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The efficiency of economics departments reconsidered

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Abstract

Employing data envelopment analysis and the free disposal hull approach, we evaluate the efficiency of 206 economics departments around the world. We use one input, full-time equivalents, and ten outputs which were both downloaded from RePEc website. By averaging over 1023 efficiency scores, obtained from all possible input-output combinations, we rank the economics departments. Furthermore, we provide some evidence that efficiency is not well correlated with reputation which is measured by the institutional ranking in RePEc.

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1 Introduction

There is a large literature that examines the efficiency of (higher) education institutions, see Worthington (2001) for a survey. The most often used approach within the frontier efficiency measurement is the data envelopment analysis (DEA) and variations thereof. With respect to economics departments there are only a few studies investigating their productivity or efficiency. Johnes and Johnes (1992, 1993, 1995) conduct a DEA for 36 British economics departments. Conroy, Dusansky, and Kildegaard (1995), Cherchye and Abeele (2005) and Perianes-Rodríguez and Ruiz-Castillo (2014) use other input-output measures not belonging to frontier efficiency class. Macri and Sinha (2006) provide an overview of international rankings, which are partly based on productivity considerations.

This paper provides the most comprehensive efficiency analysis of economics departments around the world so far. We use data for 206 economics departments from Research Papers in Economics (RePEc). As the only input variable we have full-time equivalents for authors affiliated with the respective department. Furthermore we have ten output variables, which represent both quantity (or scientific output as published work) and quality (or scientific impact as number of citations) bibliometric information. Efficiency scores are calculated using the standard and popular data envelopment analysis (DEA). Furthermore, we report results for the lesser employed free disposal hull approach (FDH). Many previous studies on efficiency of higher education institutions are driven by the availability of input and output indicators. Furthermore, they often only provide one score, which is calculated using all inputs and outputs simultaneously. We circumvent or reduce the problem of a potential omitted variable or selection bias by considering all 1023 input-output combinations for each department. Based on this we obtain an average efficiency score. Furthermore, the RePEc data is by construction less prone to measurement error, which is a serious problem in non-parametric frontier efficiency analysis. The idea to use various combinations of given inputs and outputs goes back to Johnes and Johnes (1993). Instead of investigating variation across efficiency scores we take them as given to calculate an average efficiency measure.

2 Data and empirical approach

Our data is taken from the RePEc website and refers to February 2015. We consider one input: author shares, according to the share the authors set by themselves in RePEc.[1] In case of no self-setting, RePEc calculates a share based on the affiliated members of the listed institutions, see Zimmermann (2013) for details.

Based on the information of bibliometric items and registered authors, RePEc provides more than 30 rankings, which could potentially serve as output indicators. However, Seiler and Wohlrabe (2012) or Zimmermann (2013) show that there is a high correlation between some of them, indicating a high degree of similarity. For this reason we have chosen ten output indicators which consider the arguments from the literature and represent from our point of view the bibliometric impact of a faculty. The outputs are given by: distinct number of works (overall and weighted by simple and by recursive impact factor), citations (overall and weighted by simple and by recursive impact factor), number of citing authors who are

[1] If author A identifies himself with 50% as an affiliate of institution A and with 50% of institution B, then both institutions will increase their input by 0.5.

registered with RePEc and the number of journal pages (overall and weighted by simple and by recursive impact factor). The latter one represents publications in economics journals. For details for each ranking see Zimmermann (2013).

The nature of the data refers to the stock approach, i.e. a publication is assigned to the current affiliation of a researcher (only a share in case of multiple affiliations). In contrast to this, one could adopt the flow approach where work is credited to the institution that the author was affiliated with at the time of publication. Although the flow approach is preferable to the stock one, it cannot be realized with the RePEc data.

Given the input and output indicators, we downloaded the corresponding publicly available rankings from the RePEc website. In these rankings only the top 5% institutions are shown. We selected all faculties that were listed in all ten rankings. We excluded all economic research institutions (e.g. Ifo institute), central banks and networks (e.g. NBER). To make the results comparable across units, we only include economics departments. Some are sub-identities of larger organizations. Finally, we end up with 206 institutions. We standardize the data by dividing each indicator by its mean.

