Measuring economic journals' citation efficiency: A data envelopment analysis approach

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by

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Abstract

This paper by using Data Envelopment Analysis (DEA) and statistical inference evaluates the citation performance of 229 economic journals. The paper categorizes the journals into four main categories (A to D) based on their efficiency levels. The results are then compared to the 27 "core economic journals" as introduced by Dimond (1989). The results reveal that after more than twenty years Diamonds' list of "core economic journals" is still valid. Finally, for the first time the paper uses data from four well-known databases (SSCI, Scopus, RePEc, Econlit) and two quality ranking reports (Kiel Institute internals ranking and ABS quality ranking report) in a DEA setting and in order to derive the ranking of 229 economic journals. The ten economic journals with the highest citation performance are *Journal of Political Economy, Econometrica, Quarterly Journal of Economics, Journal of Financial Economics, Journal of Economic Literature, American Economic Review, Review of Economic Studies, Journal of Econometrics, Journal of Finance, Brookings Papers on Economic Activity*.

Keywords: Ranking journals; Data Envelopment Analysis; Indexing techniques; Nonparametric analysis

MSC classification codes: 46N10; 62F07; 62G09

Jel classification codes : C02 ; C14 ; C61 ; C67

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1. Introduction

The ranking of academic and scientific journals has attracted the interest of researchers in every discipline worldwide. For almost half a century, citation analysis has been applied in the evaluation of research performance with great success (Lopez-Illescas et al., 2008). Perhaps the most characteristic phrase which confirms citations' power is that "Citations are the formal, explicit linkages between papers that have particular points in common" (Garfield, 1979). The field that deals with citation analysis is scientometrics and its application to journals called journology (Garfield, 2005).

The idea of a citation index belongs to Garfield (1955) who six years later created the Science Citation Index (SCI) and after that the Social Science Citation Index (SSCI) and the Arts & Humanities Citation Index (A&HCI). Together these three indices form the electronic database Web of Science (WoS) powered by the Institute for Specific Information (ISI), which is currently named Thomson Scientific (Lopez-Illescas et al., 2008). WoS contains over 36 millions of records from approximately 8.700 titles, most of which are academic and scientific journals, several hundreds are conference proceedings and 190 are open access journals (Meho and Yang, 2007). The depth of coverage among the three indices varies significantly. SCI coverage goes back to 1900, SSCI coverage back to 1956 and A&HCI index covers publications after 1975 (Meho and Yang, 2007). ISI publishes every year a Journal Citation Report (JCR) which includes the aggregated citation data among journals and it is available since 1974 for SCI, 1977 for SSCI and is not available for A&HCI (Leydesdorff et al., 2010).

The most commonly used bibliometric structure is probably the Impact Factor (Moed, 2010), which measures the significance of scientific journals based on citation

analysis and is published in JCR (Glanzel and Moed, 2002). According to JCR, Impact Factor is a ratio between citations and citable items published. More analytically and according to Garfield (2005), Impact Factor is the ratio of "the number of cites in the current year to any items published in the journal in the previous two years and the number of substantive articles published in the same two years". The substantive articles in the denominator are also called source items.

Another index of ISI's JCR is the Immediacy Index which according to JCR is "a measure of how quickly the average cited article, in a particular journal is cited" (Glanzel and Moed, 2002). The above two indices, Impact Factor and Immediacy Index, have received plenty of criticism and Glanzel and Moed (2002) summarize a number of their flaws, like for instance the bias in favor of lengthy papers. Selective coverage of the scientific literature, the bias in favor of English language journals and the differences among disciplines are the most considerable limitations of ISI's database according to Kousha and Thelwall (2008). These flaws led to the construction of various alternative indices which will be discussed later.

Until 2004, WoS was a monopoly. On November 2004, Elsevier published Scopus, a multidisciplinary database with citation indexing (Norris and Oppenheim, 2007). Scopus contains over 28 millions of records from 15.000 titles, 12.850 of which are journals, 700 conference proceedings, 600 trade publications, 500 open access journals and 125 book series. The depth of coverage for cited references goes back to 1996 and for not cited references back to 1966 (Meho and Yang, 2007). Scopus includes a larger number of international and open access journals than WoS (Bakkalbasi et al., 2006). Moreover, Scopus has its own Web search engine, named Scirus, which is freely accessible. In contrast with ISI's JCR, Elsevier has not published the aggregated citations of the Scopus database although, the Spanish

Scimago group has made available for sientometric analysis the Scopus' data from 1996 to 2007 (Leydesdorff et al. 2010).

Some days after the publication of Scopus, Google, world's largest search engine and one of the most significant Internet corporations, launched Google Scholar (GS) which was developed by Anurag Acharya (Noruzi, 2005). Although the number of GS's records, titles and depth of coverage are unknown, GS covers a wide variety of literature documents such as articles, books, abstracts, theses, dissertations, presentations and other academic and scientific documents. In addition, GS provides a citation index feature under each article, which is a list of the documents which cited the article. In GS citations are important relative to the ranking of papers, as more cited papers tend to be ranked higher (Noruzi, 2005). Another interesting feature of GS is that it presents citations of documents that are not available in the Web.

Due to the aforementioned flaws and limitations various discipline-oriented databases and journal metrics have been created. Cite Seer for computer and information science, SMEALSearch for academic business and RePEc for economics are discipline oriented databases while the majority of alternatives to ISI's JCR journal metrics are based upon the work of Pinski and Narin (1976) (Lopez-Illescas et al., 2008). The basic concept of Pinski and Narin's (1976) idea is the weights of citations according to the prestige of the citing journal. Some of the other approaches are Pudovkin and Garfield's (2004) rank normalized impact factor (rnIF), Hirsch's (2005) Hirsch Indices, Zitt and Small's (2008) Audience Factor and Bollen and Van de Sompel's (2008) Usage Impact Factor. Moed (2010) proposed a new index called SNIP (source normalized impact paper) which is "the ratio of the journal's citation count per paper and the citation potential in its subject field". The aim of the author is to achieve direct comparisons among papers in different disciplines.

