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Research Article

How much does journal reputation tell us about the academic interest and relevance of economic research? Empirical analysis and implications for environmental economic research

Felix Schläpfer

Institute for Environmental Decisions, ETH Zurich, and Socioeconomic Institute, University of Zurich

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Address for correspondence: Socioeconomic Institute, University of Zurich, Hottingerstrasse 10, 8032 Zürich, Switzerland, felix.schlaepfer@soi.uzh.ch

I am grateful to Silvana Wölfl for database research in the Web of Science. Furthermore, I would like to thank Bruno S. Frey, Hans-Werner Sinn, Peter Zweifel, Jörg Schläpfer, Ortwin Renn, Susanna Bucher, Almut Jödicke and three anonymous reviewers for helpful comments on drafts of the manuscript.
How much do scores based on journal reputation tell us about the academic interest and relevance of economic research? Empirical analysis and implications for interdisciplinary environmental research

Abstract

Unlike in other disciplines, research output in economics is commonly measured based on the disciplinary reputation of the journals in which an author has published. Here, I examine how much output measures based on journal reputation tell us about the academic interest and relevance of economic papers as measured by frequency of citation. Using data from the 2008 Handelsblatt ranking of economists in German speaking countries and interdisciplinary citation data from the Web of Science, I find that researcher scores based on journal reputation explain only about thirty percent of the variation (variance) in article citations. When the top 10 (20) percent of the researchers according to journal reputation scores are excluded, the percentage of explained variation in citation frequency drops to 8 (3) percent. Furthermore, using environmental economics journals as an example, I show that the traditional output measures strongly discourage applied and interdisciplinary economic research. The findings confirm that the traditional output measures provide incentives for narrow economic work even if that work is of interest to only few other researchers. Responsible hiring committees and funding institutions should take these problems seriously and re-consider existing standards in the evaluation of economic research.

Keywords: citation index, incentives, interdisciplinarity, publication, research evaluation, scientometrics
The use of citation frequency as a sole or main criterion for measuring researcher productivity is being increasingly criticised (e.g. Adler et al. 2008). Key issues with citations based measures include their limited potential to reflect an article’s interest and relevance outside academia and the problem that these measures can provide incentives for unproductive herd behaviour and “citation cartels” in research. Furthermore, it is often argued that the coverage of sources by the existing citation databases is not sufficiently objective or comprehensive (see e.g. Winiwarter and Luhmann 2009, Mocikat 2009 in recent articles in this journal). These issues are of even greater concern where evaluations are based on citation measures at the journal level (i.e., impact factors) rather than on individual article citations (Mocikat 2009).

In a reply to Winiwarter and Luhman and Mocikat, Nentwich (2009) acknowledges important problems with citations based measures of research output but also argues that some of the criticism misses the mark. Most importantly, perhaps, the resulting incentives for publishing in an (internationally) visible and accessible form can be seen as inherently desirable, and the relevance and translation for the world outside academia may be seen as a separate problem on which competing measures may not fare any better. Furthermore, Nentwich (p. 281) suggests that the “distorting mirror of citations” can promote reflection on how scientific output is measured and may thus be a positive trigger of change.

Can citations based measures be a healthy challenge to existing standards in academic research? One way to look into this is by empirically comparing the implications of alternative approaches in research evaluation. A field of inquiry where research output is not measured based on article citations is economics. In economics, the measurement of research output relies on the number of articles and an expert rating of the journals in which these articles are published. In this system, a small number of authoritative insiders define journal quality and reputation through a subjective weighting of journals and at the same time act as gate-keepers who decide what is accepted for publication in the most reputable journals (Laband and Tollison 2003, Oswald 2007). Hence, the success of an individual article is defined solely, and ultimately, by the reputation of the journal in which it is published—quite regardless of its further fate among its audience in the scientific community.

