's	8.5	1,8,17,14	9.9(35)	9.6(32)	9.9(27)	7.9(36
31.	UC-Santa Barbara	8.4	1,7,13,9	11.4(30)	10.3(30)	8.0(31)	10.1(26
32.	Cambridge	8.0	1,7,13,1	11.5(29)	10.7(27)	8.7(30)	9.7(27
33.	Purdue	8.0	0,4,4,17	8.3(43)	8.3(37)	7.3(36)	8.5(31
34.	Arizona	7.8	1,5,7,18	8.3(44)	7.4(43)	6.8(38)	6.3(40
35.	Michigan St.	7.3	0,7,15,18	9.2(37)	7.9(39)	7.9(32)	8.2(33
36.	SUNY-Buffalo	7.1	0,4,4,4	8.7(42)	8.0(38)	6.4(42)	7.7(37
37.	Oxford	7.0	4,5,25,20	12.8(27)	10.7(28)	7.3(37)	8.4(32
38.	SMU	7.0	1,1,7,5	11.1(31)	9.5(33)	7.5(34)	9.6(28
39.	Washington-St. Louis	6.4	0,7,11,8	9.3(36)	7.6(42)	6.7(41)	8.1(34

TABLE 7: (CONTINUED)

40.	Simon Fraser	6.4	1,3,12,9	10.6(32)	8.7(36)	6.7(39)	5.5(44
41.	Florida	6.3	1,3,10,11	9.0(39)	7.8(40)	5.8(43)	6.3(43
42.	Vanderbilt	6.1	0,7,12,9	9.0(40)	7.2(44)	6.7(40)	5.4(45
43.	Illinois	5.8	0,11,21,2	9.0(38)	7.6(41)	5.5(46)	6.1(43
44.	George Washington	5.6	1,4,15,18	8.0(45)	7.0(45)	7.4(35)	6.1(42
45.	Cal. Tech	5.5	0,2,4,10	5.9(52)	5.9(48)	4.8(47)	5.2(46
46.	USC	5.4	1,7,7,15	10.2(34)	8.9(34)	5.8(44)	9.1(29
47.	Duke	4.9	0,5,11,6	7.8(47)	6.5(46)	5.5(45)	6.4(39
48.	Indiana	4.7	0,3,13,11	5.4(54)	4.6(51)	3.9(52)	3.6(54
49.	Maryland-Baltimore	4.5	0,2,2,9	4.6(61)	3.1(62)	3.6(55)	2.3(70
50.	Toronto	4.1	1,14,26,36	7.4(48)	5.5(49)	4.8(48)	3.6(52
51.	UC-Davis	3.8	0,2,8,12	4.8(57)	4.1(54)	4.6(49)	3.3(55
52.	Wyoming	3.7	0,4,6,4	8.0(46)	6.2(47)	3.9(53)	4.3(49
53.	Stoney Brook	3.4	0,2,14,6	4.7(60)	4.5(52)	3.1(58)	4.7(48
54.	North Carolina	3.2	0,3,16,20	4.8(58)	3.8(56)	3.2(56)	2.8(62
55.	Tulane	3.2	0,2,4,14	2.9(76)	2.7(69)	4.1(51)	1.6(76
56.	Ohio State	3.1	0,6,10,27	4.0(65)	3.6(59)	3.2(57)	3.6(51
57.	Boston College	3.0	0,3,10,9	4.1(64)	3.7(57)	4.2(50)	2.8(62
58.	Florida State	2.9	0,4,7,13	5.5(53)	3.9(55)	2.6(63)	3.6(53
59.	Mass.-Amherst	2.8	0,3,10,13	4.8(59)	3.5(60)	2.2(68)	2.9(60
60.	N. Carolina State	2.7	0,3,25,33	3.2(73)	2.8(67)	2.5(65)	1.5(81
61.	Oregon	2.7	0,2,5,11	3.5(69)	2.9(64)	3.6(54)	3.1(57
62.	Rice	2.5	0,2,2,7	5.9(51)	3.7(58)	2.8(60)	1.6(79
63.	York (England)	2.4	0,6,9,21	6.0(50)	4.6(50)	2.7(61)	3.3(56
64.	Wisconsin-Milwaukee	2.2	0,2,5,14	3.1(75)	2.6(72)	2.0(71)	2.9(61
65.	Carleton (Canada)	2.2	0,2,14,2	3.7(67)	2.8(66)	2.6(64)	2.4(68
66.	Arizona State	2.0	1,4,7,18	6.8(49)	4.5(53)	1.7(76)	4.8(47
67.	Essex	1.9	0,2,7,18	2.6(80)	2.4(74)	2.2(67)	1.6(80
68.	Washington St.	1.9	0,2,7,10	4.4(63)	2.9(65)	1.8(73)	2.5(65
69.	Iowa	1.9	0,1,11,15	2.7(79)	2.6(71)	1.7(78)	2.6(64
70.	Kansas	1.9	0,1,4,18	1.6(93)	2.1(78)	1.8(72)	2.5(67
71.	Manchester	1.8	0,4,17,27	3.5(71)	2.8(68)	2.0(70)	1.6(77
72.	Boston U.	1.7	0,5,10,17	5.1(55)	3.5(61)	1.7(80)	3.8(50
73.	Colorado	1.7	1,1,6,15	5.0(56)	3.0(63)	1.7(75)	3.0(58
74.	Texas-Austin	1.7	0,2,14,9	3.7(66)	2.1(77)	2.3(66)	2.1(72
75.	New School	1.6	0,4,3,14	4.5(62)	2.7(70)	1.7(77)	2.3(71
76.	Penn. State	1.6	0,2,17,16	3.6(68)	2.5(73)	1.7(79)	2.5(66
77.	Clark	1.5	0,0,3,7	1.6(92)	1.8(81)	1.3(83)	1.7(74
78.	McMaster	1.4	0,3,10,17	2.8(78)	2.3(75)	1.3(82)	1.7(75
79.	Claremont	1.4	0,2,7,20	2.6(81)	1.7(83)	2.2(69)	0.6(94
80.	UC-Santa Cruz	1.4	0,2,5,9	3.5(70)	1.7(84)	1.5(81)	1.1(85
81.	Pittsburgh	1.4	0,1,13,24	2.0(86)	1.8(82)	1.1(86)	1.6(78
82.	Kentucky	1.3	0,1,13,13	2.8(77)	1.9(79)	1.3(84)	1.8(73
83.	Syracuse	1.3	0,1,9,10	3.3(72)	2.2(76)	1.1(87)	2.4(69
84.	CUNY-Queens	1.2	0,0,9,10	1.9(87)	1.5(89)	1.8(74)	1.0(86
85.	Concordia	1.2	0,0,9,19	1.7(89)	1.5(88)	1.0(89)	1.4(82
86.	Tufts	1.1	0,0,3,11	2.0(85)	1.1(93)	1.2(85)	0.9(88
87.	Tennessee	1.1	0,0,10,16	1.7(91)	1.6(86)	0.8(92)	1.0(87
88.	Missouri-Columbia	1.0	0,0,9,15	1.8(88)	1.6(87)	1.1(88)	1.1(84