A significant number of papers study citation counts and coverage of the three multidisciplinary databases, WoS, Scopus and GS. The majority of these papers analyze only citation counts without cleansing them first from duplicates. In contrast with previous studies, Meho and Yang (2007) and Bar-Ilan (2010) not only cleanse their citation data from duplicates but also from non-peer reviewed documents from GS. Specifically, Bar-Ilan (2010) aims to analyze GS citation data relatively with quantity and accuracy and to investigate the overlap between the three databases. The author finds that none of the databases can substitute all the others but on the contrary the three databases supplement each other.

Bar-Ilan's (2010) results are confirmed by almost every similar research. Bauer and Bakalbassi (2005) compare WoS and GS for the years 1985 and 2000 and their findings are inconclusive for 1985 but for 2000 are in favor of GS. Noruzi (2005) also compares WoS and GS in webometrics papers and concludes that GS is a supplement to other databases. Meho and Yang (2007), examining WoS, Scopus and GS in Information Science, extracted similar results and underlined the difficulty in the usage of GS. Franceschet (2010) concludes that the rankings of scholars and journals based on citations are similar for GS and WoS. Perhaps the most representative results are Bakkalbasi's et al. (2006) according to which the selection of the best tool available depends on the discipline and year of publication. Etxebarria and Gomez-Uranga (2010) verify that the choice among databases relies on the discipline. The authors state that WoS is better in classical fields such as Physics and Chemistry while Scopus performs better in Health Science.

In Economics, journal rankings are considered very important tools for performance evaluation of economic departments and individual economists. The most significant advantage which is provided by journal rankings is that scientific

quality is not hearsay anymore, in fact it is measurable and quantifiable. According to Ritzberger (2008), journal rankings offer relatively objective information about the scientific quality although they suffer from bias and the main reason is their inability to cover all sub-fields of Economics. The two main ranking approaches are peer review and citation analysis (Pujol, 2008). The first approach is based on experts' opinion while the second approach is based upon the received citations and offers an objectivity advantage. Pujol (2008) presents an alternative matching approach in which the principal factor is top scholars' publishing pattern. The author argues that top scholars tend to publish in top journal, so top scholars' preferences indicate the journals with higher academic impact.

Although citation analysis offers objectivity it also has shortcomings. Ritzberger (2008), argues that most important papers with significant contribution to economic theory are often not cited as this knowledge is considered as given. As a result the most cited papers are not the most important papers. Furthermore, the author states that new advances in sciences tend to be published in new journals. In addition, there are many journals that achieve high scores based on a small number of papers which are often cited. This limitation is confirmed by Garfield (2005) who underlines that 20% of articles receive 80% of citations. Moreover, Ritzberger (2008) presents further limitations which are relative to the peer review system and generally the system of scientific journals.

One of the most famous and controversial ranking of economic journals is the "Diamond's core economic journals". Diamond (1989) used data from SSCI for 1986 to analyze three performance criteria in order to form his list of 27 core economic journals. Diamond's arbitrary use of weights in order to aggregate his final ranking has received much criticism. Burton and Phimister (1995) overcome the problem of

arbitrary weights by applying Data Envelopment Analysis in ranking Diamond's 27 core economic journals.

The most widely used ranking method for Economics is the aforementioned Impact Factor of Thomson Scientific. Many attempts have been made to overcome the flaws of Impact Factor and the first significantly improved method is LP-method (Liebowitz and Palmer, 1984) which measures "the number of citations that authors make to articles appearing in various journals". The differentiation with previous studies lies at the journal's weights. A journal which is not economic or it is less important does not receive a greater merit. Laband and Piette (1994) present an updated ranking based on the paper of Liebowitz and Palmer (1984). LP-method is also used by Kalaitzidakis et al. (2003) in order to construct a global ranking of universities. Kalaitzidakis et al. (2010) applied the same updated methodology in order to provide a smoother longer view and to avoid randomness.

Koczy and Strobel (2007) criticized the other methods that they are subject to manipulations and constructed the tournament method which is not manipulable. Palacio-Huerta and Volij (2004) do not assume a ranking method a priori; instead they derive a method which satisfies a number of properties like anonymity, invariance to reference intensity and splitting of journals, weak consistency and weak homogeneity. This method called the Invariant method was first introduced by Pinski and Narin (1976) and was adopted by Kodrzycki and Yu (2006) and Ritzberger (2008). It is notable that Google uses this methodology in order to rank web cites. Ritzberger's classification is used by Schneider and Ursprung (2008) to classify EconLit journals in categories and improve the CL classification used by the Committee for Research Monitoring of German Economic Association.

Kiel Institute for the World Economy publishes an Internal Journal Ranking which is based upon Kodrzycki and Yu's (2006) seminar work. The purpose of the Kiel Ranking is to identify the best refereed journals that are relevant for the current research program of the Institute (Kiel, 2010). The minimum criteria for a journal to be considered in the Kiel list are that it must be a refereed journal and it must be also listed either in EconLit or in JCR of WoS. Journals that achieve the minimum criteria are classified in category "E". In order to classify journals in categories from "A" to "D" a modified version of Schneider and Ursprung's (2008) ranking is used.

Another widely used ranking is provided in Academic Journal Quality Guide by the Association of Business Schools (ABS). As noted above, there are two kinds of ranking approaches, one based on experts' opinion and another based on citation analysis. The limitations of citation analysis led ABS to a more careful approach. The ABS Academic Journal Quality Guide is a hybrid of these two approaches and is specialized in business and management journals (Harvey et al., 2010). Thus, ABS guide is a consensus ranking.

Liner and Amin (2004) claim that using only one ranking approach may lead to serious biases because different approaches can produce significantly different results. The authors state that the problem remains even if the journals in the group are highly related. Rainer and Miller (2005) find that a composite journal ranking smooth the difference across various ranking approaches. Klavans and Boyack (2009) define convergence and consensus and highlight that although convergence is extremely difficult to occur, consensus is more possible. The authors emphasize that consensus is about the common features among journal maps, or journal rankings in our case. Theussl and Hornik (2009) apply consensus optimization problems and derive a consensus ranking for seven management journals. Cook et al. (2010) use a

branch-and-cut algorithm firstly introduced by Cook et al. (2007) and construct a consensus ranking for accounting journals.

In the same spirit of the previous studies this paper applies DEA formulation in order to measure and evaluate 229 economic journals' citation efficiency. Additionally, it applies bootstrap techniques on the efficiency scores obtained and in order to correct the estimated efficiencies from sampling bias. In order to increase the validity of our results, 95% confidence intervals of the biased corrected efficiency scores are constructed. In contrast with the previous studies data from four databases (SSCI, Scopus, RePEc, Econlit) and two quality ranking reports (Kiel institute internals ranking and ABS quality ranking report) are been incorporated into our DEA formulation and in order for the economic journals' citation performance levels to be measured.