Since citations, in contrast, play virtually no role in the evaluation of economic research output, any rational economist who wishes to survive and succeed in academia should focus on publishing in high-reputation journals – and sacrifice the objectives of relevance and interest (as measured by future citations) in his or her research. Of course, one would expect that the researchers who publish most successfully in terms of journal
reputation are also those who are most relevant and interesting. However, if there are tradeoffs between the two objectives, it could also happen that research output based on journal reputation is only weakly, if at all, associated with output based on citations. This is a testable hypothesis. If it is confirmed, the finding would imply that the incentives introduced by the existing output measures do not encourage interesting and widely relevant work. Originating from a time when citation data were unavailable, these output measures would thus be highly insufficient from a societal and efficiency perspective.

Here, I examine this hypothesis empirically. Specifically, I investigate the relationship between a well known traditional measure of researcher output based on expert-rated journal reputation – the Handelsblatt-Ranking of economists in German speaking countries\(^1\) – with the same authors’ citation rates in Web-of-Science-listed journals. The following specific questions are addressed:

(1) How much of the variation in researchers’ number of citations is explained by their score based on journal reputation?

(2) How strong is the association between researcher rank based on citations and researcher rank based on journal reputation scores?

We find that these relationships are very weak, confirming the hypothesis that the traditional measurement of research output in economics produces problematic incentives and should for this reason be abandoned by universities and funding institutions as a sole or major indicator of research quality.

Economic journal weighting schemes and resulting incentives

In economics, a variety of journal weighting schemes have been proposed (see e.g. Kodrzycki and Yu 2006). The Handelsblatt, in weighting the journals, borrows from the two probably most established European journal rankings, the “Tinbergen list” and the weighting scheme developed by Combes and Linnemer (2003). Each of these is based on a subjective weighting of journals by selected experts.

The Tinbergen list, developed by the Tinbergen Institute in Rotterdam (NL) classifies journals as “generally accepted top-level journals” (AA), “very good journals covering economics in general and the top journals in each field” (A), and “good journals for all research fields within the Tinbergen Institute”. These fields cover “economics, econometrics, economic journal weighting schemes and resulting incentives

\(^1\) Since 2010, the Handelsblatt-Ranking is based on the database Forschungsmonitoring which has been enacted by the Verein für Socialpolitik (German Economic Association) and is administered by the KOF Swiss Economic Institute of the Federal Institute of Technology ETH according to guidelines set by the Newspaper Handelsblatt. The ranking is thus officially endorsed by a large academic association and a large publicly funded research institution.
finance, operations research, marketing and accounting”. On its website, which also displays the resulting journal weights, the Tinbergen Institute describes the classification as follows:²


The weighting scheme by Combes and Linnemer (2003) was developed for the European Economic Association (EEA) to rank the leading European economics departments. The weighting is described as follows (Combes and Linnemer 2003, p. 4):

We built an original journal weighting scheme denoted CL that weights all *EconLit* journals from 1 to 1/12. After a long and repetitive procedure which started in 1998 (...) we divided the *EconLit* journals in six groups. First, top journals are significantly differentiated from other ones with a weight equal to 1. A weight of 8/12 only is given to the next 16 journals. Then, a series of 39 journals are weighted 6/12, 68 journals 4/12, 138 journals 2/12 and all remaining journals 1/12 (...).

Our choices, which could be discussed endlessly as more than 800 journals are considered, tried to be consistent with citation/impact indicators when they are available. We do not think, however, that these have to be followed blindly. Independently of the journal average quality, the number of citations can vary from one field to the other and from a young journal to an older one. To counter this kind of effects, in any case, we tried to put at least 6/12 to any journal which is a leader in its field. Conversely, we did not put 8/12 or more to a journal too specialized. We do not believe that our scheme is perfect but the centre rankings proved to be very robust to moderate changes in weights even if such changes could be important at the individual level.

Evidently, this description is not very precise about when exactly the impact factors were not “followed blindly”.³ Furthermore, reputation scores may be a highly noisy signal of individual article quality, and its use as a sole or main measure of research output may produce a number of problematic incentives beyond those of output measures based on article citations. At least four additional problems can be identified (Table 1).

