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Journal evaluation by environmental and resource economists: A survey

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Using an online survey, we have asked the researchers in the field of environmental and resource economics how they themselves would rank a representative list of journals in their field. The results of this ranking are then compared to the ordering based on the journals' impact factors as published by Thomson Scientific. The two sets of rankings seem to be positively correlated, but statistically the null hypothesis that the two rankings are uncorrelated cannot be rejected. This observation suggests that researchers interpret the current quality of journals based on other factors in addition to the impact factors.

Introduction

The quality of a journal can be assessed from different perspectives depending on the intended use of the evaluation exercise. Consequently journal quality has been evaluated in a variety of ways over the years. The most commonly known of these indicators is without a doubt the journal impact factor published by Thomson Scientific (also called ISI impact factor). This performance measure is based on averages, measuring the average number of citations to an article published during the previous two years. A journal's impact factor is often used by universities, institutions and research foundations to assess researchers, projects and proposals. An overview of the

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use and the design of impact factors can be found in MOED [2005]. The ISI impact factor has, for instance, been complemented by FRANDSEN & AL. [2006] with a series of diffusion factors in order to measure the influence across the literature of a particular journal title. Also, YUE & WILSON [2004] have developed an integrated conceptual model of journal evaluation to study the external factors affecting journal citation impact. KODRZYCKI & YU [2006] use a flexible, citation-adjusted and reference-intensity-adjusted ranking technique to evaluate economic journals using a wide range of alternative criteria. EGGHE & AL. [2007] and ROUSSEAU & AL. [FORTHCOMING] focus on yet another measure of performance and use TOP-curves to analyze the most influential – defined as the most cited – articles of a journal.

The previously discussed measures have in common that they are based on objective, output-related concepts, such as the volume and intensity of citations or the yearly number of published articles. However, we can wonder whether these citation-based rankings correspond with the perceptions the researchers themselves have about the quality of the journals. Researchers have after all specific preferences with respect to the journals they would like to publish in, the publications that should be taken into account when evaluating job candidates, what journals they regularly read and what journals are representative for their specific research field. For this reason, we have asked environmental and resource economists how they appreciate the journals in their field by means of a web-based survey. This research is motivated in part by intellectual curiosity: environmental and resource economists might be interested in knowing whether the journals they hold in high esteem are the same as or different from the ones that are habitually used in the evaluation of their research. In addition, the survey's results can be used to check to what extent subjective perceptions and more objective measures of journal quality coincide, which is useful to guide publication decisions and to help evaluate journals.

The field of environmental and resource economics is generally defined as the study of the different aspects of the interactions between environmental quality and the economic behavior of individuals, groups of people and firms (see, for example, [CALLAN & THOMAS, 2000; KOLSTAD, 2000; FIELD & FIELD, 2002; PERMAN & AL., 2003; TIETENBERG, 2003; CONRAD, 2006]). While natural resource economics focuses on the role of nature as a provider of raw materials and inputs, environmental economics examines the economy's residual flows and their impact on the natural world.

Even though the ranking we obtain from the online survey seems to be positively correlated with the one based on the ISI impact factors, tests show that the two rankings differ significantly. The results are also potentially biased, since European researchers are overrepresented in the sample. However, we show that their evaluation of the listed journals is statistically identical to that of the rest of world. More detailed analysis suggests that the valuation of some individual journals might be slightly different between continents.

Methods

A number of approaches to ranking journals have been applied, but broadly they can be divided between citation-based studies or perception-based analyses. The economics literature is rich with studies that use citation-based methods to rank journals (see, for example, [MOORE, 1972; LIEBOWITZ & PALMER, 1984; LABAND & SOPHOCLEUS, 1985; LABAND & PIETTE, 1994; LINER, 2002; KODRZYCKI & YU, 2006]). However, cases that use survey-based methodologies to study perceptions are in scarcer supply. For example, HAWKINS & AL. [1973] and AXARLOGLOU & THEOHARAKIS [2003] have examined the degree of scientific diversity in economics based on journal quality perceptions of economists. Also, BRINN & AL. [1996] and LOWE & LOCKE [2005] have evaluating accounting journals by asking researchers for their views on the journals' quality. As mentioned before, in this contribution we chose to perform a survey to examine the ranking based on perceptions for the field of environmental and resource economics.