The structure of this paper is as follows. Section 2 describes the data and the variables used in our DEA setting. Section 3 presents the methodologies and the statistical techniques adopted. Finally, section 4 presents the findings and the main conclusions of our paper.

2. Data and variable construction

The data refer to all economic journals listed in the following databases/ ranking reports:

1) KIEL internal rankings (KIEL, 2010)[2],

2) ABS Academic Journal Quality Guide (Harvey et al., 2010)[3],

3) Research paper in economics (RePEc)[4],

4) Social Science Citation Index (SSCI)[5],

[2]KIEL internal rankings for 2009 can be downloaded from: http://www.ifw-kiel.de/academy/Journal%20Ranking%203%20Jan%2009.pdf.
[3] ABS Academic Journal Quality Guide can be found at: http://www.the-abs.org.uk/?id=257.
[4] RePEc data can be retrieved from: http://ideas.repec.org/top/top.journals.simple.html.

5) Scopus database[6] and

6) in Econlit database[7].

The data are related to journals' citations and impact factors until 2009. Therefore, the number of journals which are going to be evaluated is 229 (see Appendix for Journals' names). The descriptive statistics of the variables used in order to construct the outputs/input for our DEA formulation is presented in table 1. As can be realized eight variables have been used in order to construct the input and output ratios for our DEA formulation. These are:

- the number of documents cited from SSCI database (NSSCI),
- the number of documents cited from Scopus database (NSCOP),
- the five year journals' impact factor (Journal Citation Report) from SSCI (IFSSCI)[8],
- journals' impact factor from RePEc (IFREPEC),
- the number of total citations appeared in SSCI (NCSSCI),
- the number of total citations appeared in Scopus (NCSCOP),
- the number of journals' issues (NJI) and finally,
- the number of journals' volumes (NJV).

As can be realized both the impact factors from RePEc and SSCI has been used in order to "grasp" journals' impact both among economic and social science journals. In addition both the citation numbers and number of cited papers from the largest databases have been used (i.e. Scopus and SSCI database). As can be realized from the descriptive statistics (especially from the standard deviation values) the

[5]Data from Social Science Citation Index can be retrieved from: http://thomsonreuters.com/products_services/science/science_products/a-z/social_sciences_citation_index.

[6] SCOPUS data can be retrieved from: http://www.scopus.com/home.url.

[7] Data from Econlit database can be retrieved from: http://www.aeaweb.org/econlit/journal_list.php.

[8] When a journal wasn't in the SSCI database more than five years, the latest impact factor (i.e. for 2009) has been used.

fluctuations and heterogeneities among the journals and among the variables are very high. Therefore, there is a need to construct a pre-weighted input and outputs variables before we apply our DEA formulation.

TABLE 1 about here

The DEA formulation uses one composite input and two composite outputs.

The input x_1 is constructed as:

$$x_1 = \frac{NJV}{\left(NJI * \left(KIEL + ABS\right)\right)} \tag{1}$$

As can be realized the input is constructed by dividing journals' volume number to journals number of issues. This is actually performed in order to grasp the size effect of the journal. In addition the number of issues is weighted by the sum of the journals' quality rankings as presented by Kiel and ABS quality reports[9].

Then the first output y_1 is constructed as:

$$y_1 = \frac{NCSCOP}{\left(NSCOP / NJI\right)} * \left(IFREPEC + IFSSCI\right) \tag{2}$$

This output concerns the citations derived by the Scopus database and it is the ratio of number of citations from Scopus database by the number of papers of the specific journal which are been cited in the Scopus database which then is divided by the number of issues of that journal. Then in order to capture the effect of the citations in the social and economic science literature the calculated ratio is multiplied by the sum of the five year impact factor as derived from SSCI database and the impact factor from the RePEc database.

[9] In Kiel report the journals take the values from "A" (high quality journal) to "D" (lower quality journal). In addition we sign the value of 4 to "A", 3 to "B", 2 to "C" and 1 to "D". Equally, in the ABS report four values can be assigned for journals' quality (1, 2, 3 and 4). The highest quality in a journal is a signed with "4" whereas the lowest quality with "1". In contrast with the KIEL quality assessment the ABS "grasps" the quality of the journals within their subject area (i.e. Accounting and Auditing, Finance, Economics, etc.)

Finally, the second output y_2 is constructed as:

$$y_2 = \frac{NCSSCI}{(NSSCI / NJI)} * (IFREPEC + IFSSCI) \quad (3).$$

Similarly, this output concerns the citations derived by the SSCI database and it is the ratio of number of citations from SSCI database by the number of papers of the specific journal which are been cited in the SSCI database which then is divided by the number of issues of that journal. Again and in order to capture the effect of the citations in the social and economic science literature the calculated ratio is multiplied by the sum of the five year impact factor as derived from SSCI database and the impact factor from the RePEc database.

3. Methodology

Based on the work by Koopmans (1951) and Debreu (1951) the production set Ψ constraints the production process and is the set of physically attainable points (x, y)：

$$\Psi = \left\{ (x, y) \in \Re_+^{N+M} \middle| x \ \ can \ \ produce \ \ y \right\} \quad (4),$$

where $x \in \Re_+^N$ is the input vector and $y \in \Re_+^M$ is the output vector. As suggested by several authors (Førsund and Sarafoglou, 2002; Førsund *et al.*, 2009), Hoffman's (1957) discussion regarding Farrell's (1957) paper was the first to indicate that linear programming can be used in order to find the frontier and estimate efficiency scores, but only for the single output case. Later, Boles (1967, 1971) developed the formal linear programming problem with multiple outputs identical to the constant returns to scale (CRS) model in Charnes et al. (1978) who named the technique as data envelopment analysis (DEA). For the input oriented efficiency score a country operating at the level (x, y) is defined as:

$$\theta(x,y) = \inf\left\{\theta \middle| (\theta x, y) \in \Psi\right\} \quad (5).$$

