UNIVERSITIES AND AUTHORS: A RANKING BASED ON PUBLISHED PAPERS

Paulo Sérgio Amaral de Sousa – paulus@fep.up.pt, Faculdade de Economia do Porto
Pedro Cosme da Costa Vieira – pcosme@fep.up.pt, Faculdade de Economia do Porto, Portugal

Abstract: We rank universities and colleges using the EconLit database and measuring quality by the number of American Economic Review-equivalent articles published over the ten-year period 1996-2005. We observe that there is some dissimilarity between the sub-fields rankings and that of the general field of Economics, so that the sub-field rankings provide extra information. The sub-fields ranks may be useful for students considering post-graduate work in specific areas.

Keywords: Universities ranking; Economics; International Finance
JEL Codes: F39; A14; I29; J69

1. Introduction

It is acknowledged that universities want high-quality students (e.g., Kalaitzidakis et al., 2003) and that top students aim at high-quality universities. On the university side, high-quality students are important because top students have high potential for proposing new ideas, are good vehicles of diffusion for the ideas that emerge within the university, are rewarding to teach and so attract top professors, and are likely themselves to become top researchers and advance the university's reputation and prestige. More generally, since new ideas are a primary driver of economic growth (Boskin and Lau, 2000), and new ideas result from research and development activities where the primary input is high-skilled labour (Romer, 1990), where knowledge diffusion and externalities make an important contribution (e.g., Jaffe 1989; Acs, Audretsch and Feldman, 1992), when a university is able to enlist high-quality students it may become an important economic engine for its region (Griliches, 1992, 1997). As successful innovation depends on the ability of firms effectively to incorporate new ideas in their activities (Kline and Rosenberg, 1986; Freeman, 1987), which increases with social proximity to research and development centres (Boschma, 2005), high-quality students are also important vehicles of diffusion for the ideas that emerge from within the university (Park, 2004).

Given the positive economic effects of centres of excellence in teaching and research, public authorities encourage universities, through funding policy, to attract high-quality students (e.g., Greenaway and Haynes, 2003).

On the student side, it is important to be accepted by a high-quality university because the learning process encompasses informal diffusion of knowledge among students and between professors and students (Polanyi, 1966), and it is a signal to the labour market that the student is a high-quality person (Spence, 1973). Informal learning and signalling enlarge the probability that the student attains a highly-paid job (Weiss, 1995).

An implication of the globalisation phenomenon is that universities now expand their areas of student recruitment beyond borders and that students search for opportunities to study over a much broader territory. Due to this widening of the recruitment process, assessment methods used locally to distinguish universities become uninformative and it is crucial to apply methods that are objective and internationally valid. Thus, international aptitude and assessment tests such as the Graduate Record Examination (GRE) and the Graduate Management Aptitude Test (GMAT) have become global standards for comparing students' knowledge and competence.

On the university side, considering that there is a connection between their ability to create new ideas and regional development, the level of development of the region where a university is located informs us of its quality. However, universities' geographic areas of influence overlap and the quality of each university is not identically distributed across all fields of knowledge. Thus, it is necessary to investigate more directly, going beyond just inferring a university's quality from its location.

In economics, the diffusion of relevant new ideas is accomplished through the publication of articles in reputed journals where the affiliation and fields of knowledge of the articles' authors are made explicit. Due to this fact, since Fusfeld (1956) an extensive literature has developed on the ranking of economics departments by using published articles as a source of information (e.g., Grave et al., 1982; Scott and Mitias, 1996; Kalaitzidakis et al., 2003).

Although there is an abundance of published rankings, (e.g., Cribari-Neto et al., 1999, Barrett et al., 2000, Phillips and Kinnear, 2004) they do not, however, cover all sub-fields of economics, which would benefit

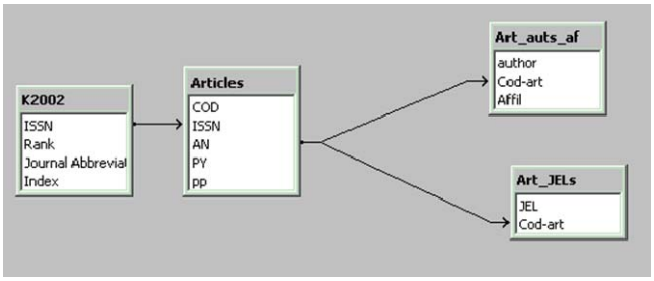
prospective post-graduate students who are usually interested in deepening their studies in a particular sub-field.