The RePEc data is homogenous and consistent across faculties for two reasons. First, authors can give weights to their affiliations (if they have more than one). This eliminates any arbitrary weighting that would have to be applied if an outsider performed this task. This way, we have full-time equivalents for each faculty. Second, RePEc allows for authors to manage their publication and citation list. Thus, the result is a consistent data set which even enables international comparisons. Furthermore, it reduces the measurement error, which is a critical point in the non-parametric efficiency analysis.

In order to obtain efficiency scores for each institution we non-parametrically estimate an educational production frontier. We employ the standard data envelopment analysis introduced by Charnes, Cooper, and Rhodes (1978). We opt for the input efficiency measures and assume constant returns to scale. See Cooper, Seiford, and Zhu (2004) for a comprehensive discussion of DEA. The most serious disadvantage is that the DEA is extremely vulnerable to outliers and measurement error. Therefore, we additionally employ the free disposal hull approach (FDH) which is a little bit less prone to outliers. The FDH approach was introduced by Deprins, Simar, and Tulkens (1984). Both DEA and FDH are non-stochastic methods in that they assume all deviations from the frontier are the result of inefficiency. See Tauchmann (2012) for an illustrative example of both approaches.

3 Results

Given one input and ten outputs we conduct both the DEA and FDH for each input-output combination. We start with one input and one output and increase the latter up to ten. This gives us 1023 efficiency scores for both approaches. In Table 1 we show the results for the top 100 departments.[2] The results are sorted by the best average DEA score. In addition to the average, we report the best and the worst score. An efficiency score of 1.00 indicates that a department is efficient. With the FDH approach potentially more institutions are located on the educational production frontier. As a consequence, all institutions are closer to this line. We find this in our example as all average FDH efficiency scores are higher compared to their DEA counterparts. The correlation between the DEA and the FDH average scores is with 0.95

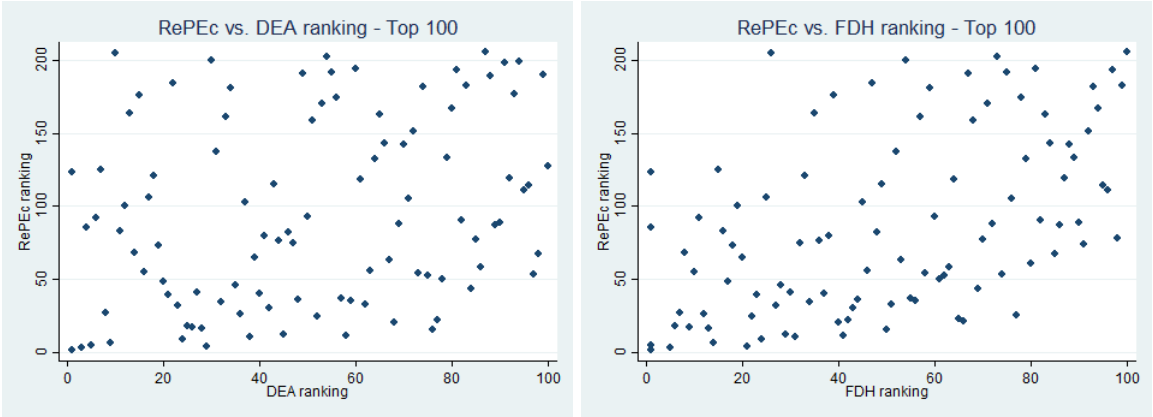
[2]The full list of 206 departments can be found in Friedrich and Wohlrabe (2016).

(Spearman rank correlation: 0.97) quite high. Thus, the findings do not change substantially if we employ a different approach to measure efficiency. Generally, the overall results are very similar.