Furthermore, DEA became more popular when introduced by Charnes et al. (1978) in order to estimate Ψ allowing for constant returns to scale (CRS model). Later, Banker et al. (1984) introduced a DEA estimator allowing for variable returns to scale (VRS model). In our case, when evaluating journals' citation performance input orientation of DEA models have been applied due to the fact that input quantities appear to be the primary decision variables (Coelli and Perelman, 1999; Coelli et al., 2005; Halkos and Tzeremes, 2010). The quality of the papers appeared in a journal but also the number of the papers to be published (i.e. the number of issues and volumes) is subject to the editors' decision. Therefore the decision makers have most control over the input compared to the outputs used. Furthermore, the CRS model developed by Charnes *et al.* (1978) can be calculated as:

$$\hat{\Psi}_{CRS} = \left\{ \begin{array}{l} (x,y) \in \Re^{N+M} \left| y \le \sum_{i=1}^{n} \gamma_i y_i ; x \ge \sum_{i=1}^{n} \gamma_i x_i \quad for \quad (\gamma_1, ... \gamma_n) \right. \\ such \quad that \quad \gamma_i \ge 0, i = 1, ...n \end{array} \right\} \quad (6).$$

The VRS model developed by Banker *et al.* (1984) allowing for variable returns to scale can then be calculated as:

$$\hat{\Psi}_{VRS} = \left\{ \begin{array}{l} (x,y) \in \Re^{N+M} \left| y \le \sum_{i=1}^{n} \gamma_i y_i ; x \ge \sum_{i=1}^{n} \gamma_i x_i \quad for \quad (\gamma_1, ... \gamma_n) \right. \\ such \quad that \quad \sum_{i=1}^{n} \gamma_i = 1; \ \gamma_i \ge 0, i = 1, ...n \end{array} \right\} \quad (7).$$

Then in order to obtain the corresponding input oriented DEA estimators of efficiency scores we need to plug in $\hat{\Psi}_{CRS}$ and $\hat{\Psi}_{VRS}$ respectively in equation (5) presented previously.

3.1 Bias correction using the bootstrap technique

Simar and Wilson (1998, 2000, 2008) suggest that DEA estimators were shown to be biased by construction. They introduced an approach based on bootstrap techniques (Efron, 1979) to correct and estimate the bias of the DEA efficiency indicators. The bootstrap bias estimate for the original DEA estimator $\hat{\theta}_{DEA}(x,y)$ can be calculated as:

$$\hat{BIAS}_B\left(\hat{\theta}_{DEA}(x,y)\right) = B^{-1}\sum_{b=1}^{B}\hat{\theta}^*_{DEA,b}(x,y) - \hat{\theta}_{DEA}(x,y) \tag{8}.$$

Furthermore, $\hat{\theta}^*_{DEA,b}(x,y)$ are the bootstrap values and B is the number of bootstrap reputations. Then a biased corrected estimator of $\theta(x,y)$ can be calculated as:

$$\begin{aligned}\hat{\hat{\theta}}_{DEA}(x,y) &= \hat{\theta}_{DEA}(x,y) - \hat{BIAS}_B\left(\hat{\theta}_{DEA}(x,y)\right) \\ &= 2\hat{\theta}_{DEA}(x,y) - B^{-1}\sum_{b=1}^{B}\hat{\theta}^*_{DEA,b}(x,y)\end{aligned} \tag{9}.$$

However, according to Simar and Wilson (2008) this bias correction can create an additional noise and the sample variance of the bootstrap values $\hat{\theta}^*_{DEA,b}(x,y)$ need to be calculated. The calculation of the variance of the bootstrap values is illustrated below:

$$\hat{\sigma}^2 = B^{-1}\sum_{b=1}^{B}\left[\hat{\theta}^*_{DEA,b}(x,y) - B^{-1}\sum_{b=1}^{B}\hat{\theta}^*_{DEA,b}(x,y)\right]^2 \tag{10}.$$

We need to avoid the bias correction illustrated in (8) unless:

$$\frac{\left|\hat{BIAS}_B(\hat{\theta}_{DEA}(x,y))\right|}{\hat{\sigma}} > \frac{1}{\sqrt{3}} \tag{11}.$$

Finally, the $(1-\alpha)$ x 100 - percent bootstrap confidence intervals can be obtained for $\theta(x,y)$ as:

$$\frac{1}{\hat{\delta}_{DEA}(x,y)-nc^{*}_{1-a/2}} \leq \theta(x,y) \leq \frac{1}{\hat{\delta}_{DEA}(x,y)-nc^{*}_{a/2}} \qquad (12).$$

3.2 Choosing between CRS and VRS

In order to choose between the adoption of the results obtained by the CCR (Charnes et al., 1978) and BCC (Banker et al., 1984) models in terms of the consistency of our results obtained we adopt the method introduced by Simar and Wilson (2002). Therefore, we compute the DEA efficiency scores under the CRS and VRS assumption and by using the bootstrap algorithm we test for the CRS results against the VRS results obtained such as:

$$H_o : \Psi^{\vartheta} \quad is \quad CRS \quad against \quad H_1 : \Psi^{\vartheta} \quad is \quad VRS \qquad (13)$$

The test statistic is given by the equation (6) as:

$$T(X_n) = \frac{1}{n}\sum_{i=1}^{n} \frac{\hat{\theta}\, crs, n(X_i, Y_i)}{\hat{\theta}\, vrs, n(X_i, Y_i)} \qquad (14)$$

Then the *p-value* of the null hypotheses can be approximated by the proportion of bootstrap samples as:

$$p - value = \sum_{b=1}^{B} \frac{I\left(T^{*,b} \leq T_{obs}\right)}{B} \qquad (15)$$

where B is 2000 bootstrap replications, I is the indicator function and $T^{*,b}$ is the bootstrap samples and original observed values are denoted by T_{obs} .

4. Results and Conclusions

Following the methodology proposed by Simar and Wilson (2002) this paper tests the appropriateness between CRS or VRS DEA formulation. In our application

we have one input and two outputs and we obtained for this test a *p-value* of 0.91 > 0.05 (with B=2000). Hence we cannot reject the null hypothesis of CRS. Therefore, the results adopted in our study are based on the CCR model[10]assuming constant returns to scale.