First, journal reputation may be a very noisy signal of the quality of *individual articles*. Previous research has demonstrated a large overlap of article citation rates among journals with higher and lower reputations (Laband and Tollison 2003, Starbuck 2005,

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³ Based on all 125 journals included in the 2008 Handelsblatt-Ranking and the 2008 Journal Citation Reports (category Economics), the 2-year impact factor explains only 20 percent and the 5-year impact factor 26 percent of the *Handelsblatt* journal weights.
Oswald 2007). Measurement based on journal reputation thus provides powerful incentives for wasteful investments in repeated submissions to top journals.

Second, it is well known that papers can be purposefully written to please the editors and reviewers of the journal to which they are submitted. Articles are more likely to be accepted in highly ranked economics journals if they largely support, rather than challenge, received wisdom (Frey 2003). Hence, measures based on journal reputation may discourage innovative work that may not be accepted in highly ranked journals but would be frequently cited (even in a “lower” journal).

Third, as many economists perceive technicality and mathematical sophistication as signals of high-quality research, journal reputation scores may reflect and promote those qualities. 4

Finally, since articles published in journals of related disciplines are not “counted”, the economic output measures provide powerful and virtually irresistible incentives for a purely disciplinary orientation in publishing. (As a matter of fact, the authors of some economic weighting schemes seem to have quite willingly cultivated a narrow disciplinary orientation. 5)

In sum, output measures based on journal reputation may provide incentives for economic research that is technically sophisticated, supportive of prior work and close to the core of the discipline – at a possible expense of relevance, interest, originality and innovation.

Data and measures

Output measure based on journal reputation scores

On 22 September 2008, the German newspaper Handelsblatt published the 2008 edition of its ranking of the “top 200” active economists at research institutions in Germany, Austria and Switzerland, based on their lifetime publication output. Furthermore, the newspaper issued a ranking of the “top 100” researchers based on articles published in 2004 through 2008.

The Handelsblatt ranking is based on research output in 220 journals in the fields of economics and statistics, weighted according to a combination of the two schemes described above. Five top journals obtain the value 1, the remaining journals obtain values between 0.67 and 0.2 points. A list with the journals and their scores is available on the Internet 6. Short

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4 In discussing the origins of the recent economic crisis, Paul Krugman (2009) argues that “the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth.”

5 Liebowitz and Palmer (1984) who analyze the influence of economic journals state: “Economists, being a rather narrow-minded and self-centered group, are probably more concerned with a journal’s impact on the economic profession (than on other disciplines).”

6 www.handelsblatt.com/_t=dgtool,id=15,obj=1;singleclip (accessed 18 November, 2009).
research notes and comments count half the value of regular articles. Book reviews, replies and corrections are not counted.

The journal score received by the author of an article is calculated by the formula $2p/(n+1)$, where $p$ is the point value of the journal and $n$ the number of authors of the article. Points are summed over articles to obtain a researcher’s total score. The dataset relies on researcher-reported article lists. The article lists of all researchers (with journal points of each article) are published on the Internet, such that misrepresentation is unlikely.

Output measure based on citations
For all authors listed in the Handelsblatt ranking lists, the 2008 citation data were researched from the Web of Science database in May 2009, using the “search” and “cited reference search” tools.\footnote{The analysis is based on the citation data of a single year since the random variation of individual citation numbers over time (years) tends to be small. Nevertheless, using data from several consecutive years might be appropriate to remove some of the random variation in future research.} \footnote{http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science (accessed May 4, 2010)} Where an author’s work could not be unambiguously identified by his or her last name and initial(s), we used his or her publication list to exclude articles from other authors. In the cases where we could proceed with the efficient “cited reference search” tool (since no or only few papers from other authors with identical name and initials had to be manually excluded), the citation numbers also include citations to articles that are not listed themselves in the Web of Science. In the remaining cases, where we used the “search” tool, the citations include only those to articles referenced in the Web of Science. Due to resource constraints, and since the citations to non-Web of Science-listed publications are only a small fraction of the total, we chose to tolerate this (unsystematic) measurement error.
Results