With respect to average DEA scores, the *Economics Department of Harvard* and the *Tepper School of Business Administration at the Carnegie Mellon University* are the most efficient institutions in our sample. For all input-output-combinations, both exhibit no inefficiencies as all scores are equal to one.[3] Whereas the strength of Harvard is its high output values, the strength of the Tepper School of Business is its small inputs in terms of staff. The first nine departments are located in the U.S. followed by two faculties from Israel. In the top 20 there are only four non–U.S. economics departments.

In contrast to someone's expectation, the efficiency ranking in Table 1 reveals that the top-ranked departments in terms of reputation are not necessarily top-ranked with respect to efficiency. For instance, the department from Chicago is ranked 24th in the DEA ranking, whereas it was ranked 10th in February 2015 in RePEc or 2nd in the ranking provided by Coupé (2003). To support this point we add the average ranking position based on the rankings from our ten outputs using the harmonic mean in Table 1 (last column).[4] In Figure 1 we show a scatter plot of the RePEc and the DEA/FDH ranking for the top 100 listed in Table 1. It is obvious that the relationship is quite weak especially for the DEA. The corresponding Spearman rank correlations are given by 0.29 for the DEA and 0.63 for FDH. The correlations are even lower if we consider our full sample of 206 departments: 0.11 and 0.29, respectively.[5] Thus, efficiency is not well correlated with reputation proxied by the RePEc ranking.

Figure 1: Ranking comparison between RePEc and the efficiency approaches



[3]This argument is only valid with the chosen sample, i.e. an overall efficiency statement could only be made if *all* economics departments could be included in the analysis.

[4]This resembles the ranking aggregation approach in RePEc. See Zimmermann (2013) for details.

[5]The conclusions are similar if we use the world-wide ranking results from RePEc in February 2017 based on 31 rankings.

4 Discussion

A special characteristic of research evaluation is the emergence of university, or as in our case economics departments, rankings. Here, metrics are used to rank the universities in a country or worldwide. There are some obvious advantages of such rankings. For example, they offer a quick, simple and easy way of comparing universities (worldwide). The most interested groups in the rankings are students, the public and governments. However, a lot of critique has been published in recent years which has focused on the methods and arbitrary weightings used to combine different metrics. Seiler and Wohlrabe (2012) provide a critique of the RePEc rankings used in this paper. Daraio, Bonaccorsi, and Simar (2015) mention four points which summarize the main criticisms at rankings: mono-dimensionality, statistical robustness, dependence on university size and subject mix, and lack of consideration of the input-output structure. In this note, we pick up this last point and set a possible approach of input-output consideration in institutional evaluation to discuss (in scientometrics). We investigated the efficiency of 206 economics departments from all over the world. With data from RePEc, we calculated 1023 different efficiency scores using the DEA and FDH approach based on one input and ten output indicators. Both techniques yield similar results.

Additionally, we show that efficiency is not always a good predictor of reputation measured by rankings and vice versa. So what is the value-added if we know that one department is more efficient than another? First, we propose to use such efficiency analysis as an additional tool for signalling scientific achievement. Decisions on grants are often influenced by the relative position in rankings. Since the positions in such rankings are dependent on certain context factors (see Bornmann, Stefaner, de Moya Anegón, and Mutz (2014); Safón (2013)), rankings should not only offer information on the output, but also the relation of input and output. Furthermore, many rankings, as RePEc, are driven by the pure size of a department. More professors mean more output and (potentially) more citations. Our results indicate that efficiency analysis should complement traditional rankings approaches.[6]

What are the limitations of the current study? Although we tried to realize an advanced design of efficiency analysis, the study is concerned by several limitations which might be considered in future studies.

A critical aspect of our data set is the fact that RePEc only reports the data for authors who registered with RePEc and the work is only assigned to an institution if the author set it as his affiliation. Even if the author shares reported on RePEc are only a part of the actual author shares for an institution, the outputs are also only reported for the registered authors. Maybe a bias can arise if only the 'productive' authors register.