We intend to construct a university ranking in Macroeconomics and International Finance including all articles referenced in the EconLit database over the 10 years period between the beginning of 1996 and the end of 2005. Then, by measuring the correlation between specific and generic rankings, we examine the correlations between the sub-fields rankings and Economics rankings. Second, we intend to construct a list of top authors. Finally, by computing author mobility, we intend to evaluate whether high productive authors are created in, or hunted by, high-prestige universities.

2. Methodology

We use data covering the period 1996-2005, which is extracted from Econlit, using the American Economic Association ECJR0012 and ECJR0014 CD-ROMs. The articles considered are limited to those published in the journals ranked in Kalaitzidakis et al. (2003) with a quality index superior to one (76 journals). The final working database contains 64,003 articles. The data was stored in a Microsoft Access database (see Figure 1). Authors' affiliations other than universities and colleges (e.g., research institutions such as the NBER or the CEPR) have been removed from our database. Very few authors declare affiliation to more than one university or college.

Figure 1: Structure of the database



Although articles include methodological Journal of Economic Literature (JEL) codes that are irrelevant to the identification of the article sub-field, we conjecture that a more specialised article will have less JEL codes. After having excluded from our database the pre-1991 descriptor codes since they duplicate the corresponding current JEL codes, on average there are 2.56 JEL codes per article.

We use as a quality-adjustment factor the Kalaitzidakis et al. (2003, Table 1, column 5) index that reduces the number of pages of an article to quality-equivalent American Economic Review (AER) pages. We employ a log transformation of this index due to the fact that Kalaitzidakis et al. (2003) ranking is extremely steep, Vieira (2008) .[1]

In mathematical form, for each article i authored by author j, the score of j is calculated by dividing the logarithm of the journals' quality index, ln(Wi), by the number of authors, Bi, raised to the power of 0.76. This exponent indicates that an article's quality density increases with the number of co-authors, which has been estimated by Vieira (2008). The article contribution is then weighted by the ratio of the number of sub-field JEL codes, NJi, and the total number of JEL codes, TJi, and multiplied by an indicator variable, ji, which is set to one when j is an author of an article in the database and is zero otherwise. Finally, the author score, Aj, is computed by adding the contribution over all articles, normalised to the AER index logarithm, ln(100):

$$A_j = \frac{1}{\ln(100)} \sum_{i=1}^{N} \frac{\ln(W_i)}{B_i^{0.76}} \frac{NJ_i}{TJ_i} \delta_{ji} \qquad (1)$$

The score of institution k, Sk, is computed by adding the scores of all authors who reference refer it as an affiliation in their last published article over the ten-year period 1996-2005:

$$S_k = \sum_{j=1}^{M} A_j \gamma_{kj} \qquad (2)$$

—where γ_{kj} is set to one when k is the last affiliation of j and is zero otherwise, and M is the number of authors. This score approximates the institutions' number of published articles equivalent to those of an AER article.

We assume, as usual, that the Macroeconomics JEL codes are D9, E0-E6, F3-F4, H5-H6, H72, H74, H8 or O4, and that International Finance JEL codes are F30-F36, F39 or F41 - F42.

We also compute raw numbers, R_j, that sum the number of articles weighted by the number of authors, B_i, the ratio of the number of sub-field JEL codes, NJ_i, and the total number of JEL codes, TJ_i.

$$R_j = \sum_{i=1}^{N} \frac{1}{B_i} \frac{NJ_i}{TJ_i} \qquad (3)$$

3. Results

In our database there are 64,003 articles with a Kalaitzidakis et al. (2003) index greater than 1, which corresponds to 22,815 AER-equivalent articles. Of these, 15.7% are in the Macroeconomics field and 2.7% in the International Finance sub-field.

Regarding universities and colleges, the top fifteen accounts for some 20% of the International Finance

[1] Comparing the 100 top listed authors ranked with and without a logarithmic transformation, we obtain a Spearman correlation coefficient of 0.82.

overall output and top one-hundred universities and colleges accounts for approximately two thirds of AER-equivalent pages in International Finance[2] (see Figure 2). See Table 3 top 150 institutions.

We then studied how sub-field rankings are correlated. We observe that the International Finance, Macroeconomics and overall Economics are correlated among the top 200 universities ranked by AER-equivalent publications in overall Economics (Table 1).