Relationship between score based on journal reputation and scores based on number of citations

Figure 1a shows scatter plots of the “top 200” researchers’ numbers of citations in 2008 and their lifetime scores (all articles) based on journal reputation as published in the Handelsblatt ranking. Visual inspection suggests that the correlation between the two measures is relatively weak. Many of the “top” researchers in the Handelsblatt ranking are cited relatively rarely. On the other hand, there are some apparent “second rate” researchers whose work apparently makes a substantive impact on the literature.

To quantify how much of the variation in citations can be explained by the Handelsblatt scores, the citation measure was regressed on the journal score to obtain the $R^2$ values (explained variation in the linear model) and the respective $P$-values (from testing the restriction that the coefficient on “journal score” is zero). The data were not log-transformed due to the occurrence of zero values in the citation variable. (The original data are available from the author on request.)

Table 2 (upper part) summarizes these results. In the linear model, the journal reputation score explains 30.7 percent of the variation in citation rates. However, much of this explanatory power is due to a small number of top researchers. When the top 10 (20) percent of researchers (based on Handelsblatt scores) are omitted, the percentage of explained variation drops to 7.8 (3.3) percent. Hence, if the Handelsblatt ranking is used to compare the research output of candidates within the lower 80 percent of the distribution, relevance and interest as measured by citations is almost completely discounted.

One might object that lifetime journal scores may be only weakly correlated with 2008 citations, since older articles might not be cited any more in 2008 (although articles citing those articles might still be). To entertain this possibility, I also examined the relationship between journal scores from publications in 2004 through 2008 and citations to articles published in 2004 through 2008 (Figure 1b). The finding is similar. The percentages of explained variation are even somewhat smaller, ranging from 10.8 percent for the full sample to 2.5 percent when the top 20 percent of researchers are omitted (Table 2, lower part).
Relationship between rank based on journal reputation scores and rank based on citations

How do these numbers translate into researcher ranks? For illustrative purposes, I also plotted rank based on journal scores (Handelsblatt rank) against rank based on citations (Figure 2). The Handelsblatt ranks based on lifetime journal score and 2008 citations to all articles are shown in Figure 2a. The data for the journal score of articles published in 2004 through 2008 and the citations in 2008 to articles published in 2004 through 2008 are shown in Figure 2b. Again, the scatter plots shows that the Handelsblatt ranks are a very poor predictor of researcher ranks based on number of citations.

Implications for disciplinary and interdisciplinary environmental research

Concerning the focus of this journal, it is easy to show that the traditional economic standard in measuring research output also has adverse implications specifically for economists interested in disciplinary and interdisciplinary environmental research. In addition to the problem that contributions in journals of other disciplines are ignored in the traditional output measures (see above), the disciplinary and interdisciplinary environmental economics journals which publish mainly applied work are greatly underweighted in the relevant journal weighting schemes.

This is illustrated in Table 3 for those 13 environmental economics journals which are included in the Handelsblatt ranking. For instance, the journal Ecological Economics ranks among the top 15% of the economics journals in terms of its 5-year Web-of-Science impact. Nevertheless, the journal receives a very low score in the disciplinary rankings, including the Handelsblatt ranking described below, where the journal weight of 0.2 suggests a rank somewhere in the bottom 25% of the economics journals. Among the environmental economics journals, only those three ranking highest (according to the traditional measures) receive weights that are approximately proportionate to their impacts on the literature. (Incidentally, those three are journals with a preference for theoretical and highly technical articles).