A second limitation is closely related to the first point. The registration of departments in RePEc is voluntary. There might be a self-selection process at work. However, we consider this problem as rather small. As of January 2017 more than 13,000 economic institutions are registered in RePEc. Although these are not all economics departments (it also includes research institutes, central banks or international organization), at least all top departments in Coupé (2003) are listed in RePEc.

A more severe problem arises from the data availability. Our data set comprises only 206 economics departments. For these we have data for all output variables. RePEc publishes only the top 5% departments for each ranking. The scores for the other ones are not publicly

[6] Another approach to ranking educational institutions is via peer review.

available. The inclusion of missing observations will affect the efficiency scores of the already included units if and only if they lie on the new estimated efficiency frontier. In any case they influence the efficiency ranking. This aspect is a general problem of efficiency approaches like the DEA and the FDH: the results crucially depend on the used data set. Furthermore, they can be prone to measurement error or outliers. A potential solution is the use of partial frontier analysis which allows for super-efficient units with scores larger than one. See Bonaccorsi, Daraio, and Simar (2006) and references cited therein.

The final problem relates to the issue of measurement error. As we have already lined out, the DEA and FDH are quite sensitive to this issue. With respect to our data set we identify one major cause of measurement error: missing bibliometric information in the RePEc database. This relates especially to citations. With respect to missing oberservation, Seiler and Wohlrabe (2012) documents that all major and (un)important journals are listed in RePEc. Therefore, we do not expect a large error arising from this aspect. But the more serious issue is that the citation database is incomplete for two reasons. First, due to gated access to journal articles it is not possible to extract citations from all journal articles. Second, even there is access there are problems with matching of existing references (see Seiler and Wohlrabe (2012)). Citations affect eight out of our ten rankings. So our data is clearly mismeasured. But does it also affects the results and the interpretation? In case that all departments are affected to the same extent (proportionally), the results wouldn't change. If one department suffers more from missing citations, our reported results can be considered as a lower bound of the true efficiency.

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Table 1: Rankings and efficiency scores based on DEA and FDH for the top 100 economics departments