TABLE I: (CONTINUED)

89. Case Western	1.0	0,0,5,10	1.7(90)	0.9(94)	2.7(62)	0.0(103)
90. Iowa State	0.9	0,4,19,26	3.1(74)	1.9(80)	0.8(94)	0.7(92)
91. York (Canada)	0.8	0,2,6,20	2.1(83)	1.6(85)	0.8(96)	1.4(83)
92. S. Illinois-Carbondale	0.8	0,0,3,18	0.8(98)	0.8(96)	2.8(59)	0.2(102)
93. Massachusetts	0.8	0,1,3,7	2.3(82)	1.1(91)	1.0(91)	0.8(91)
94. Alberta	0.8	0,1,5,25	1.3(95)	1.2(90)	1.0(90)	0.7(93)
95. Oklahoma St.	0.7	0,1,16,78	1.4(94)	1.1(92)	0.6(96)	1.3(101)
96. Calgary	0.6	0,0,5,23	0.7(100)	0.7(97)	0.6(95)	0.8(90)
97. Louisiana St.	0.6	0,0,3,14	0.6(102)	0.5(99)	0.4(97)	0.5(97)
98. Waterloo	0.4	0,0,5,37	0.7(101)	0.4(103)	0.4(98)	0.3(100)
99. Auburn	0.4	0,0,6,12	2.0(84)	0.9(96)	0.4(100)	0.8(89)
100. Laval	0.3	0,0,4,21	0.5(103)	0.4(102)	0.4(99)	0.5(96)
101. New Orleans	0.2	0,0,7,17	0.8(99)	0.6(98)	0.2(101)	0.6(95)
102. S. Illinois	0.1	0,0,3,12	1.2(96)	0.5(100)	0.2(102)	0.3(99)
103. Kansas State	0.1	0,0,4,16	0.8(97)	0.5(101)	0.1(103)	0.4(98)
Chicago Law	30.6	2,1,0,1	63.2(3)	31.2(7)	43.3(6)	26.0(8)
Chicago-Business	44.6	7,10,13,5	49.6(6)	48.0(5)	44.4(6)	43.6(5)
Rochester-Management	32.3	2,5,8,3,	26.9(12)	23.8(14)	27.4(9)	20.2(13)

KEY

Column 1: Each cite is weighted by citing journal's value in L-P 1983 or 1984 - Table 2, Column 2. Journals ranked by impact adjusted cites per character; per capita.

Column 2: Each citation derived from an economics journal ranked in Liebowitz-Palmer (1983) or 1984) gets a value of 1. All other cites given zero weight; per capita.

Column 3: Each cite is weighted by citing journal's value in L-P 1983 - Table 5, Column 2. Journals ranked by survey of department chairmen; per capita.

Column 4: Each cite is weighted by the citing journal's value in L-P 1983 or 1984 - Table 2 Column 4. Journals ranked by impact adjusted cites per article; per capita.

Column 5: Each cite from journal considered as in top 24 in Graves et.al. (1982) given equal weight. All other journal's cites given zero weight; per capita.

Note: Tables 1 and 2 are identical in L-P 1983 and L-P 1984. The 1983 paper, however, contains some additional tables not in the 1984 paper.

Column 2': This represents the distribution of faculty in departments based on the number of citations each faculty member received. The first number indicates the number of faculty receiving more than 30 economic citations (the top 5% of the sample); the second number indicates those receiving between 6 and 29 cites; the third number indicates those receiving between 1 and 5 cites and the last number indicates those receiving no economic citations.

survey of department chairmen we conducted in 1982 (Table 5, column 2, L-P 1983). Column 4 weights each cite by the expected impact of the citing journal where the citing journal's expected impact is based on the number of cites received per article (taken from column 4, Table 2, L-P 1983). In column 5, twenty-four journals identified as 'top' by Graves et al. (1982) were given weight of 1, all other journals were given a weight of zero.

Column 2' represents the distribution within a department of individual performances measured as in column 2. This column might be interpreted as the fragility of a department's ranking: if most of the department's citations are to one or two individual's work, that department's reputation would be in peril if those one or two persons left or threatened to leave. The four numbers indicate the number of department members in various parts of the total distribution; the first number indicates those in the top 5%, the second number those in the 79th to 94th percentile, the third number those in the 47th to 78th percentile, and the fourth number those in the bottom 46% (zero citations).

The rankings in columns 1-5 of Table 1 are quite similar although some substantial variations in rank do exist. The top ten schools are the same no matter how the citations are weighted; in fact, only Northwestern in column 1, Minnesota in column 3, and Harvard in column 4 keep the rankings from being identical throughout. This robustness is due in large part to the pronounced spread in values between the number one school (Chicago) and the number ten schools, which average only about twenty-five percent of Chicago's citation values. This lack of crowding allows the rankings to remain relatively stable even when changes in weighting schemes alter the relative performance of these schools. The values become

considerably more crowded toward the middle of the list, and many more rank changes occur here. Still, only nine schools change rank by more than twenty positions. Note also that changing scores by ten per cent (the largest conceivable shift due to the potential co-authorship bias [see L-P (1986)]) would not alter most schools' relative positions to any great extent. The correlations between column 1 and columns 2-5 range from .986 to .998 (see Table 3). In Table 3, the starred rows and columns represent correlations between per capita rankings and a ranking based on totals. The correlation between totals and per capita values is considerably less, being .957, for example, for column 1 and the totals version of column 1. All of these correlations are very high, and all of the citation ranking methods achieve very similar overall results. The considerable additional cost of weighting cites may be unwarranted in these circumstances.