The implications for economists interested in disciplinary and interdisciplinary environmental research are straightforward: (i) don’t do research in environmental economics since, all else equal, the reputation of the resulting papers will be much lower than in other fields; (ii) if you nevertheless decide to pursue environmental economic research, make it

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9 Where two or more researchers had received identical numbers of citations, the ranks were assigned based on journal scores. (Alternatively, one could assign equal ranks to these individuals without changing the overall pattern of the results.)
10 A similar argument applies to other fields of applied and interdisciplinary research fields such as health economics.
theoretical and highly technical since otherwise you are less likely to publish it in a respectable journal; (iii) don’t write publications for a broad environmental science audience (like that of the journal Environmental Science & Technology, for instance), since those articles will not count if you apply for a position at a traditional economics department or for funding of competitive economic research grants.

These incentives are clearly not encouraging talented researchers to pursue applied environmental economic research that worries about cumbersome institutional details, realism of assumptions, or unwieldy distributional concerns. To the contrary, it seems reasonable to argue that the preference for highly abstract theoretical research at the “core” of the discipline, which is supported by the disciplinary standard, is a major reason for the limited contribution and success of the economic discipline in major environmental debates of our time.

Conclusion

Article citations – the standard measure of research output in many disciplines – are increasingly questioned as a sole indicator of research quality. The present study argues that journal reputation – the standard measure of research quality in economics – is even more problematic as a sole indicator of research output.

The empirical analysis shows that, at the level of the individual researcher, there is a lack of consistent relationship between the standard measure of research output and citation rates. The result confirms the hypothesis that the pursuit of reputation as currently measured conflicts with the objective of academic relevance and interest (as measured by citations). Moreover, at the level of the journals, reputation within the discipline has very little to do with the impact on the literature. The relatively high impact of many environmental economics journals, for instance, contrasts sharply with their low reputation in the discipline. Together, these findings support the hypothesis that the standard measure of research output in economics does not adequately reflect the academic interest of economic research as measured by citation frequency.

In addition, the standard measures based on journal reputation not only fail to adequately measure an individual researcher’s output. More importantly, due to tradeoffs between academic reputation and relevance they introduce powerful incentives against interesting and relevant work. They provide incentives for investments in detached theory, unfruitful technical sophistication, disciplinary isolation, and academic followership, which tend to be rewarded by that standard.
The experience of the financial crisis suggests that the existing merit system produces economic research that does not adequately address relevant real world issues (e.g. Krugman 2009). If society is to further rely on economic advice in solving important economic and environmental problems, it needs to make sure that the assessment of economic research is not only based on the internal standard of an arguably complacent discipline but on (multiple) standards that also reflect the relevance and plausibility of the research for an interdisciplinary academic audience. One such standard is interdisciplinary article citations.

Key players who can influence these standards include hiring committees at universities and national and international public research funding institutions (Nentwich 2009). Responsible individuals in these institutions should re-examine existing practices in research evaluation and abandon the heavy reliance on subjective disciplinary measures of journal reputation in the evaluation of economic research. If these institutions do not (or cannot) initiate the necessary changes, the changes would need to be encouraged by the governments funding the research institutions.
References


Nentwich, M. 2009. Citation indices as distorting mirrors and challenges. GAIA 18(4):281-283.


<table>
<thead>
<tr>
<th>Problematic characteristic</th>
<th>Resulting incentives</th>
<th>Economic journal reputation</th>
<th>Article citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind to relevance outside academia</td>
<td>Incentive for irrelevant “ivory tower” research</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Reward for “fashionable” topics (in review stage or after publication)</td>
<td>Incentive for publication of superficially interesting results, herd behaviour</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Measurement at group (journal) rather than individual (article) level</td>
<td>Incentive for wasteful investments in repeated submissions to top journals with high rejection rates</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Quality appraisal only during review process</td>
<td>Incentive for “pleasing” rather than innovative research</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Inappropriate reward for technicality/sophistication</td>
<td>Incentive for wasteful investments in technical sophistication</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Exclusion of work in other disciplines</td>
<td>Disincentive for collaboration with other disciplines</td>
<td>+</td>
<td></td>
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</tbody>
</table>
Table 2. Proportion of variation in citations explained by journal reputation scores ($R^2$-values and $P$-values from linear regression models).