	DEA				FDH				
		Efficiency Scores				Efficiency Scores			
Department	Rank	Average	Min	Max	Rank	Average	Min	Max	RePEc
Dept of Economics, Harvard University	1	1.00	1.00	1.00	1	1.00	1.00	1.00	1
Dept of Economics, Tepper Sch. of Business Administration, Carnegie Mellon University	1	1.00	1.00	1.00	1	1.00	1.00	1.00	123
Economics Dept, Massachusetts Institute of Technology (MIT)	3	0.96	0.85	1.00	5	1.00	1.00	1.00	3
Sch. of International and Public Affairs (SIPA), Columbia University	4	0.95	0.86	1.00	1	1.00	1.00	1.00	85
Dept of Economics, Princeton University	5	0.93	0.83	1.00	1	1.00	1.00	1.00	5
Dept of Economics, Johns Hopkins University	6	0.91	0.87	0.95	11	0.99	0.91	1.00	92
Warrington College of Business, University of Florida	7	0.89	0.89	1.00	15	0.93	0.89	1.00	125
Finance and Economics Dept, Graduate Sch. of Business, Columbia University	8	0.89	0.76	0.95	7	1.00	0.79	1.00	27
Dept of Economics, University of California-Berkeley	9	0.87	0.78	1.00	14	0.94	0.93	1.00	6
Dept of Economics, Bar Ilan University	10	0.82	0.82	0.83	26	0.82	0.82	0.93	205
Eitan Berglas Sch. of Economics, Tel Aviv University	11	0.82	0.75	0.89	16	0.92	0.80	1.00	83
Tepper Sch. of Business Administration, Carnegie Mellon University	12	0.81	0.79	0.82	19	0.91	0.84	0.93	100
Dept of Economics, Maxwell Sch., Syracuse University	13	0.76	0.76	0.80	35	0.76	0.76	0.93	164
Innocenzo Gasparini Institute for Economic Research (IGIER), Universita Commerciale Luigi Bocconi	14	0.76	0.70	0.83	8	1.00	0.75	1.00	68
Dept of Economics, Tufts University	15	0.73	0.73	0.74	39	0.73	0.73	0.90	176
Dept of Economics, University of Minnesota	16	0.72	0.61	0.75	10	0.99	0.66	0.99	55
Dept of Economics, University of Washington	17	0.71	0.68	0.81	25	0.82	0.68	1.00	106
Dept of Agricultural and Resource Economics, University of California-Berkeley	18	0.70	0.68	1.00	33	0.77	0.68	1.00	121
Sch. of Management, Yale University	19	0.69	0.64	0.74	18	0.92	0.65	1.00	73
Institut dEconomie Industrielle (IDEI), Toulouse Sch. of Economics (TSE)	20	0.69	0.61	0.89	17	0.92	0.81	1.00	48
Anderson Graduate Sch. of Management, University of California-Los Angeles (UCLA)	21	0.69	0.60	0.82	23	0.84	0.67	1.00	39
Institut dAnalisi Economica CSIC (IAE-CSIC), Barcelona Graduate Sch. of Economics (Barcelona GSE)	22	0.68	0.68	0.68	47	0.68	0.68	0.68	184
Economics Dept, Dartmouth College	23	0.68	0.58	0.71	27	0.81	0.65	1.00	32
Dept of Economics, University of Chicago	24	0.67	0.54	0.73	24	0.83	0.83	0.83	9
Graduate Sch. of Business, Columbia University	25	0.66	0.56	0.72	6	1.00	0.96	1.00	18
Economics Dept, Yale University	26	0.65	0.56	0.76	9	0.99	0.66	1.00	17
Economics Dept, University of Wisconsin-Madison	27	0.64	0.57	0.68	30	0.80	0.64	1.00	41
Kennedy Sch. of Government, Harvard University	28	0.64	0.54	0.75	13	0.97	0.63	0.97	16
Booth Sch. of Business, University of Chicago	29	0.64	0.44	0.71	21	0.85	0.66	1.00	4