Table 1: Rankings Correlations Among Top 200 Economics Universities or Colleges

	Pearson			Spearman		
	IntFin	Macro	Econ	IntFin	Macro	Econ
IntFin	1.000			1.000		
Macro	0.838*	1.000		0.858*	1.000	
Econ	0.573*	0.807*	1.000	0.571*	0.655*	1.000
*- significantly different from zero at the 0.1% level						

A small and statistically insignificant correlation coefficient informs us of universities' high level of specialisation, i.e., that general rankings are inadequate when the choice of one university for a sub-field of specialisation is on the agenda. On the other hand, correlation coefficients between the general Economics rankings and the International Finance or Macroeconomics rankings are in each case strongly significantly positive (p-value ≈ 0) at the university level. Nevertheless, the correlation coefficients are not close to one, indicating that sub-field rankings add some information to the general ranking.

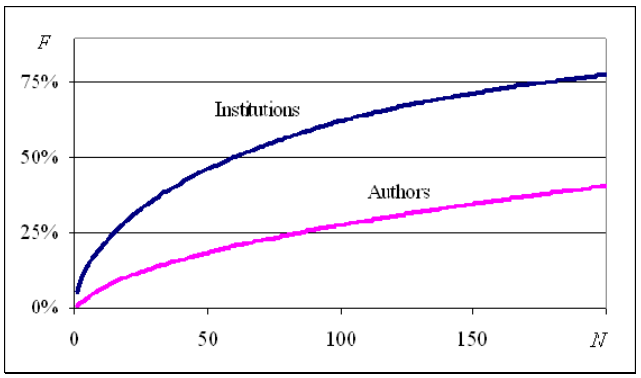
Regarding authors, the top 100 authors in International Finance over the period 1996-2005, it is interesting to note that the top 35 authors in International Finance over the period 1996-2005 accounts for some 15% of published AER-equivalent output and the top 100 authors altogether contribute approximately to 30% of quality-adjusted published papers in International Finance (Figure 2).

We then studied correlation among the top 100 authors ranked by AER-equivalent publications in overall Economics (Table 2)

On average, correlation between Quality-adjusted output and Raw number of articles is 96% for universities (Table 1) and 87% for authors (Table 2).

[2] These two thirds include fifteen institutions that are not universities. For example, the International Monetary Fund alone contributes 5.6% of published papers in International Finance in our database.

Figure 2: Empirical distribution for International Finance output



N =number of institutions or authors; F = cumulated frequency

Table 2: Rankings Correlations Among Top 200 authors

	Pearson			Spearman		
	IntFin	Macro	Econ	IntFin	Macro	Econ
IntFin	1.000			1.000		
Macro	0.672*	1.000		0.780*	1.000	
Econ	0.412*	0.611*	1.000	0.411*	0.555*	1.000
*- significantly different from zero at the 0.1% level						

Regarding authors' mobility during the period under analysis, 18.5% of the 200 International Finance top authors changed their affiliation. Although our research seems to suggest that author mobility tends to be downwards on the university ranking, the differences are not in fact statistically significant. Authors' downward movement would indicate that top-ranking universities "capture" outstanding young students as their future high-prestige professors and that mistake occurs.

References

Acs, Z., D. Audretsch, and M. Feldman (1992), "Real effects of academic research: Comment", *American Economic Review* 82, 363-367.

Barrett, C.B., A. Olia and D. Von Bailey (2000), "Subdiscipline-Specific Journal Rankings: Whither Applied Economics?", *Applied Economics* 32, 239-252.

Boschma, R. (2005), "Proximity and Innovation: A Critical Assessment", *Regional Studies* 39, pp. 61-74.

Boskin, M. J. and L. J. Lau (2000), Generalized Solow-Neutral Technical Progress and Postwar Economic Growth, NBER Working Papers 8023.

Cribari-Neto, F., M. Jensen and A. Novo (1999), "Research in Econometric Theory: Quantitative and Qualitative Productivity Rankings", *Econometric Theory* 15, 719-52.

Freeman, C. (1987), *Technology Policy and Economic Performance: Lessons from Japan*, Pinter: London.

Fusfeld, D.R. (1956), "The Program of the American Economic Association Meetings", *American Economic Review* 46, 642-44.