The broader list of departments used in this study allows two additional observations. Of the non-U.S. schools none is in the top ten. The best performance among this group belongs to the London School of Economics, which ranges from thirteenth to eighteenth. Other top non-U.S. departments tend to be rated in the 20-30 range. On the other hand, as indicated by the rankings at the bottom of Table 1, the economists at Chicago's law and business schools and Rochester's management school do quite well, all in the top fifteen,[19] indicating that omission of these and other similar groupings of economists probably neglects many distinguished groups of academic economists.

6. Publication Tabulations

The flow of research output is measured by the publications attributed to members of each of the ranked departments in the four-year period,

TABLE 2: RANKINGS BASED ON PUBLICATIONS
[W=Weights Used]

		Per Capita					
	W =	(1) cites / character	(1') distribution	(2) W=equal	(3) W=survey	(4) W= cites / article	(5) W=Grave's
1.	Carnegie Mellon	75.4	7, 4, 5, 5	52.0(3)	76.2(1)	71.9(1)	62.7(1
2.	Harvard	64.4	12, 5,16,21	60.1(1)	71.2(2)	69.7(3)	54.3(7
3.	Yale	63.0	11,17,10,20	49.8(6)	68.5(4)	61.7(6)	55.6(6
4.	Chicago	62.7	7, 9, 7, 6	54.3(2)	69.6(3)	66.9(4)	59.4(5
5.	Princeton	61.1	8,11,13, 9	49.8(7)	68.4(5)	70.4(2)	51.9(9
6.	Minnesota	60.4	9, 6, 8, 9	42.9(12)	67.2(7)	55.9(10)	61.2(3
7.	MIT	58.5	8,10,12,12	49.9(5)	67.5(6)	66.8(5)	39.4(18
8.	Rochester	57.8	1, 6, 5, 8	36.1(20)	51.1(15)	60.3(7)	47.4(11
9.	Virginia	51.4	4, 7, 10, 6	47.4(9)	60.2(9)	58.2(9)	59.7(4
10.	UCLA	50.4	4,11, 6, 9	38.2(15)	50.7(13)	52.3(12)	43.5(13
11.	Brown	49.6	1, 6, 3, 7	31.5(30)	46.2(19)	55.1(11)	34.8(20
12.	Stanford	48.7	4,14, 4,15	47.9(8)	59.0(10)	58.5(8)	49.2(10
13.	L.S.E.	44.4	6,10,17,15	47.4(10)	63.3(8)	50.1(13)	61.2(2
14.	UC-San Diego	44.0	2, 7, 4, 6	37.0(17)	58.8(11)	46.4(15)	53.2(8
15.	Pennsylvania	43.1	4,16,17,13	41.5(13)	50.7(16)	38.3(22)	40.4(17
16.	Northwestern	41.2	4, 6,15, 9	38.7(14)	52.9(12)	42.1(18)	41.4(16
17.	Western Ontario	38.7	4,13,15,20	37.1(16)	46.2(20)	42.9(17)	31.1(27
18.	Cornell	38.3	4, 7, 5, 9	32.1(26)	48.3(17)	46.5(16)	44.9(12
19.	British Columbia	37.3	3,12,13,12	36.7(18)	50.7(14)	37.7(23)	41.7(15
20.	U. Washington	36.6	4, 7,10,13	32.6(23)	41.3(23)	41.1(20)	42.5(14
21.	Johns Hopkins	35.1	1, 3, 5, 4	50.5(4)	48.0(18)	46.7(14)	33.5(23
22.	Columbia	31.3	5, 6,18,17	29.9(34)	35.3(28)	37.6(24)	30.0(31
23.	Wisconsin (Madison)	30.9	5, 8,22,15	36.2(19)	42.2(22)	35.9(27)	33.6(21
24.	Queens	28.8	3, 7,14,16	34.4(21)	43.8(21)	38.3(21)	31.2(26)
25.	VPI	27.6	1,12, 6, 8	32.3(25)	36.0(27)	41.4(19)	27.6(32)
26.	Michigan	26.9	3,11,15,21	33.6(22)	36.5(26)	36.3(25)	30.3(30)
27.	Purdue	26.7	1, 4, 5,15	23.4(43)	32.3(32)	29.2(34)	33.5(24)
28.	Texas A & M	26.0	0,11,13,6	30.0(33)	37.2(25)	33.8(29)	35.6(19)
29.	UC-Santa Barbara	25.8	1, 4,15,10	30.4(32)	29.6(36)	30.4(32)	30.8(28)
30.	UC Davis	25.5	2, 4, 7, 9	28.6(35)	35.2(29)	30.1(33)	31.5(25)
31.	Cal. Tech.	25.3	1, 4, 2, 9	17.6(56)	27.1(42)	27.9(35)	23.9(39)
32.	N.Y.U.	24.5	3, 5,14,19	27.1(38)	29.8(35)	27.1(38)	19.9(48)
33.	Cambridge	23.9	2, 4, 8, 8	26.6(39)	31.6(33)	21.5(51)	27.3(33)
34.	N. Carolina	23.4	1,12, 9,17	31.6(29)	33.3(30)	27.4(37)	30.3(29)
35.	Wyoming	23.2	0, 3, 7, 4	47.6(11)	40.9(24)	26.9(39)	24.2(38)
36.	Duke	22.7	1, 5,11, 5	30.4(31)	30.8(34)	30.5(31)	19.9(49)
37.	Vanderbilt	22.6	1, 7,10,10	27.9(37)	29.3(38)	23.8(42)	18.1(52)
38.	Boston College	21.9	0, 5, 7, 10	21.8(48)	27.2(41)	22.6(47)	24.4(37)
39.	U.S.C.	21.7	1, 7, 9, 13	32.0(27)	32.9(31)	22.3(48)	21.2(44)
40.	Auburn	19.8	0, 6, 7, 5	28.2(36)	27.7(40)	36.0(26)	33.6(22)

TABLE 2: RANKINGS BASED ON PUBLICATIONS (CONTINUED)