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Table 1 – *cont. from previous page.*

Department	DEA Efficiency Scores Rank	Average	Min	Max	FDH Efficiency Scores Rank	Average	Min	Max	RePEc
Dept of Geography and Environment, London Sch. of Economics (LSE)	30	0.64	0.64	0.65	54	0.64	0.64	0.72	200
Said Business Sch., Oxford University	31	0.64	0.64	0.69	52	0.65	0.64	0.78	137
Graduate Sch. of Business, Stanford University	32	0.63	0.50	0.68	34	0.76	0.51	0.76	34
Economic Science Institute (ESI), Argyros Sch. of Business and Economics, Chapman University	33	0.63	0.63	0.65	57	0.63	0.63	0.77	161
Economics Dept, University of Missouri	34	0.62	0.62	0.62	59	0.62	0.62	0.62	181
Dept of Economics, Cornell University	35	0.62	0.54	0.78	28	0.81	0.71	1.00	46
Dept of Economics, University of Pennsylvania	36	0.61	0.56	0.70	12	0.97	0.68	1.02	26
Dept of Economics, Hebrew University of Jerusalem	37	0.61	0.58	0.70	45	0.70	0.58	1.00	103
Dept of Economics, New York University (NYU)	38	0.61	0.53	0.67	31	0.80	0.80	0.80	10
Economics Dept, Stern Sch. of Business, New York University (NYU)	39	0.61	0.54	0.70	20	0.88	0.54	0.89	65
Sloan Sch. of Management, Massachusetts Institute of Technology (MIT)	40	0.60	0.50	0.65	37	0.74	0.59	0.74	40
Centre for Economic Performance (CEP), London Sch. of Economics (LSE)	41	0.59	0.53	0.69	38	0.74	0.62	0.93	80
Dept of Economics, Northwestern University	42	0.59	0.47	0.63	43	0.71	0.55	1.00	30
Economics Dept, University of California-Santa Cruz (UCSC)	43	0.59	0.57	0.71	49	0.68	0.57	0.83	115
Dept of Economics, University of Southern California	44	0.59	0.52	0.66	36	0.76	0.61	0.92	76
Dept of Economics, Sch. of Arts and Sciences, Columbia University	45	0.59	0.52	0.67	29	0.81	0.81	0.81	12
Dept of Economics, Washington University in St. Louis	46	0.58	0.54	0.65	48	0.68	0.61	0.92	82
Dept of Economics, University of California-Santa Barbara (UCSB)	47	0.58	0.53	0.62	32	0.78	0.59	0.89	75
Harvard Business Sch., Harvard University	48	0.58	0.47	0.61	44	0.71	0.56	0.71	36
Dept of Economics, University of California-Riverside	49	0.57	0.57	0.59	67	0.57	0.57	0.69	191
Dept of Economics, Pennsylvania State University	50	0.56	0.51	0.61	60	0.62	0.61	0.92	93
John E. Walker Dept of Economics, Clemson University	51	0.55	0.55	0.63	68	0.56	0.55	0.68	159
Walter A. Haas Sch. of Business, University of California-Berkeley	52	0.54	0.44	0.66	22	0.85	0.60	0.92	24
Warwick Business Sch., University of Warwick	53	0.54	0.54	0.58	71	0.54	0.54	0.66	170
Sch. of Economics, University College Dublin	54	0.54	0.54	0.57	73	0.54	0.54	0.66	202
HEC Montreal (Ecole des Hautes Etudes Commerciales)	55	0.53	0.53	0.61	75	0.53	0.53	0.65	192
Dept of Agricultural and Resource Economics, University of Maryland	56	0.52	0.52	0.60	78	0.53	0.52	0.64	174
Dept of Economics, University of California-San Diego (UCSD)	57	0.52	0.44	0.58	55	0.64	0.50	0.64	37
Dept of Economics, Stanford University	58	0.52	0.47	0.56	41	0.72	0.71	0.72	11
Dept of Economics, University of California-Los Angeles (UCLA)	59	0.52	0.46	0.56	56	0.63	0.50	0.93	35
Dept Volkswirtschaftlehre, Universität Bern	60	0.51	0.51	0.54	81	0.51	0.51	0.63	194
Dept of Economics, Indiana University	61	0.51	0.50	0.60	64	0.59	0.50	0.73	118
Vancouver Sch. of Economics, University of British Columbia	62	0.51	0.42	0.73	51	0.65	0.64	0.98	33
Kellogg Graduate Sch. of Management, Northwestern University	63	0.50	0.45	0.53	46	0.69	0.46	0.69	56

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Table 1 – *cont. from previous page.*