<table>
<thead>
<tr>
<th>Sample</th>
<th>$n$</th>
<th>$R^2$</th>
<th>$P$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All articles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>200</td>
<td>0.307</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Top 10 percent of scores omitted</td>
<td>180</td>
<td>0.078</td>
<td>0.001</td>
</tr>
<tr>
<td>Top 20 percent of scores omitted</td>
<td>160</td>
<td>0.033</td>
<td>0.021</td>
</tr>
<tr>
<td><strong>Articles in 2004-2008</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full sample</td>
<td>100</td>
<td>0.108</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Top 10 percent of scores omitted</td>
<td>90</td>
<td>0.066</td>
<td>0.014</td>
</tr>
<tr>
<td>Top 20 percent of scores omitted</td>
<td>80</td>
<td>0.025</td>
<td>0.163</td>
</tr>
</tbody>
</table>
Table 3. Environmental economics journals: traditional journal weights and impact factors.

<table>
<thead>
<tr>
<th>Journal</th>
<th>Combes / Linnemer list</th>
<th>Tinbergen list</th>
<th>Handelsblatt ranking 2008</th>
<th>Citation report 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight (0.17 to 1)</td>
<td>Rating (B to AA)</td>
<td>Weight (0.1 to 1)</td>
<td>Rank (°)</td>
</tr>
<tr>
<td>J. Env. Econ. Mgt.</td>
<td>0.5</td>
<td>A</td>
<td>0.5</td>
<td>36</td>
</tr>
<tr>
<td>Land Econ.</td>
<td>0.5</td>
<td>B</td>
<td>0.4</td>
<td>62</td>
</tr>
<tr>
<td>Am. J. Agr. Econ.</td>
<td>0.5</td>
<td>B</td>
<td>0.4</td>
<td>62</td>
</tr>
<tr>
<td>Energy Econ.</td>
<td>0.33</td>
<td>B</td>
<td>0.3</td>
<td>97</td>
</tr>
<tr>
<td>Env. Planning. A</td>
<td>0.33</td>
<td>B</td>
<td>0.3</td>
<td>97</td>
</tr>
<tr>
<td>Ecological Econ.</td>
<td>0.17</td>
<td>B</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>Res. Energy Econ.</td>
<td>0.17</td>
<td>B</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>Energy J.</td>
<td>0.17</td>
<td>-</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>Eur. Rev. Agr. Ec.</td>
<td>0.2</td>
<td>B</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>Env. Res. Econ.</td>
<td>0.33</td>
<td>-</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>J. Agr. Econ.</td>
<td>0.33</td>
<td>-</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>Agr. Econ.</td>
<td>0.17</td>
<td>-</td>
<td>0.2</td>
<td>161</td>
</tr>
<tr>
<td>Env. Dev. Econ.</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>161</td>
</tr>
</tbody>
</table>

Note: The table includes all Environmental Economics journals represented in the Handelsblatt ranking.

- Entries are means of the rank bracket into which a journal falls. (Rank brackets for weights 0.5, 0.4, 0.3 and 0.2 are: 26-45, 46-78, 79-115, 116-206, 207-220).
- The respective 2-year-impact ranks are: 27, 73, 78, 15, -, 19, 69, 28, 74, 70, 54, 149.
- Journal not included/ranked in Economics category.
Figure legends

Figure 1. Relationship between journal reputation score and number of citations in 2008: a) total journal score and citations to all articles; b) journal score based on articles published in 2004-2008 and citations to articles published in 2004-2008.

Figure 2. Relationship between researcher rank based on journal reputation score and researcher rank based on citations: a) ranks based on total journal score and citations to all articles; b) ranks based on journal score based on articles published in 2004-2008 and citations to articles published in 2004-2008.
3 observations are out of range: (16/299), (22/422), (35/312)
a) All articles

b) Articles published 2004-2008