Grave, P.E., J.R. Marchang and T. Randall (1982), "Economics departmental rankings: Research incentives, constraints, and efficiency", *American Economic Review* 72, 1131–1141.

Greenaway, D. and M. Haynes (2003), "Funding Higher Education", *Economic Journal* 113, 150-F116.

Griliches, Z. (1992), "The Search for R&D Spillovers", *Scandinavian Journal of Economics* 94, S29-47.

Griliches, Z. (1997), "Education, Human Capital, and Growth: A Personal Perspective", *Journal of Labor Economics* 15, S330-44.

Jaffe, A. (1989), "Real effects of academic research", *American Economic Review* 79, 957–970.

Kalaitzidakis, P., T.P. Mamuneas and T. Stengos (2003), "Rankings of Academic Journals and Institutions in Economics", *Journal of the European Economic Association* 1, 1346-1366.

Kline, S.J., and N. Rosenberg (1986), "An Overview of Innovation" in *The Positive Sum Strategy: Harnessing Technology for Economic Growth* by R. Landau, and N. Rosenberg (ed.). Academy Press: Washington DC, pp. 275-304

Park, J. (2004), "International student flows and R&D spillovers", *Economics Letters* 82, 315-320.

Phillips, R.J. and D. Kinnear (2004), "The Twentieth Century Trend of Institutionalism in Mainstream Economics", in *Research in the History of Economic Thought and Methodology* by W Samuels and J E. Biddle (ed.),Elsevier: Amsterdam, 283-300.

Polanyi, M. (1966), *The Tacit Dimension*, Doubleday: New York.

Romer, P.M. (1990), "Endogenous Technological Change", *Journal of Political Economy* 98, S71–S102.

Scott, L. and P. Mitias (1996), "Trends in Rankings of Economics Departments in the US: An Update", *Economic Inquiry* 34, 378-400

Spence, A.M. (1973), "Job market signalling". *Quarterly Journal of Economics* 87, 355–374.

Vieira, P.C.C. (2008), "A economic journals' ranking that takes into account the number of pages and co-authors", *Applied Economics* 40, 853-861.

Weiss, A. (1995), "Human Capital vs. Signalling Explanations of Wages", *Journal of Economic Perspectives* 9, 133-154.

Table 3: Top 150 Economics Institutions

Rank	Affiliation	AEReq	Raw
1	Harvard U	734,7	509,2
2	U CA, Berkeley	499,2	342,9
3	MIT	449,8	336,9
4	World Bank	445,4	199,6
5	Stanford U	440,7	299,0
6	LSE	400,0	239,0
7	U Chicago	394,9	305,9
8	U Pennsylvania	370,3	266,6
9	IMF	345,5	174,1
10	New York U	342,9	245,1
11	Northwestern U	331,4	252,3
12	Columbia U	315,4	198,9
13	Cornell U	285,4	172,5
14	Yale U	271,4	188,8
15	U California, LA	270,8	185,3
16	Princeton U	270,3	220,1
17	U Maryland	261,4	153,8
18	U Michigan	255,3	167,3
19	U Wisconsin–Madison	254,7	169,4
20	U Warwick	232,3	132,7
21	Federal Reserve System	231,3	150,8
22	U California, Davis	227,3	127,9
23	Ohio State U	222,0	146,7
24	U Toronto	217,1	130,0
25	U Illinois	212,1	123,0
26	Duke U	206,2	135,9
27	Michigan State U	202,8	119,1
28	Texas A&M U	199,0	111,3
29	U Minnesota	192,5	126,0
30	U British Columbia	189,9	106,6
31	U California, San Diego	188,5	134,7
32	Australian National U	179,0	75,9
33	Iowa State U	173,1	91,1
34	U Nottingham	173,0	74,5
35	Dartmouth College	151,0	91,5
36	U Melbourne	145,8	61,4
37	Purdue U	144,7	75,8
38	U Toulouse	144,0	100,3
39	U Oxford	143,8	66,3
40	Pennsylvania State U	142,1	94,1
41	U Rochester	140,1	96,0
42	U Amsterdam	140,1	81,2
43	Tilburg U	138,4	80,9
44	U College London	137,1	97,7
45	Indiana U	134,2	91,1
46	Rutgers U	134,2	73,2
47	U Southern California	133,2	76,8
48	U Cambridge	130,0	51,9
49	U Texas	128,9	85,4
50	Brown U	128,5	89,0
51	U York	126,9	71,1
52	Hebrew U Jerusalem	126,2	79,0
53	U California, Irvine	125,5	66,5
54	Carnegie Mellon U	124,8	88,0