41.	Stoney Brook	19.2	0, 7, 2,13	17.7(55)	24.6(46)	23.1(45)	22.5(4
42.	Simon Fraser	19.2	1, 4,10,10	24.4(41)	23.6(47)	35.3(28)	16.7(5
43.	Tulane	19.1	0, 5, 3, 12	14.2(68)	20.0(57)	23.8(43)	17.2(5
44.	Maryland	18.8	1, 7,24, 7	22.3(47)	23.3(48)	27.7(36)	15.3(6
45.	Ohio State	18.7	2, 6,12,23	18.8(52)	22.5(50)	23.6(44)	26.0(3
46.	Illinois	17.5	0, 9,24, 1	31.2(28)	27.8(39)	25.1(41)	23.6(4
47.	Florida	17.3	0, 6,10, 9	22.8(46)	25.9(43)	22.9(46)	25.7(3
48.	Michigan St.	16.9	1, 7,17,15	25.8(40)	25.8(44)	26.5(40)	21.2(4
49.	Toronto	16.7	1,14,29,33	20.2(50)	23.3(49)	18.5(56)	15.9(5
50.	Berkeley	16.4	1, 7,15,24	22.9(45)	22.2(52)	21.6(50)	17.1(5
51.	Essex	16.2	1, 4, 8,14	21.0(49)	21.9(53)	19.4(54)	14.2(6
52.	Indiana	16.0	0, 6,11,10	24.3(42)	24.9(45)	21.8(49)	20.8(4
53.	Iowa	15.7	1, 3,14, 9	18.4(53)	22.4(51)	19.9(53)	22.2(4
54.	Wisconsin (Milwaukee)	15.5	1, 2, 6,12	19.0(51)	20.5(56)	20.5(52)	26.4(3
55.	S. Illinois	14.8	0, 2, 5, 8	15.7(61)	21.3(54)	16.3(57)	15.7(5
56.	S.M.U.	14.2	0, 2, 8, 4	13.5(72)	19.8(58)	30.7(30)	19.3(5
57.	N. Carolina St.	13.9	1, 8,26,26	16.8(57)	17.2(61)	14.3(61)	12.4(6
58.	McMaster	13.0	1, 1,15,13	13.1(73)	14.0(69)	15.5(59)	8.2(7
59.	SUNY-Buffalo	12.5	0, 3, 1, 8	12.6(74)	19.7(59)	16.1(58)	19.0(5
60.	Washington St.	11.5	0, 3,11,5	23.1(44)	21.2(55)	14.7(60)	20.3(4
61.	Missouri (Col.)	11.2	0, 4, 8,12	14.4(65)	14.3(66)	13.7(65)	13.7(6
62.	Kentucky	10.7	0, 2,13,12	14.3(66)	15.9(63)	14.2(62)	13.5(6
63.	Oxford	10.6	1, 2,26,25	32.3(24)	29.5(37)	10.6(70)	23.0(4
64.	Washington (St. Louis)	10.3	0, 4, 8,14	14.0(69)	13.7(71)	14.0(63)	9.7(7
65.	Oregon	9.8	0, 2, 9, 7	13.7(70)	14.1(67)	13.8(64)	11.4(6
66.	York (England)	9.1	0, 3,15,18	13.6(71)	15.0(64)	18.7(55)	11.8(6
67.	Concordia	9.0	0, 2, 9,17	15.1(64)	15.9(62)	13.6(66)	6.0(8
68.	Arizona	9.0	1, 0,13,17	11.6(79)	11.9(75)	7.5(80)	9.4(7
69.	Tennessee	8.5	0, 2,14,10	16.0(59)	13.9(70)	11.5(67)	14.8(6
70.	Penn. State	8.3	0, 4,10,21	16.4(58)	14.5(65)	10.6(69)	13.6(6
71.	Carleton (Canada)	8.2	0, 2,15,11	18.2(54)	17.3(60)	11.1(68)	15.4(5
72.	George Washington	7.9	0, 3,17,18	14.3(67)	13.3(72)	8.8(74)	8.9(7
73.	Colorado (Boulder)	7.5	0, 2, 6, 15	15.4(62)	12.4(74)	8.0(77)	9.8(7
74.	Iowa St.	6.9	0, 3,21,25	15.8(60)	13.3(73)	7.9(78)	8.5(7
75.	Texas (Austin)	6.8	0, 1, 9,15	12.2(76)	10.1(79)	10.0(72)	6.9(8
76.	Rice	6.5	0, 1, 4, 6	12.0(78)	10.6(78)	10.5(71)	5.8(8
77.	Maryland (Balt.)	6.5	0, 1, 3,10	12.6(75)	14.1(68)	4.9(90)	17.4(5
78.	Pittsburgh	6.0	0, 4, 9,25	7.2(86)	9.2(80)	8.3(76)	9.2(7
79.	Boston U.	5.9	0, 2,13,17	9.1(83)	7.8(83)	6.7(83)	5.1(8
80.	Florida St.	5.7	0, 1,11,12	15.3(63)	11.6(76)	6.0(86)	9.3(7
81.	Arizona St.	5.3	0, 1,14,15	12.0(77)	10.8(77)	7.3(81)	11.2(6
82.	New School	5.2	0, 2, 3,16	4.6(99)	5.8(86)	6.1(84)	4.3(8
83.	Kansas	5.0	0, 1, 6,16	7.2(88)	9.0(82)	9.9(73)	8.7(7
84.	Claremont	4.2	0, 1, 8,20	6.3(91)	5.3(89)	8.8(75)	3.5(9
85.	Oklahoma St.	3.3	0, 2,22,26	7.2(87)	5.3(90)	4.8(91)	2.1(9

Table 2 (Continued)