In addition the efficiency results obtained but also the biased corrected efficiency estimates calculated following the bootstrap algorithm introduced by Simar and Wilson (1998, 2000) are presented in tables 2-4. As can be realised tables 2 to 4 are categorised in a descending order based on economics journals' efficiency estimates under the CRS hypothesis. In addition we distinguish the journals into four categories[11] "A" to "D" (A being the high citation efficiency economic journals to D being the economic journals with the lowest citation efficiency). The four categories have been separated according to the first 10% (category A), the next 20% (category B), the next 30% (category C) and the final 40% as category "D".

Category "A" contains the journals with the highest efficiency scores. These are *Journal of Political Economy, Econometrica, Quarterly Journal of Economics, Journal of Financial Economics, Journal of Economic Literature, American Economic Review, Review of Economic Studies, Journal of Econometrics, Journal of Finance, Brookings Papers on Economic Activity, Economic Journal, Journal of Monetary Economics, Journal of Economic Theory, Review of Economics and Statistics, Journal of International Economics, Journal of Public Economics, Journal of Accounting and Economics, Journal of Economic Perspectives, Journal of Environmental Economics and Management, Rand Journal of Economics, Journal of*

[10] The results of the BCC model are available upon request.
[11] We did the categorization in such a way in order to be comparable to the two main quality ranking reports as introduced by Kiel institute (which separates the journals into four categories from "A" to "D") and to ABS (which also separates economic and other discipline journals into four quality categories from 1 to 4)

Development Economics, Journal of Economic Growth and European Economic Review.

As can be realised, tables 2 to 4 present journals efficiency scores alongside with the biased corrected efficiency scores and the 95% confidence intervals (lower and upper bound obtained by B=2000 bootstrap replications using the algorithm described previously). Given the fact that the established economic journals are about 1500 (according to the Econlit database) and in this study we use 229[12], the biased correction algorithm (Simar and Wilson 1998, 2000) of the citation efficiency estimates must be applied.

Finally, when analysing our results we compare them with Diamond's list of 'core economic journals' (Diamond, 1989). According to Burton and Phimister (1995) Diamond's list has raised much controversy. However Burton and Phimister in their application of DEA technique had found that many of the journals in the Diamond core reappeared (Burton and Phimister, 1995). Surprisingly, in our study eighteen (out of the twenty seven Diamond's core economic journals) are appearing in the A category, five in the B category and four in the C category (all of them are indicated by a star sign "*"). Therefore, given the research developments and changes over the years since the Diamond's list appeared (over twenty years since the analysis was carried out) the validity of the quality of the "core economic journals" still holds.

Table 2-4 about here

According to Burton and Phimister "whilst research assessment exists, the judgement of which journals are seen to be the 'best' will continue to play a role in the evaluation of the 'quality' of research output" (Burton and Phimister, 1995, p. 361). This study for the first time applies a DEA bootstrap formulation for biased correction

[12] As stated previously only the economic journals which are registered and measured in the 6 main databases/ reports (Econlit, SSCI, RePEc, SCOPUS, Kiel rankings, ABS quality rankings report) are considered for evaluation.

(Simar and Wilson, 1998, 2000) and in order to measure economic journals' citation efficiency. It evaluates 229 economic journals which are registered in four main databases (Econlit, Scopus, SSCI and RePEc) and are included in two well-known ranking reports (Kiel internal ranking and ABS quality ranking reports).

By combining different data from several databases we formulate our DEA model using one composite input and two composite outputs. For constructing the proposed composite input two qualitative measures have been used from two international ranking reports. Furthermore, our two composite outputs used have been weighted not only from the five year impact factor derived from the SSCI database but also from the impact factor from RePEc database. Finally, both the citation data from the Scopus and from SSCI database have been used in our DEA setting making the validity of the results (based also in the application of biased correction) more robust.

However, three points have to be mentioned as possible weaknesses. First the inclusion of the two quality ranking reports (Kiel rankings and ABS rankings) can be themselves subject to criticism. In addition journals' self citations have not been excluded in our analysis[13]and therefore can create a further criticism. Finally, the fact that our input and outputs have been pre-weighted by the journals' issues instead of the number of journals' pages can raise further criticism (especially when citations from notes and short communications are compared with the citations derived from larger papers). Nevertheless and regardless of those limitations our paper provides an illustrative way of how statistical inference in DEA formulation can be applied in order to evaluate journals' citation efficiency.

[13] We assumed that journals' self citation have been used to promote and support the ongoing research.

Appendix: Journals' names (229 journals)

Accounting Review, African Development Review, Agricultural Economics, American Economic Review, American Journal of Agricultural Economics, Annals of Regional Science, Applied Economics, Applied Economics Letters, Australian Economic Review, Australian Journal of Agricultural and Resource Economics, British Journal of Industrial Relations, Brookings Papers on Economic Activity, Bulletin of Indonesian Economic Studies, Cambridge Journal of Economics, Canadian Journal of Agricultural Economics, Canadian Journal of Economics, China Economic Review, Contemporary Accounting Research, Contemporary Economic Policy, Defence and Peace Economics, Demography, Developing Economies, Development, Development and Change, Eastern European Economics, Ecological Economics, Econometric Reviews, Econometric Theory, Econometrica, Econometrics Journal, Economic and Industrial Democracy, Economic Development and Cultural Change, Economic Development Quarterly, Economic Geography, Economic History Review, Economic Inquiry, Economic Journal, Economic Modelling, Economic Policy, Economic Record, Economic Theory, Economica, Economics and Human Biology, Economics and Philosophy, Economics Letters, Economics of Education Review, Economics of Transition, Empirical Economics, Energy Economics, Energy Journal, Environment and Development Economics, Environment and Planning A Environment and Planning C, Environmental & Resource Economics, European Economic Review, European Journal of Health Economics, European Journal of Industrial Relations, European Journal of the History of Economic Thought, European Review of Agricultural Economics, European Review of Economic History, Experimental Economics, Explorations in Economic History, Feminist Economics, Finance and Stochastics, Financial Management, Fiscal Studies, Food Policy, Foreign Affairs, Games and Economic Behavior, Geneva Papers on Risk and Insurance: Issues and Practice, Geneva Risk and Insurance Review, German Economic Review, Growth and Change, Health Economics, History of Political Economy, IMF Staff Papers, Industrial and Labor Relations Review, Industrial Relations, Information Economics and Policy, Insurance: Mathematics and Economics, International Economic Review, International Finance, International Journal of Finance and Economics, International Journal of Forecasting, International Journal of Game Theory, International Journal of Industrial Organization, International Journal of Production Economics, International Journal of Urban and Regional Research, International Organization, International Regional Science Review, International Review of Law and Economics, International Tax and Public Finance, Jahrbücher für Nationalökonomie und Statistik, Japan and the World Economy, Japanese Economic Review, Journal of Accounting and Economics, Journal of Accounting Research, Journal of African Economies, Journal of Agricultural Economics, Journal of Applied Econometrics, Journal of Applied Statistics, Journal of Banking & Finance, Journal of Business & Economic Statistics, Journal of Comparative Economics, Journal of Conflict Resolution, Journal of Consumer Research, Journal of Corporate Finance, Journal of Cultural Economics, Journal of Development Economics, Journal of Development Studies, Journal of Econometrics, Journal of Economic Behavior & Organization, Journal of Economic Dynamics & Control, Journal of Economic Education, Journal of Economic Geography, Journal of Economic Growth, Journal of Economic History, Journal of Economic Issues, Journal of Economic Literature, Journal of Economic Perspectives, Journal of Economic Psychology, Journal of Economic Surveys, Journal of Economic Theory, Journal of Economics (Zeitschrift