Rank	Affiliation	AEReq	Raw
55	Vanderbilt U	124,7	70,8
56	Syracuse U	118,3	64,9
57	U North Carolina	117,5	71,9
58	U Essex	117,0	69,1
59	U Virginia	115,0	75,1
60	U Arizona	111,3	65,0
61	U Pittsburgh	110,3	66,1
62	Stockholm School of Econ	109,3	62,7
63	Georgetown U	109,3	67,2
64	Chinese U Hong Kong	109,1	53,0
65	Boston U	104,2	78,1
66	U Vienna	104,0	56,1
67	Free U Amsterdam	103,2	56,5
68	U Washington	101,0	58,2
69	U Georgia	100,4	43,4
70	U Kentucky	99,2	50,4
71	Boston College	99,1	61,1
72	Johns Hopkins U	99,0	64,1
73	Tel Aviv U	97,5	64,7
74	Catholic U Louvain	96,9	58,7
75	Arizona State U	93,7	62,9
76	U Florida	93,2	47,5
77	U California, Santa Barbara	92,7	54,5
78	North Carolina State U	92,0	49,0
79	U Copenhagen	91,8	56,2
80	U Southampton	91,6	49,9
81	U Carlos III de Madrid	91,2	59,7
82	Monash U	90,7	36,5
83	U Montreal	90,5	63,0
84	Simon Fraser U	90,0	50,4
85	U Manchester	89,9	32,2
86	Erasmus U Rotterdam	88,5	46,1
87	U Bonn	88,2	50,6
88	California Institute of Tech	87,0	64,6
89	U Colorado	86,8	43,4
90	Georgia State U	86,5	41,8
91	George Washington U	85,5	41,8
92	Oregon State U	84,1	39,9
93	National U Singapore	83,8	38,6
94	F R Bank of New York	81,8	51,3
95	U Zurich	81,7	48,0
96	U Alberta	81,1	41,6
97	U Mannheim	79,8	40,8
98	U Western Ontario	77,2	46,0
99	Hong Kong U ST	76,8	46,4
100	U Connecticut	76,0	30,3
101	U Notre Dame	74,9	38,5
102	George Mason U	74,0	28,9
103	Virginia State U	73,4	39,3

Rank	Affiliation	AEReq	Raw
104	U Pompeu Fabra	72,9	50,0
105	Catholic U Leuven	72,5	34,9
106	U Birmingham	71,0	39,6
107	U Missouri	70,7	33,8
108	McMaster U	70,5	37,6
109	U Bologna	70,2	32,4
110	U Wyoming	70,0	34,8
111	U Iowa	69,7	47,8
112	York U	68,7	38,9
113	U Oslo	68,2	37,6
114	McGill U	67,8	33,9
115	Southern Methodist U	67,6	36,3
116	Florida State U	66,5	28,4
117	U Houston	66,5	35,9
118	U Hong Kong	66,1	33,7
119	U Valencia	64,8	27,8
120	Emory U	64,3	32,9
121	U Ilinois, Chicago	63,8	24,8
122	U Oregon	63,4	39,1
123	Carleton U	63,2	30,0
124	U Munich	63,0	32,2
125	U Paris I	62,4	35,2
126	U Glasgow	62,3	23,3
127	Tufts U	62,2	31,7
128	U Groningen	61,9	24,7
129	USDA	61,9	26,0
130	Uppsala U	61,5	33,9
131	U Alabama	61,5	30,7
132	U London	61,3	20,5
133	U Queensland	61,3	22,9
134	U Calgary	61,0	25,7
135	Auburn U	60,0	23,8
136	U California, Santa Cruz	59,3	31,7
137	U New South Wales	59,0	24,8
138	European U Institute	58,5	40,7
139	Bilkent U	58,3	25,3
140	U Durham	58,3	17,1
141	U Sussex	58,0	17,9
142	Kansas State U	57,8	27,3
143	U Alicante	57,2	32,4
144	U New S Wales	56,8	27,6
145	U Tokyo	56,7	32,5
146	Osaka U	56,0	28,6
147	Rice U	55,9	40,1
148	Washington U, St Louis	55,3	33,2
149	U Leicester	55,3	31,2
150	U Aarhus	55,0	29,8