86.	Alberta	3.3	0, 0,15,16	11.3(80)	9.1(81)	7.1(82)	3.3(9
87.	Calgary	3.2	0, 1, 1, 26	4.1(101)	4.6(95)	3.7(97)	1.9(10
88.	Manchester	2.9	0, 1,18,29	7.8(85)	6.5(84)	5.3(88)	4.1(9
89.	Syracuse	2.6	0, 0, 7,13	6.5(89)	4.6(93)	5.1(89)	6.4(8
90.	Massachusetts	2.6	0, 0, 3, 8	6.5(90)	5.7(88)	4.2(95)	3.1(9
91.	CUNY-Queens	2.4	0, 1, 5,13	6.2(93)	3.7(100)	2.3(101)	2.4(9
92.	York (Canada)	2.4	0, 0, 9,19	4.3(100)	4.4(98)	4.4(93)	1.8(10
93.	Clark	2.3	0, 0, 2, 8	6.1(95)	3.6(101)	2.4(99)	11.0(7
94.	UC-Santa Cruz	2.3	0, 0, 6,10	10.0(81)	3.8(99)	4.3(94)	0.5(10
95.	Tufts	2.3	0, 0, 5, 9	9.9(82)	6.0(85)	4.0(96)	6.0(8
96.	New Orleans	2.2	0, 0, 5,19	4.9(98)	4.7(92)	4.4(92)	5.5(8
97.	Massachusetts (Amherst)	2.1	0, 0,11,15	5.9(96)	4.5(96)	7.6(79)	3.6(9
98.	S. Illinois (Carbondale)	2.0	0, 0, 7,14	6.2(94)	5.8(87)	6.7(87)	5.4(8
99.	Case Western	1.9	0, 0, 6, 9	8.0(84)	4.4(97)	6.0(90)	2.1(9
100.	Waterloo	1.9	0, 0, 9,33	6.3(92)	4.8(91)	2.3(100)	4.1(9
101.	Louisiana St.	1.6	0, 0, 7,10	5.3(97)	4.6(94)	2.6(98)	5.3(8
102.	Laval	1.1	0, 0, 3,22	3.7(102)	2.7(102)	2.2(102)	0.4(10
103.	Kansas St.	0.9	0, 0, 4,16	2.9(103)	1.4(103)	0.8(103)	2.2(9
	Chicago Law	100.0(1)	1, 2, 0, 1	100.0(1)	100.0(1)	100.0(1)	100.0(
	Chicago Business	52.0(9)	6,13, 8, 8	48.1(8)	61.1(9)	50.3(13)	56.5(
	Rochester Management	74.4(2)	5, 3, 3, 7	40.4	35.8(28)	55.4(11)	31.6(1

KEY

Column 1: Pages in journal x characters per page x weight of character in Table 2, Column L-P 1983; per capita.

Column 2: Pages in journal x characters per page; per capita.

Column 3: Pages in journal x characters per page x weight of character from Table 5, Colum 2, L-P 1983; per capita.

Column 4: Articles in journal x weight per article from Table 2, Column 4, L-P 1983; per capita.

Column 5: Articles in "top 24" journals; per capita.

Column 1': This represents the distribution of faculty in departments based on the number of characters published weighted by the values found in table 2, column 2 of Liebowitz-Palmer, 1984. The first number indicates the number of faculty in the top 5% of the distribution; the second number indicates those in the 80-94 percentile; the third number indicates those in the 48-79 percentile and the last number indicates those with no measured publications.

1978-1981. In a sense, these publications can be viewed as an imperfect measure of the gross investment flow being added to the research capital of a department.

Publication size was measured in several ways and then weighted in a manner similar to that used to weight citations. The publication data provided details of co-authorship and we were thus able to divide the value of any particular publication by the number of authors to avoid double counting the research output. The values of publications for members of a department were then summed and divided by the number of members in deriving the per capita rankings of columns 1-5 of Table 2. As in Table 1, all scores are relative to the top score which was normalized to 100 (Note: the top score often did not belong to an economics department). As before, different weighting schemes were used to produce the values in columns 1-5. Column 1' is to be interpreted in the same way as column 2' was in Table 1. There are some major differences between the various columns. The rankings are less consistent than those of Table 1. Only six schools are consistently in the top ten in columns 1-5, and even for those which are, the ranks still change from column to column. This is because there is much less variation in the relative performances of these departments (i.e. there is very little spread in their scores). The rank correlations between column 1 and the other four columns (ranging from .921 to .978) are lower than those in Table 1.

Of even greater interest are the correlations between columns 1-5 of Table 1 and Table 2 (fully presented in Table 3). Here the correlations range from .683 to .776, considerably below those between columns based on citations or publications alone, indicating the relatively larger differences between citation and publication measurement. Examination of the

TABLE 3: CORRELATIONS BETWEEN COLUMNS IN TABLE 1 AND TABLE 2

	Table 2						Table 3					
Table 1	(1)	(2)	(3)	(4)	(5)	(1*)	(1)	(2)	(3)	(4)	(5)	(1
(1)	1	.992	.990	.998	.981	.957	.771	.749	.758	.773	.695	.7
(2)		1	.998	.996	.982	.949	.767	.722	.744	.761	.683	.7
(3)			1	.996	.986	.941	.776	.725	.751	.767	.695	.7
(4)				1	.987	.952	.776	.743	.760	.773	.701	.7
(5)					1	.931	.745	.714	.732	.738	.685	.7
(1*)						1	.722	.720	.720	.719	.644	.8
Table 2												
(1)							1	.921	.971	.978	.949	.8
(2)								1	.959	.925	.917	.8
(3)									1	.958	.960	.8
(4)										1	.937	.8
(5)											1	.8
(1*)												

Column (1) and row (1*) represent the totals (as distinguished from per capita) version o: column 1.

rankings between tables indicates many significant variations in the performance of individual departments (e.g. Berkeley ranges between 15-20 in Table 1, but 35-55 in Table 2; Auburn between 22-40 in Table 2 and 84-100 in Table 1; Carnegie-Mellon between 1-3 in Table 2 but 14-24 in Table 1; Virginia between 4-9 in Table 2 but 18-23 in Table 1). We suspect that these differences indicate the directions in which these departments were moving during this period of time. Also of interest is the variation in rankings caused by interchanging per capita values with totals. These correlations are lower than those associated with changing weights, but higher than those associated with comparing stocks and flows.

Despite these differences, all the correlations are high enough to warrant the conclusion that top schools tend to remain top schools and bottom schools remain bottom schools regardless of how one measures performance. The rankings of individual schools, however, tend to vary considerably, and the choice between using citations or publications appears to be more important than that between totals and per capita or the choice of weights for the measures of performance by journal.

7. Individual Rankings: Where Do You Fit in?

Department rankings are the primary concern of this paper. It was essential, of course, in constructing these rankings that we also construct (at least implicitly) a ranking of all individuals in these departments. Many of our colleagues in the profession have expressed a strong interest in examining the distribution of both publication and citation records. In particular, they wished to know where they stood relative to others in the profession and who the leaders were. In an attempt to accommodate these wishes without listing complete sets of names and scores, we now provide

individuals with a method of determining their relative position within the group of over 3,000 economists.