für Nationalökonomie), Journal of Economics and Management Strategy, Journal of Environmental Econ. and Management, Journal of Environmental Planning and Management, Journal of Evolutionary Economics, Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Financial Economics, Journal of Financial Intermediation, Journal of Financial Markets, Journal of Forecasting, Journal of Futures Markets, Journal of Health Economics, Journal of Housing Economics, Journal of Human Resources, Journal of Industrial Economics, Journal of International Business Studies, Journal of International Economics, Journal of International Money and Finance, Journal of International Trade and Economic Development, Journal of Labor Economics, Journal of Labor Research, Journal of Law & Economics, Journal of Law, Economics & Organization, Journal of Legal Studies, Journal of Macroeconomics, Journal of Mathematical Economics, Journal of Monetary Economics, Journal of Money Credit and Banking, Journal of Peace Research, Journal of Policy Analysis and Management, Journal of Policy Modelling, Journal of Political Economy, Journal of Population Economics, Journal of Portfolio Management, Journal of Post Keynesian Economics, Journal of Productivity Analysis, Journal of Public Economics, Journal of Real Estate Finance and Economics, Journal of Regional Science, Journal of Regulatory Economics, Journal of Risk and Insurance, Journal of Risk and Uncertainty, Journal of the European Economic Association, Journal of the Japanese and International Economies, Journal of Transport Economics and Policy, Journal of Urban Economics, Kyklos, Labour Economics, Land Economics, Macroeconomic Dynamics, Management Science, Manchester School, Marketing Science, Mathematical Finance, Mathematical Methods of Operations Research, Mathematical Social Sciences, Michigan Law Review, National Tax Journal, Natural Resources Journal, New Political Economy, Open Economies Review, Oxford Bulletin of Economics and Statistics, Oxford Economic Papers – New Series, Oxford Review of Economic Policy, Papers in Regional Science, Policy Sciences, Population and Development Review, Population Research and Policy Review, Post-Communist Economies, Post-Soviet Affairs, Public Choice, Quarterly Journal of Economics, Rand Journal of Economics, Real Estate Economics, Regional Science and Urban Economics, Regional Studies, Research Policy, Resource and Energy Economics, Resources Policy, Review of Accounting Studies, Review of Development Economics, Review of Economic Dynamics, Review of Economic Studies, Review of Economics and Statistics, Review of Financial Studies, Review of Income and Wealth, Review of Industrial Organization, Review of International Studies, Review of World Economics, Scandinavian Journal of Economics, Scottish Journal of Political Economy, Small Business Economics, Social Choice and Welfare, South African Journal of Economics, Southern Economic Journal, Statistical Papers, Telecommunications Policy, Theory and Decision, Transportation Research: Part B: Methodological, Urban Studies, World Bank Economic Review, World Bank Research Observer, World Development, World Economy and Yale Law Journal

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Table 1: Descriptive statistics of the variables used in DEA formulation

	Number of documents cited from SSCI database (NSSCI)	**Number of documents cited from SCOPUS database (NSCOP)**	**Journals' impact factor from RePEc (IFREPEC)**
Mean	358.4430	664.8202	3.624855
Median	264.5000	526.5000	1.845500
Maximum	3202.000	3522.000	33.15100
Minimum	41.00000	49.00000	0.000100
Std. Dev.	344.7724	527.1873	5.395743
	Five year journals' impact factor from SSCI (IFSSCI)	**Number of total citations appeared in SSCI (NCSSCI)**	**Number of total citations appeared in SCOPUS (NCSCOP)**
Mean	1.822395	2278.496	10344.70
Median	1.424500	919.0000	4642.000
Maximum	8.922000	49204.00	93735.00
Minimum	0.196000	23.00000	64.00000
Std. Dev.	1.429865	4632.814	14858.65
	Number of Journals' issues (NJI)	**Number of Journals' volumes (NJV)**	**X_1**
Mean	180.3465	44.93421	1.113728
Median	148.0000	38.00000	0.991296
Maximum	919.0000	229.0000	6.687500
Minimum	21.00000	7.000000	0.303571
Std. Dev.	129.3926	30.18913	0.648490
	Y_1	**Y_2**	
Mean	39046.39	19615.94	
Median	4283.778	1486.183	
Maximum	2471320.	1188832.	
Minimum	20.52016	10.71038	
Std. Dev.	181773.0	98403.43	