The sample of researchers that received a questionnaire consists of the environmental and resource economists who presented a paper at the World Conference of Environmental and Resource Economists (WCERE) in Kyoto (Japan) in 2006. WCERE is organized every four years and is a combined effort of the American Association of Environmental and Resource Economists (AERE), the European Association of Environmental and Resource Economists (EAERE) and the Society for Environmental Economics and Policy Studies (SEEPS). Jointly these associations represent over 2500 members worldwide. Even though the Australian and Latin American associations (AARES and ALEAR) are not formally involved, this is still the largest gathering of environmental and resource economists in the world. Moreover, the majority of the conference presenters could be contacted by email: 527 out of 589 (i.e. 89 percent). We sent the emails on 8 and 13 August 2007. Since 22 mails were undeliverable, the total number of persons contacted equals 505.

The respondents were asked to indicate for eleven journals whether they consider the journal to belong to the top or subtop in the field of environmental and resource economics.[1] The list of journals, together with the abbreviations we use in the remainder of the paper and the journals' impact factors 2006, is presented in Table 1. The starting point of the list are the six journals that are categorized by Thomson Scientific under 'Economics' and 'Environmental Studies' simultaneously. The selection was then extended by the journals that explicitly have the term 'resource economics', 'ecological economics' or 'environmental economics' in their title and are covered by Thomson Scientific. Finally, the most influential journal in agricultural economics, i.e. the *American Journal of Agricultural Economics*, was added.

[1] We did not include an explicit definition of what constitutes a top or subtop journal and thus allow each expert to form his/her own opinion. This is standard practice in perception-based studies since these differences in opinion are exactly what the studies want to capture.

Table 1. List of journals

Journal	Abbreviation	Impact factor 2006
American Journal of Agricultural Economics	AJAE	1.196
Australian Journal of Agricultural and Resource Economics	AJARE	0.935
Ecological Economics	EE	1.223
Energy Journal	EJ	1.038
Environment and Development Economics	EDE	0.681
Environment and Resource Economics	ERE	0.862
Journal of Agricultural and Resource Economics	JARE	0.493
Journal of Environmental Economics and Management	JEEM	1.496
Land Economics	LAND	0.920
Natural Resources Journal	NRJ	0.403
Resource and Energy Economics	REE	1.051

Results

In this section we present the results of the survey. On 29 August, we had received 150 answers resulting in a response rate of 29.7 percent[2]. The responses are dominated by European researchers, as was to be expected from the distribution of all WCERE presenters over continents (see Table 2). In a later section, we compare the answers of Europeans with the rest of the world in order to check for a possible bias. The rankings differ slightly but are statistically indistinguishable.

Table 2. Distribution of respondents over continents

	Respondents	(%)	All presenters WCERE	(%)
Africa	4	3	12	2
Asia	25	17	142	24
Australia	2	1	14	2
Europe	77	51	268	46
North America	38	25	139	24
South America	4	3	14	2
Total	150	100	589	100

Next we order the eleven journals with respect to the percentage of researchers who consider the journal to be a 'top' journal in the field of environmental and resource economics. In case of a tie, the number of respondents that viewed the journal as a 'subtop' journal was used as a decision criterion. The results are presented in Figure 1 and Table 3. The *Journal of Environmental Economics and Management* (JEEM) is almost unanimously ranked as the top journal in the field. *The American Journal of Agricultural Economics* (AJAE) and *Land Economics* (LAND) are also placed in the

[2] This response rate is similar to the one obtained by BRINN & AL. [1996], i.e. 34.6%, and higher than the 20.2% obtained by AXARLOGLOU & THEOHARAKIS [2003] and the 16% response rate of LOWE & LOCKE [2005].

top group by more than half of the respondents. The valuation of *Environmental and Resource Economics* (ERE) is noticeable since this journal would be second in rank, if we ordered the journals increasingly with respect to the percentage of researchers who consider the journal to belong to the 'other' group (see Figure 2). Spearman's rank correlation between these two rankings (Figure 1 versus Figure 2) is 0.964 and this allows us to reject the null hypothesis that the two rankings are uncorrelated. On the contrary, the two rankings are strongly positively correlated.