For those faculty members interested in their relative influence on the profession as measured by citations, we present in Table 4, column A, a list of distribution percentiles based on the number of citations from our list of over 100 economics journals, and column B, the percentiles based on all cites received in all citing journals listed in the SSCI. Because the raw percentiles were slightly biased due to the SSCI policy of attributing the cite only to the first author of a co-authored article, the distribution in Table 4 is an average of the distributions of citation frequencies for authors whose last names begin with different letters of the alphabet (See L-P, 1986, for details). An individual wishing to compare his performance to our sample merely needs to go to his library, look up his citations (economic or total) to all work (deleting all self-citations from the count), even those attributed to a co-author. Each cite should then be divided by the number of co-authors to arrive at one's true total. This total allows one to find his or her percentile.

It is interesting that the leading individual from the original biased citation distribution garnered as many cites as the twenty-first leading department. Equally interesting is the fact that of the 3260 economists in these leading institutions, almost half (1535) received no citations in 1981. Table 5 presents a list of the top 50 individuals, ranked according to the number of citations (excluding self-citations) each received in economics journals during 1981, along with the departments which received credit for their cites. The reader is cautioned that these data are biased because the first author bias was not eliminated from these numbers. Nevertheless, the list may be of some interest. We apologize in advance to the many eminent

TABLE 4: PERCENTILE BASED ON CITATION OR PUBLICATION

	A	B
Percentile	Economic Cites	Total Cites
99.5	130	265
99.0	83	167
97.5	53	110
95.0	30	61
90.0	15	30
85.0	9	18
80.0	6	12
75.0	4	8
70.0	3	6
65.0	2	4
60.0	2	4
55.0	1	2
50.0	1	2
45.0	0	1
40.0	0	0
Highest Value	257	523

TABLE 5: TOP 50 CITATION RECEIVERS*

	Individual	Affiliation	Number of Citations in Economics Journals
1.	Feldstein, M.S.	Harvard	257.00
2.	Arrow, K.J.	Stanford	254.00
3.	Samuelson, P.A.	M.I.T.	252.00
4.	Barro, R.J.	Chicago/Rochester	196.00
5.	Becker, G.S.	Chicago	195.00
6.	Lucas, R.E.	Chicago	188.00
7.	Famma, E.F.	Chicago–Bus.	187.00
8.	Theil, H.	Chicago	177.00
9.	Stigler, G.J.	Chicago–Bus.	167.00
10.	Sargent, T.J.	Minnesota	155.00
11.	Tobin, J.	Yale	152.00
12.	Baumol, W.J.	New York U./Princeton	131.00
13.	Buchanan, J.M.	Vir. Polytech	129.00
14.	Dornbusch, R.	M.I.T.	126.00
15.	Modigliani, F.	M.I.T.	126.00
16.	Stiglitz, J.E.	Princeton	115.00
17.	Heckman, J.J.	Chicago	107.00
18.	Diamond, P.A.	M.I.T.	95.00
19.	Bhagwati, J.N.	Columbia	94.00
20.	Griliches, Z.	Harvard	93.00
21.	Solow, R.M.	M.I.T.	91.00
22.	Zellner, A.	Chicago–Bus.	90.00
23.	Diewert, W.E.	British Columbia	88.00
24.	Hall, R.E.	Stanford	87.00
25.	Sen, A.K.	Oxford	87.00
26.	Mincer, J.	Columbia	84.00
27.	Ross, S.A.	Yale	82.00
28.	Williamson, O.E.	Pennsylvania	81.00
29.	Goldfeld, S.M.	Princeton	80.00
30.	Phelps, E.S.	Columbia	80.00
31.	Scherer, F.M.	Northwestern	79.00
32.	Jorgenson, D.W.	Harvard	76.00
33.	Gordon, R.J.	Northwestern	74.00
34.	Spence, A.M.	Harvard	74.00
35.	Fischer, S.	M.I.T.	73.00
36.	Atkinson, A.B.	L.S.E.	71.00
37.	Debreu, G.	U.C.–Berkeley	71.00
38.	Harberger, A.C.	Chicago	71.00
39.	Nerlove, M.L.	Northwestern	70.00
40.	Houthakker, H.S.	Harvard	69.00
41.	Lintner, J.	Harvard	68.00
42.	Dasgupta, P.S.	L.S.E.	67.00
43.	Frenkel, J.A.	Chicago	67.00
44.	Jensen, M.C.	Rochester–Management	67.00
45.	Brock, W.A.	Wisconsin–Madison/Chicago	66.00
46.	Tullock, G.	Vir. Polytech	66.00
47.	Musgrave, R.A.	Harvard	65.00
48.	Balassa, B.A.	Johns Hopkins	64.00
49.	Lancaster, K.J.	Columbia	64.00
50.	Kmenta, J.	Michigan	63.00

*Living Nobel prize winners not in our sample, with their economic citations in parentheses are J. Tinbergen (36); S. Kuznets (60); J.R. Hicks (157); W. Leontief (51); G. Myrdal (32); F.A. von Hayeck (80); L.V. Kantorovich (2); T.C. Koopmans (55); M. Friedman (312); J.E. Meade (62); H.A. Simon (51); A. Lewis (8); T.W. Schultz (44); J.R.N. Stone (8); Samuelson, Arrow, L.R. Klein (42); Tobin, Stigler and Debreu are in the sample. It should be remembered that the research capital of many of these individuals has depreciated since the publication of the work for which they received their prize. Also, the SSCI does not include most non-english language jo[illegible]

economists left off the list because they were not in our sample. A partial list of these economists taken from the set of living Nobel prize winners, with their citations, is included in a footnote to Table 5. One of these Nobel winners, not in our sample, had the highest recorded citation count.[20]

8. Conclusions

When one is asked about the quality of an economics department, one usually reacts by asking in return, "Who do they have there now?" not "What did they publish there last year?" It is bigger news to the profession when someone moves from one employer to another than when that person has an article accepted or rejected for publication. The reason is that the perceived quality of an economics department is based on the reputations of the members of that department, and these reputations are based, in turn, on the cumulative impact that the individual member's writings have had on the profession. Publication tabulations may be correlated with reputation, they may be useful indicators of the direction in which the reputation is going, and they may be useful for other reasons, but they do not provide as close a measure as citation tabulations do of reputation or impact on the profession.