Table 2: Efficiency scores of category “A” (the 10%) economics journals

Journal Name	CRS	BCCRS	LB	UB	Category	Diamond
Journal of Political Economy	1.000000	0.501827	0.500010	0.516607	***A***	*
Econometrica	0.754091	0.379690	0.377086	0.394628	***A***	*
Quarterly Journal of Economics	0.497315	0.250683	0.248713	0.261833	***A***	*
Journal of Financial Economics	0.445434	0.225012	0.222809	0.237316	***A***	*
Journal of Economic Literature	0.291783	0.147523	0.145959	0.157636	***A***	*
American Economic Review	0.213625	0.108456	0.106909	0.118602	***A***	*
Review of Economic Studies	0.204893	0.104455	0.102577	0.116914	***A***	*
Journal of Econometrics	0.203178	0.103962	0.101774	0.117566	***A***	*
Journal of Finance	0.184274	0.093757	0.092235	0.103555	***A***	
Brookings Papers on Economic Activity	0.130962	0.067280	0.065649	0.078534	***A***	*
Economic Journal	0.107483	0.054830	0.053831	0.061717	***A***	*
Journal of Monetary Economics	0.105577	0.054197	0.052922	0.061979	***A***	*
Journal of Economic Theory	0.105092	0.054533	0.052753	0.066793	***A***	*
Review of Economics and Statistics	0.091139	0.046618	0.045662	0.052705	***A***	*
Journal of International Economics	0.069145	0.035737	0.034696	0.043230	***A***	*
Journal of Public Economics	0.053565	0.027751	0.026885	0.033552	***A***	*
Journal of Accounting and Economics	0.052018	0.027183	0.026138	0.034858	***A***	
Journal of Economic Perspectives	0.047540	0.024515	0.023852	0.028610	***A***	
Journal of Environmental Econ. and Management	0.039415	0.020583	0.019812	0.025413	***A***	
Rand Journal of Economics	0.029544	0.015400	0.014854	0.018183	***A***	*
Journal of Development Economics	0.029182	0.015468	0.014711	0.020275	***A***	*
Journal of Economic Growth	0.028669	0.014897	0.014411	0.017706	***A***	
European Economic Review	0.025357	0.013114	0.012729	0.015662	***A***	*

Table 3: Efficiency scores of category “B” (the 20%) economics journals

Journal Name	CRS	BCCRS	LB	UB	Category	Diamond
Journal of Law & Economics	0.025152	0.013227	0.012670	0.016144	***B***	*
International Economic Review	0.022383	0.011765	0.011268	0.014416	***B***	*
Journal of Consumer Research	0.022368	0.011691	0.011249	0.013889	***B***	
Journal of Labor Economics	0.022293	0.011622	0.011212	0.013707	***B***	*
International Organization	0.021632	0.011278	0.010879	0.013626	***B***	
Management Science	0.021226	0.010883	0.010642	0.012333	***B***	
Economic Policy	0.020790	0.010874	0.010460	0.013261	***B***	
Journal of Risk and Uncertainty	0.018656	0.010016	0.009428	0.013146	***B***	
Journal of Industrial Economics	0.017661	0.009337	0.008903	0.011832	***B***	
Journal of Urban Economics	0.017449	0.009418	0.008817	0.012916	***B***	
Review of Financial Studies	0.016536	0.008725	0.008336	0.010811	***B***	
Journal of Human Resources	0.015990	0.008358	0.008045	0.010080	***B***	
World Bank Economic Review	0.015739	0.008487	0.007955	0.011514	***B***	
Games and Economic Behavior	0.015697	0.008597	0.007963	0.011659	***B***	
Journal of Business & Economic Statistics	0.015508	0.008228	0.007818	0.010493	***B***	
Journal of International Business Studies	0.015395	0.008112	0.007753	0.009930	***B***	
Oxford Economic Papers – New Series	0.015024	0.008043	0.007586	0.010682	***B***	*
Economic Geography	0.013359	0.007093	0.006741	0.009023	***B***	
Journal of Accounting Research	0.012831	0.006903	0.006490	0.008925	***B***	
Land Economics	0.012777	0.006814	0.006451	0.008801	***B***	
Accounting Review	0.012601	0.006686	0.006358	0.008377	***B***	
Development	0.012168	0.006385	0.006121	0.007802	***B***	
Industrial and Labor Relations Review	0.011289	0.006059	0.005704	0.007993	***B***	
Yale Law Journal	0.011140	0.005752	0.005589	0.006757	***B***	
Economica	0.010836	0.005750	0.005465	0.007300	***B***	*
Demography	0.010648	0.005732	0.005379	0.007815	***B***	
Journal of Health Economics	0.010519	0.005655	0.005312	0.007759	***B***	
Scandinavian Journal of Economics	0.009660	0.005107	0.004868	0.006363	***B***	
Journal of Law, Economics & Organization	0.009429	0.005096	0.004772	0.006555	***B***	
Oxford Bulletin of Economics and Statistics	0.009372	0.004934	0.004720	0.006036	***B***	
Transportation Research: Part B: Methodological	0.008230	0.004424	0.004159	0.005921	***B***	
Journal of Financial and Quantitative Analysis	0.008094	0.004323	0.004089	0.005508	***B***	
Journal of Money Credit and Banking	0.007968	0.004272	0.004029	0.005435	***B***	
Economic Development and Cultural Change	0.007775	0.004215	0.003937	0.005578	***B***	
Journal of Economic Behavior & Organization	0.007543	0.004129	0.003824	0.005553	***B***	
Journal of Conflict Resolution	0.006924	0.003744	0.003505	0.004914	***B***	
Journal of International Money and Finance	0.006492	0.003534	0.003285	0.004852	***B***	
World Development	0.006383	0.003371	0.003215	0.004401	***B***	
Public Choice	0.006338	0.003487	0.003220	0.004641	***B***	
World Bank Research Observer	0.006092	0.003336	0.003098	0.004349	***B***	