Table 3. Number of times the journals are listed in each group

	JEEM	AJAE	LAND	ERE	REE	EE	EDE	EJ	JARE	NRJ	AJARE
top	139	99	84	56	38	38	26	21	11	5	4
subtop	10	39	50	87	84	77	76	80	74	55	53
Other	1	12	16	7	28	35	48	49	65	90	93

Discussion

In this section we compare the citation-based ranking based on the ISI impact factor with the perception-based ranking obtained through the survey. Next we comment on the completeness of the group of journals, and test whether the answers are comparable over continents.

Comparing citation-based and perception-based rankings

In Table 4 we present both the ranking of the journals according to the ISI impact factors and the one using the survey results. A Spearman rank correlation test indicates a slightly positive correlation between the two rankings ($R = 0.591$).

Table 4. Comparison of ranking according to survey versus impact factor

	Survey	Impact factor
JEEM	1	1
AJAE	2	3
LAND	3	7
ERE	4	8
REE	5	4
EE	6	2
EDE	7	9
EJ	8	5
JARE	9	10
NRJ	10	11
AJARE	11	6

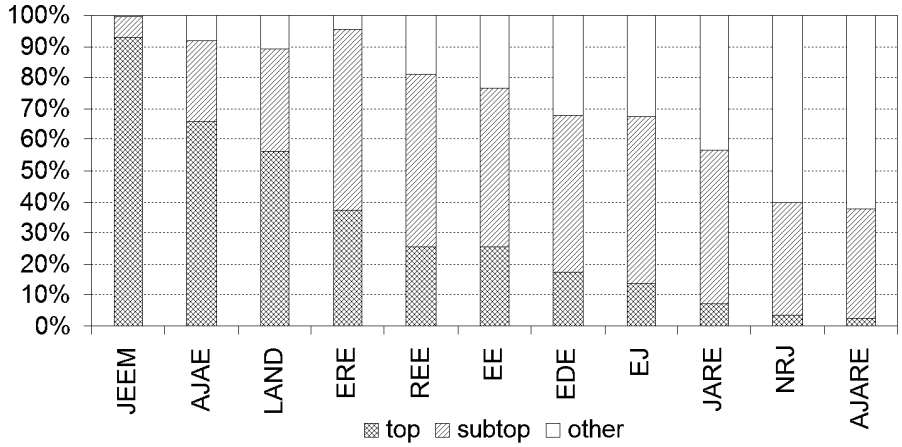

Figure 1. Survey rankings (according to number of times in 'top' group)

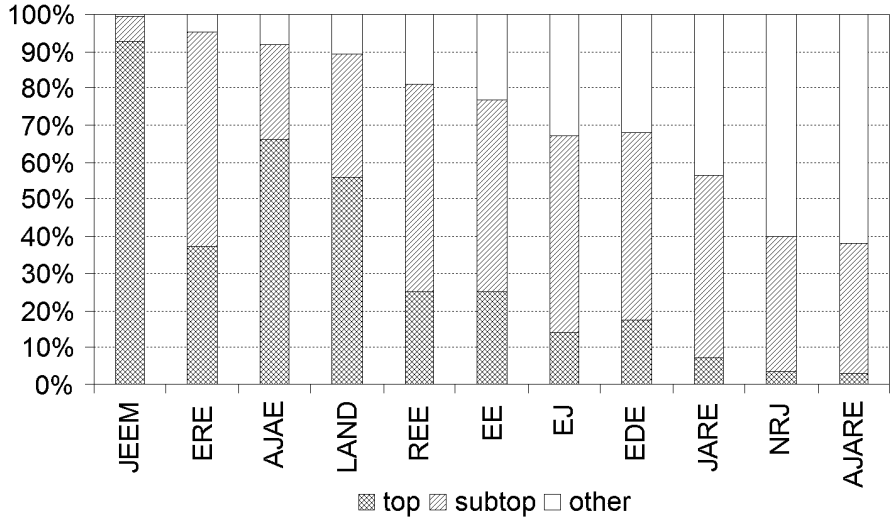

Figure 2. Survey rankings (ascending with the number of times in 'other' group)

The calculated correlation is, however, just below the critical value for $\alpha = 5\%$ (two-sided test), thus we are not able to reject the null hypothesis that the two rankings are uncorrelated [RAMSEY, 1989].