We have shown that the use of citations leads to different results than are obtained by looking at publication data. We have also shown that weighting publication or citation values does not cause as large a change in the rankings as the choice between citation and publication data. These results will, we expect, allow future rankings to proceed more economically by not having to incur the greatest expense involved in weighting citations and allow finer distinctions among types of rankings.

TABLE 6: TOP 50 PUBLISHERS

1978 - 1981

	Individual	Affiliation	Weighted Publications
1.	Feldstein, M.S.	Harvard	49791.21
2.	Barro, R.J.	Chicago/Rochester	44229.40
3.	Sargent, T.J.	Minnesota	36121.24
4.	Friedman, B.M.	Harvard	34360.25
5.	Fair, R.C.	Yale	31113.10
6.	Stiglitz, J.E.	Princeton	30621.48
7.	Ross, S.A.	Yale	30434.29
8.	Hausman, J.A.	M.I.T.	28257.74
9.	Smith, C.W.	Rochester-Management	28112.99
10.	Summers, L.H.	M.I.T.	27714.31
11.	Fama, E.F.	Chicago-Bus.	27603.95
12.	Shiller, R.J.	Pennsylvania	27145.81
13.	Mishkin, F.S.	Chicago	26180.06
14.	Frenkel, J.A.	Chicago	26112.47
15.	Lazear, E.P.	Chicago-Bus.	24422.61
16.	Grossman, S.J.	Pennsylvania	22766.05
17.	Hart, O.D.	Cambridge	22347.44
18.	Stein, J.L.	Brown	22084.95
19.	Riley, J.G.	U.C.L.A.	21589.82
20.	Carlton, D.W.	Chicago-Law	19943.43
21.	Fischer, S.	M.I.T.	19820.99
22.	Calvo, G.	Columbia	19560.26
23.	Borjas, G.J.	U.S.-Santa Barbara	19490.45
24.	Starrett, D.A.	Stanford	19441.88
25.	Seater, J.J.	North Car. State	19170.39
26.	Sachs, J.	Harvard	19161.54
27.	McCallum, B.T.	Carnegie-Mellon/Virginia	18759.14
28.	Diewert, W.E.	British Columbia	18683.32
29.	Willig, R.D.	Princeton	18606.72
30.	Baumol, W.J.	Princeton/NYU	18505.50
31.	Blinder, A.S.	Princeton	18450.21
32.	Laidler, D.E.W.	Western Ontario	17867.42
33.	Tomes, N.	Western Ontario	17668.11
34.	Kotlikoff, L.J.	Yale	17665.38
35.	Sargan, J.D.	L.S.E.	17641.30
36.	Krugman, P.R.	Yale	17201.70
37.	Howitt, P.W.	Western Ontario	16872.73
38.	Warner, J.B.	Rochester-Management	16856.22
39.	Wilson, C.A.	Wisconsin-Madison	16676.32
40.	Nelson, R.R.	Yale	16491.50
41.	Thompson, E.A.	U.C.L.A.	16301.34
42.	Crawford, V.P.	U.C.-San Diego	16218.46
43.	Hall, R.E.	Stanford	16093.59
44.	Rosen, S.	Chicago	15923.92
45.	Laitner, J.	Michigan	15875.34
46.	Shavell, S.	Harvard	15657.86
47.	Welch, F.R.	U.C.L.A.	15606.28
48.	Pollak, R.A.	Pennsylvania	15555.93
49.	Gale, D.M.	L.S.E.	15409.22
50.	Viscusi, W.K.	Northwestern	15300.73

Footnotes

1. The recent article by Davis and Papanek (1984) provides a major exception which is discussed infra.

2. See also McCloskey (1976).

3. To determine this profile, the 1984 citations to articles published in the American Economic Review, Econometrica, J. of Economic History, J. of Political Economy and Review of Economics and Statistics were examined. An examination of the age of the citations made by articles in these journals indicates a more pronounced and earlier peak (and lower half-life), due, we surmise, to the increase in the flow of articles over this period.

4. Citations measure the capital stock as perceived by authors of published articles and we assume that economists who don't publish do not have a different view of the value of research capital.

5. An anonymous referee has indicated that our assumption that the value of research capital rests in the individual rather than the department is consistent with view of Becker, Tullock, and others that faculty members should support their own research.

6. At least one such product comes quickly to mind. If co-authorship causes more department interaction, and if this is considered to be a good, per se, then the department would wish to encourage co-authorship beyond the level individuals would choose.

7. Actually, the optimal strategy for these authors is to write the articles independently (since this is the least costly method) and then to pretend to have co-authored them, thereby garnering greater payment for the work.

8. We would like to thank Robert Barro for asking, in the light of these findings, why he didn't sell his publications to authors with fewer publications.

9. See Hamermesh et al. (1982). They find, not surprisingly, that citations play a larger role in total salary determination than do publications.

10. The American schools used in this study were taken from Bell and Seater (1978), with a few additions and deletions. Generally, only unversities were examined and occasionally schools were deleted if their catalogues were unavailable. Our regrets to those schools we overlooked in the study. The economics groups of several non-ecnomics deaprtments (business schools or law school) were included to assess the possible quality of these generic groups. The economics groups in the business and law faculties at the University of Chicago and the management school at the University of Rochester were assessed and are included at the bottom of the rankings.

11. Where people were when they published may, however, form a basis for a valuable ranking for new PhDs seeking fertile environments.

12. A more detailed analysis of the citation and publication records of the economists at The University of Western Ontario over a six-year period revealed that the variance of the annual citation data was, on average, only about 20% of the variance of the annual publication data.

13. This procedure can lead to serious error in some circumstances. For example, Graves et al. determined affiliation from the listing in the journal, oftentimes (as they admit) including in economics departments persons actually in business or public policy schools, or another campus of the same university (e.g., CUNY).

14. Individuals listed in the catalogue as visiting, emeritus or instructors were not included. In a few instances, economics departments were not listed separately from business or agricultural schools and our attempts at excluding non-economists were not completely successful. In these cases, per capita department rankings may be less revealing than the total values. For some schools we had to use catalogs from 1980-81 stored on microfiche.