Department	DEA Efficiency Scores				FDH Efficiency Scores				RePEc
	Rank	Average	Min	Max	Rank	Average	Min	Max	
Charles H. Dyson Sch. of Applied Economics and Management, Cornell University	64	0.50	0.49	0.78	79	0.52	0.49	1.00	132
Dept of Economics, McGill University	65	0.49	0.49	0.56	83	0.50	0.49	0.60	163
Faculty of Economics, University of Tokyo	66	0.49	0.49	0.59	84	0.49	0.49	0.60	143
Dept of Economics, Vanderbilt University	67	0.47	0.38	0.74	53	0.64	0.46	1.00	63
Dept of Economics, Boston University	68	0.47	0.43	0.53	40	0.73	0.73	0.74	20
Dept of Economics, University of California-Irvine	69	0.47	0.41	0.61	72	0.54	0.50	0.76	88
Argyros Sch. of Business and Economics, Chapman University	70	0.47	0.47	0.53	88	0.47	0.47	0.57	142
London Business Sch. (LBS)	71	0.46	0.43	0.50	76	0.53	0.43	0.54	105
Dept of Economics, University of Illinois at Urbana-Champaign	72	0.45	0.45	0.50	92	0.46	0.45	0.56	151
Dept of Economics, Duke University	73	0.45	0.39	0.51	58	0.62	0.48	0.62	54
Departament dEconomia i Historia Economica, Universitat Autonoma de Barcelona, Barcelona Graduate Sch. of Economics (Barcelona GSE)	74	0.45	0.45	0.49	93	0.45	0.45	0.55	182
Economics Dept, Georgetown University	75	0.45	0.39	0.55	62	0.61	0.49	0.61	52
Stern Sch. of Business, New York University (NYU)	76	0.45	0.37	0.50	50	0.66	0.65	0.66	15
Economics Dept, Brown University	77	0.45	0.39	0.49	42	0.71	0.47	0.72	22
Economics Dept, University of California-Davis	78	0.45	0.39	0.58	61	0.61	0.41	0.89	50
Dept of Economics, University of Colorado	79	0.45	0.44	0.51	89	0.47	0.44	0.65	133
Dept of Econometrics and Business Statistics, Monash Business Sch., Monash University	80	0.44	0.44	0.59	94	0.45	0.44	0.65	167
Economics Dept, George Mason University	81	0.44	0.44	0.55	97	0.44	0.44	0.64	193
Dept of Economics, Ohio State University	82	0.43	0.38	0.57	82	0.50	0.38	0.70	90
Sch. of Economics, Singapore Management University	83	0.43	0.43	0.44	99	0.43	0.43	0.53	183
Economics Dept, London Sch. of Economics (LSE)	84	0.43	0.38	0.47	69	0.55	0.44	0.55	43
Dept of Economics, Rutgers University-New Brunswick	85	0.43	0.36	0.56	70	0.54	0.44	0.67	77
Dept of Economics, University of Maryland	86	0.42	0.39	0.47	63	0.59	0.47	0.59	58
Collegio Carlo Alberto, Universita degli Studi di Torino	87	0.42	0.42	0.44	100	0.42	0.42	0.52	206
Business Sch., Imperial College	88	0.41	0.41	0.44	102	0.41	0.41	0.50	189
Dept of Economics, W.P. Carey Sch. of Business, Arizona State University	89	0.41	0.38	0.47	86	0.47	0.44	0.66	87
Dept of Economics, University of Virginia	90	0.41	0.37	0.48	90	0.46	0.44	0.66	89
Economics Dept, University of Strathclyde	91	0.41	0.41	0.47	103	0.41	0.41	0.50	198
Rotman Sch. of Management, University of Toronto	92	0.41	0.40	0.47	87	0.47	0.40	0.58	119
Nationalekonomiska institutionen, Stockholms Universitet	93	0.40	0.40	0.41	106	0.40	0.40	0.46	177
Dept of Economics, Florida State University	94	0.40	0.40	0.44	108	0.40	0.40	0.49	199
Dept of Economics, Sciences economiques, Sciences Po	95	0.38	0.37	0.44	96	0.44	0.37	0.45	111

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Table 1 – *cont. from previous page.*

Department	DEA Efficiency Scores Rank	Average	Min	Max	FDH Efficiency Scores Rank	Average	Min	Max	RePEc
Dept of Economics, University of Texas-Austin	96	0.38	0.37	0.41	95	0.44	0.37	0.45	114
Dept of Economics, Boston College	97	0.38	0.33	0.47	74	0.53	0.35	0.59	53
Center for Operations Research and Econometrics (CORE), Ecole des Sciences Economiques de Louvain, Universite Catholique de Louvain	98	0.38	0.32	0.75	85	0.48	0.32	0.91	67
Sch. of Economics, Finance and Management, University of Bristol	99	0.38	0.38	0.38	111	0.38	0.38	0.42	190
Cass Business Sch., City University	100	0.37	0.37	0.46	107	0.40	0.37	0.54	127

Notes: This table reports the average efficiency scores (plus its minimum and maximum) with the corresponding ranks both for the data envelopment analysis (DEA) and the free disposal hull (FDH) approach. The names refer to the official listing on the RePEc website. Abbreviations are added by the authors. *RePEc* refers to harmonic mean of the rankings from the ten outputs as of February 2015.