As MOED [2005] and other researchers have noted, the ISI impact factor is biased in favor of journals revealing a rapid maturing phase in citation impact and it also promotes review journals. When evaluating the quality of a journal, researchers apparently consider several aspects in their assessment: for instance, their personal publication record, research experience, current research topics, journals' availability or their familiarity with the different journals. Indeed, AXARLOGLOU & THEOHARAKIS [2003] have found significant variations in journal quality perceptions by economists worldwide and these variations depend on the respondents' geographic location, school of thought, field of specialization, research orientation and focus, type of employment, and journal affiliation. These additional evaluation criteria do not coincide (completely) with the journal's impact factor and this might lead to sizeable differences in the respective evaluations. A case in point is the *Australian Journal of Agricultural and Resource Economics* (AJARE), which is ranked last in our survey, but occupies the sixth position when using the impact factors. Another example is *Environmental and Resource Economics* (ERE); this journal seems to be higher appreciated by researchers than indicated by its relative impact factor.

Completeness of the journal list

When asked, 60 percent of the respondents (91 out of 150) did not want to add any journals to the list we proposed. This percentage was lower for Europe (56 percent) than for the rest of the world (66 percent). Since three respondents only wanted to add general economic journals, we find that 63 percent of the respondents accepts the eleven journals as representative for the field of environmental and resource economics.

The researchers who thought the list was incomplete were asked to list the journals they wanted to add. The journals that are mentioned, excluding general economic journals such as the *American Economic Review*, are recorded in Table 5. These journals are ranked based on the number of researchers that refer to that particular journal. We also add information on whether the journals are listed in the (social) science citation index (SSCI and SCI) and what their impact factor is, if they are included in the index.

Remarkable is that two of the three journals that are mentioned by 5 percent of the respondents are not included in the science or social science citation indices. Also eight out of the twelve most frequently mentioned journals are not included in (S)SCI. This observation casts some doubt on the representativeness of the journals monitored by Thomson Scientific for the field of environmental and resource economics.

Table 5. List of missing journals

Journal	Frequency	(S)SCI	Impact factor
Energy Economics	8	Yes	1.098
Natural Resource Modeling	8	No	
Marine Resource Economics	7	No	
Journal of Forest Economics	6	No	
Energy Policy	5	Yes	1.362
European Review of Agricultural Economics	5	Yes	0.681
Environmental Economics and Policy Studies	4	No	
Journal of Environmental Management	4	Yes	1.477
Review of Environmental Economics and Policy	4	No	
European Journal of Agricultural Economics	3	No	
Journal of Bioeconomics	3	No	
Journal of Environmental Planning and Management	3	No	
Agricultural Economics	2	Yes	0.584
Canadian Journal of Agricultural Economics	2	Yes	0.532
Environment and Planning A	2	Yes	1.610
Environment and Planning C	2	Yes	0.652
Environmental Science and Policy	2	Yes	1.052
Forest Policy and Economics	2	Yes	0.907
Journal of Agricultural and Applied Economics	2	No	
Journal of Agricultural Economics	2	Yes	0.587
Review of Agricultural Economics	2	Yes	0.529
Water Resources Research	2	Yes	1.894
Agricultural and Resource Economics Review	1	No	
Canadian Journal of Fisheries and Aquatic Sciences	1	Yes	1.882
Climate Change	1	Yes	2.459
Climate Policy	1	Yes	0.339
Environment and Planning B	1	Yes	1.043
Environmental Modeling and Assessment	1	Yes	0.793
Environmental Sciences	1	No	
Forest Science	1	Yes	1.457
Indian Journal of Agricultural Economics	1	No	
International Journal of Sustainable Development	1	No	
Journal of Environment and Development	1	No	
Journal of Environmental Policy and Management	1	No	
Review of Agricultural and Resource Economics	1	No	
Review of Environmental and Resource Economics	1	No	
Water Resources	1	No	

However, we notice that the journal *Natural Resource Modeling* is currently being monitored in the Web of Sciences indexes. Since this has only recently occurred, no impact factor for this journal is yet available.