15. This procedure is not without drawbacks, however. Our research assistants made numerous errors when looking up individuals in the SSCI. Often, several individuals had the same last name and initials, making it difficult to attribute the various cites to the proper individual without reference to the individual vitaes, which were not availabe. These problems were further compounded by the different citation practices of authors and journals so that some citations included two (or more) initials, some one and some none. This would sometimes lead to single individuals appearing in two or three places in the SSCI, oftentimes to be missed by our all-too-human research assistants.

Finally, the names taken out of the catalogues were sometimes misspelled, leading to outright errors. Detailed examination of the first round of data collection to correct these errors (including re-checking the names in the catalogues) was carried out, and we were encouraged by the generally trivial changes in school rankings which were brought about by the seemingly substantial changes to the data. The publication data were less susceptible to these errors since the number of publications and individuals publishing was much smaller than for citations and because the SSCI gave the institutional affiliation of the authors for publications making double checking easier.

16. Probably the most thorough discussion of the uses and abuses of citation measures is provided by Garfield (1979), who addresses in greater detail each of the concerns listed above. In discussing the criticisms of many uses of citation counts, Garfield points out that, "... when you consider that some 25% of the scientific papers published are never cited even once and that the average annual citation count for papers that are cited is only 1.7, it is not hard to understand why citation counts might seem a particularly threatening measure to some." [p. 240] But Garfield's major thrust is similar to the position we have taken: citation counts used carefully can provide valuable additional information in most evaluation processes. See also Liebowitz-Palmer (1986).

17. The authors carried out two different studies, both of which indicated that the co-authorship bias is small. In one study, we found little difference in the number of citations received by economists whose last names come at different quintiles of an alphabetized list of everyone in our sample. In the other we specifically examined the potential bias

for a sample of individuals. In both cases the bias was negligible. See L-P (1986).

18. To ensure greater comparability with the other columns, cites were limited to those derived from the 108 economics journals rated in Liebowitz and Palmer (1983 or 1984). A ranking based on total cites would be virtually identical.

19. The rankings provided in the tables are the positions which these groups would earn if they were individually included in the main table. Thus, for example, in column 1, if all three were included in the rankings, Chicago Business would be seventh and Rochester Management would be fourteenth.

20. Younger members of the profession, who might understandably be more interested in their expected future influence on the profession, will be more interested in their personal standing in a publication ranking. This ranking, though only slightly more complex to determine, takes up considerable space to present all the necessary data. The top 50 publishers from 1978 - 81 are listed in Table 6. Interested readers should consult L-P (1986).

References

J. G. Bell and J. J. Seater, "Publishing Performance: Departmental and Individual, "Economic Inquiry, Oct. 1978.

F. M. Boddy, "A Preliminary Report on a Reputational Standing Survey of 100 Ph.D. Producing Departments in the U.S. Conducted in 1975," unpublished.

L. D. Brown and J. C. Gardner, "Using Citation Analysis to Assess the Impact of Articles and Journals on Accounting Research," Working Paper No. 595, University of Buffalo, 1983.

A. M. Cartter, "An Assessment of Quality in Graduate Education," Washington, D.C., American Council of Education, 1966.

K. E. Clark, "The APA Study of Psychologists", American Psychologist 9 (1954):117-120.

P. Davis and G. F. Papanek, "Faculty Ratings of Major U.S. Economics Departments by Citations," American Economic Review, March 1984.

M. Frankena and K. Bhatia, "Journal Articles from Canadian Economics Departments, 1968-71," West Ec. J., Oct. 1972.

M. Frankena and K. Bhatia, "Canadian Contributions to Economics Journals, 1968-72," Can. J. of Ec., February, 1973.

E. Garfield, "The 250 Most-Cited Primary Authors, 1961-1975, part II." Current Contents, 50 (December 1977):5-16.

_____ Citation Indexing, ISI Press, 1979.

_____ ed. Social Science Citation Index. Philadelphia: Institute for Scientific Information Press, 1981, Volumes 1-4, 6.

P. E. Graves, J. R. Marchand and R. Thompson, "Economics Department Rankings: Research Incentives, Constraints, and Efficiency," Amer. Econ. Rev., December 1982.

D. S. Hamermesh, G. E. Johnson and B. A. Weisbrod, "Scholarship, Citations, and Salaries: Economic Rewards in Economics," Southern Economic Journal, October 1982.

E. C. Ladd and S. M. Lipsett, "How Professors Rated Faculties in 19 Fields," Chronicle of Higher Education, January 15, 1979.

E. E. Leamer, "The Hit Parade of Economics Articles," Comparative Economic Systems, Exams, Puzzles, and Problems, July 1981.

S. J. Liebowitz and J. P. Palmer, "Assessing the Relative Impacts of Economics Journals," University of Western Ontario Centre for Economic Analysis of Property Rights, Working Paper, January 1983.

_____ and _____, "Assessing the Relative Impacts of Economics Journals," Journal of Economic Literature, March 1984.

_____ and _____, "Assessing Assessments of Ecoomics Departments," Universityu of Western Ontario Centre for Economic Analysis of Property Rights, Working Paper, March 1986.

D. N. McClosky, "Does the Past Have Useful Economics?", J. of Ec. Lit., June 1976.

J. C. Miller and R. D. Tollison, "Rates of Publication per Faculty Member in forty-five Rated Economics Departments," Economic Inquiry, March 1975.

W. J. Moore, "Relative Quality of Graduate Programs in Economics, 1958-72 --Who Published and who Perished," Western Economic Journal, June 1973.

A. W. Niemi, Jr., "Journal Publication Performance During 1970-74: The Relative Output of Southern Economics Departments," Southern Ecnomic Journal, July 1975.

W. F. Owen and L. R. Cross, Guide to Graduate STudy in Economics and Agricultural Economics, 6th E., Irwin, 1982.

K. D. Roose and C. J. Anderson, "Rating of Graduate Programs," American Council on Education, Washington, D.C. 1970.

J. J. Sigfried, "The Publishing of Economic Papers and Its Impact on Graduate Faculty Ratings 1960-1969," Journal of Economic Literature, March 1972.

V. K. Smith and S. Gold, "Alternative View of Journal Publication Performance during 1968-71 and 1970-74," Eastern Economic Journal, April 1976.

G. J. Stigler and C. Friedland, "Citation Practices of Doctorates in Economics," J. Pol. Econ., June 1975.

Howard P. Tuckman and Jack Leahey, "What is an Article Worth?", J. Pol. Econ. 83 (October 1975):951-967.