Comparison 'Europe' versus 'Rest of the world'

In this section we investigate whether the European (EU) answers differ substantially from these of the rest of the world (ROW) and whether a bias is present.

First, we compare the ranking according to the 'number of respondents who consider a journal as a top journal' for two groups: 'Europe' versus 'rest of the world' (see Table 6). On the one hand, Europeans seem to value the journal *Resources and Energy Economics* (REE) more than *Ecological Economics* (EE) and the *Energy Journal* (EJ) more than *Environmental and Development Economics* (EDE) compared to the rest of the world. On the other hand, Non-Europeans apparently prefer the *Australian Journal of Agricultural and Resource Economics* (AJARE) to the *Natural Resources Journal* (NRJ). However, the Spearman rank correlation test indicates an almost perfect positive correlation between the two rankings ($R = 0.973$). From a statistical point of view, the two rankings are thus indistinguishable and can be aggregated without difficulty.

Table 6. EU and ROW journal rankings

	EU		ROW	
	Rank	% in top group	Rank	% in top group
JEEM	1	96.10	1	89.04
AJAE	2	67.53	2	64.38
LAND	3	57.14	3	54.79
ERE	4	37.66	4	36.99
REE	5	31.17	6	19.18
EE	6	23.38	5	27.40
EJ	7	16.88	8	10.96
EDE	8	15.58	7	19.18
JARE	9	3.90	9	10.96
NRJ	10	2.60	11	4.11
AJARE	11	0.00	10	5.48

Secondly, we also performed a χ^2-test on the 2×3 contingency tables of each journal to test whether the two groups – EU and ROW – value the journals in an equivalent manner. The results (see Table 7) allow us to reject at the 5% interval the hypothesis that Europeans and non-Europeans value the *Australian Journal of Agricultural and Resource Economics* (AJARE) in a similar way.

Table 7. Chi-squared tests on the journals' contingency tables

	χ^2-test statistic	10%	5%	1%
JEEM	5.079679	reject	not reject	not reject
AJAE	4.405402	not reject	not reject	not reject
LAND	0.083869	not reject	not reject	not reject
ERE	0.211218	not reject	not reject	not reject
REE	2.955585	not reject	not reject	not reject
EE	0.372888	not reject	not reject	not reject
EDE	0.797747	not reject	not reject	not reject
EJ	3.989708	not reject	not reject	not reject
JARE	4.985822	reject	not reject	not reject
NRJ	1.660170	not reject	not reject	not reject
AJARE	6.186635	reject	reject	not reject

The contingency table for this journal seems to indicate that Europeans value AJARE somewhat lower than the other researchers do (see Table 8). At the 10% level, we are also able to reject the hypothesis that both groups value the *Journal of Environmental Economics and Management* (JEEM) and the *Journal of Agricultural and Resource Economics* (JARE) similarly.

Table 8. Contingency table AJARE

AJARE	Top	Subtop	Other	
EU	0	24	53	77
ROW	4	29	40	73
	4	53	93	150

Concluding remarks

Using an online survey, we have asked researchers how they feel journals should be assessed. We have focused on the field of environmental and resource economics and have asked researchers all over the world to evaluate a selection of representative journals. We have found a great consensus with respect to the most influential journal, i.e. the *Journal of Environmental Economics and Management*, since more than 90 percent of the respondents placed this journal in the top group. A similar agreement in judgment was found with respect to the lowest ranked journals, i.e. the *Journal of Agricultural and Resource Economics*, the *Natural Resource Journal*, and the *Australian Journal of Agricultural and Resource Economics*, since less than 10 percent of the respondents placed these journals in the top group.

Moreover, the ranking based on the survey did not coincide with the ranking based on the impact factors published by Thomson Scientific. Apparently, researchers take other considerations into account in addition to the number of citations. Further research would be needed to identify these other factors more explicitly.

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