Table 4: Efficiency scores of category “C” (the 30%) economics journals

Journal Name	CRS	BCCRS	LB	UB	Category	Diamond
Journal of Applied Econometrics	0.005842	0.003193	0.002959	0.004349	***C***	
Population and Development Review	0.005824	0.003183	0.002954	0.004245	***C***	
Marketing Science	0.005795	0.003126	0.002934	0.003977	***C***	
Research Policy	0.005677	0.002975	0.002855	0.003788	***C***	
Regional Science and Urban Economics	0.005336	0.002936	0.002708	0.003996	***C***	
Foreign Affairs	0.005153	0.002775	0.002606	0.003609	***C***	
International Journal of Production Economics	0.004707	0.002581	0.002395	0.003358	***C***	
Journal of Economic Dynamics & Control	0.004654	0.002546	0.002358	0.003463	***C***	
Journal of Banking & Finance	0.004617	0.002510	0.002337	0.003398	***C***	
Ecological Economics	0.004532	0.002488	0.002301	0.003331	***C***	
Journal of Financial Intermediation	0.004079	0.002261	0.002076	0.003054	***C***	
Financial Management	0.003824	0.002071	0.001938	0.002651	***C***	
Economics Letters	0.003780	0.002109	0.001929	0.002846	***C***	*
Journal of Regional Science	0.003678	0.002026	0.001870	0.002695	***C***	
International Journal of Industrial Organization	0.003570	0.001964	0.001812	0.002656	***C***	
Papers in Regional Science	0.003291	0.001842	0.001684	0.002420	***C***	
Regional Studies	0.003237	0.001754	0.001640	0.002311	***C***	
Journal of Comparative Economics	0.003219	0.001795	0.001643	0.002398	***C***	
Oxford Review of Economic Policy	0.003188	0.001764	0.001623	0.002364	***C***	
Michigan Law Review	0.003134	0.001674	0.001582	0.002145	***C***	
American Journal of Agricultural Economics	0.003094	0.001673	0.001569	0.002098	***C***	
Journal of Legal Studies	0.002971	0.001624	0.001510	0.002049	***C***	
Environment and Planning A	0.002881	0.001571	0.001459	0.002127	***C***	
British Journal of Industrial Relations	0.002790	0.001565	0.001429	0.002061	***C***	
Journal of Mathematical Economics	0.002723	0.001521	0.001390	0.002047	***C***	*
Journal of Economic Surveys	0.002643	0.001460	0.001343	0.002010	***C***	
Journal of Agricultural Economics	0.002635	0.001472	0.001347	0.001954	***C***	
Economic Inquiry	0.002440	0.001330	0.001241	0.001651	***C***	*
Small Business Economics	0.002428	0.001326	0.001234	0.001706	***C***	
Mathematical Finance	0.002416	0.001327	0.001231	0.001687	***C***	
Kyklos	0.002393	0.001304	0.001216	0.001634	***C***	
Journal of Development Studies	0.002225	0.001240	0.001134	0.001663	***C***	
International Journal of Game Theory	0.002187	0.001226	0.001118	0.001632	***C***	
Canadian Journal of Economics	0.002083	0.001141	0.001061	0.001421	***C***	*
Urban Studies	0.002076	0.001141	0.001055	0.001520	***C***	
International Journal of Forecasting	0.002072	0.001164	0.001061	0.001531	***C***	
Industrial Relations	0.001942	0.001058	0.000988	0.001298	***C***	
Journal of Economic Geography	0.001901	0.001050	0.000971	0.001314	***C***	
Review of Income and Wealth	0.001876	0.001031	0.000956	0.001266	***C***	
Journal of Population Economics	0.001865	0.001050	0.000956	0.001382	***C***	
Explorations in Economic History	0.001799	0.001022	0.000923	0.001371	***C***	
Journal of Economic History	0.001789	0.000981	0.000912	0.001206	***C***	
Southern Economic Journal	0.001769	0.000963	0.000899	0.001182	***C***	
Economic Theory	0.001748	0.000992	0.000899	0.001295	***C***	
Journal of Regulatory Economics	0.001747	0.000989	0.000896	0.001315	***C***	
Energy Journal	0.001696	0.000948	0.000869	0.001228	***C***	
Econometric Reviews	0.001685	0.000927	0.000858	0.001165	***C***	
Econometric Theory	0.001589	0.000870	0.000810	0.001063	***C***	

Environmental & Resource Economics	0.001583	0.000878	0.000808	0.001144	***C***
Cambridge Journal of Economics	0.001580	0.000883	0.000808	0.001163	***C***

Table 5: Efficiency scores of category “D” (the 40%) economics journals

Journal Names	CRS	BCCRS	LB	UB	Category
Journal of Economics and Management Strategy	0.001557	0.000868	0.000797	0.001105	***D***
Labour Economics	0.001485	0.000838	0.000761	0.001112	***D***
Journal of the Japanese and International Economies	0.001369	0.000778	0.000703	0.001043	***D***
Review of Economic Dynamics	0.001347	0.000762	0.000692	0.000997	***D***
Economic History Review	0.001340	0.000748	0.000687	0.000953	***D***
Journal of Productivity Analysis	0.001340	0.000762	0.000689	0.001013	***D***
Health Economics	0.001215	0.000677	0.000620	0.000903	***D***
Journal of Corporate Finance	0.001135	0.000645	0.000584	0.000847	***D***
Journal of Economic Psychology	0.001097	0.000617	0.000562	0.000820	***D***
Review of World Economics	0.001084	0.000611	0.000558	0.000791	***D***
Journal of Transport Economics and Policy	0.001075	0.000597	0.000550	0.000755	***D***
Economics of Education Review	0.001072	0.000610	0.000551	0.000818	***D***
Real Estate Economics	0.001071	0.000604	0.000550	0.000794	***D***
Journal of the Europ. Econ. Ass.	0.001067	0.000591	0.000546	0.000736	***D***
Journal of Evolutionary Economics	0.001035	0.000584	0.000531	0.000765	***D***
Journal of Financial Markets	0.001034	0.000584	0.000532	0.000757	***D***
Journal of Real Estate Finance and Economics	0.001023	0.000582	0.000526	0.000770	***D***
Journal of Forecasting	0.001010	0.000564	0.000517	0.000726	***D***
Scottish Journal of Political Economy	0.000989	0.000558	0.000508	0.000731	***D***
Development and Change	0.000981	0.000554	0.000503	0.000731	***D***
IMF Staff Papers	0.000940	0.000522	0.000482	0.000644	***D***
Manchester School	0.000937	0.000520	0.000480	0.000644	***D***
Journal of Peace Research	0.000912	0.000499	0.000464	0.000625	***D***
European Review of Agricultural Economics	0.000907	0.000498	0.000463	0.000608	***D***
International Regional Science Review	0.000893	0.000509	0.000460	0.000677	***D***
Empirical Economics	0.000873	0.000497	0.000449	0.000659	***D***
Resource and Energy Economics	0.000869	0.000488	0.000446	0.000625	***D***
Journal of Cultural Economics	0.000864	0.000478	0.000441	0.000598	***D***
Economic Record	0.000854	0.000478	0.000438	0.000606	***D***
Energy Economics	0.000845	0.000479	0.000434	0.000637	***D***
Policy Sciences	0.000807	0.000445	0.000412	0.000553	***D***
Food Policy	0.000796	0.000449	0.000408	0.000590	***D***
Theory and Decision	0.000785	0.000436	0.000402	0.000544	***D***
Experimental Economics	0.000775	0.000429	0.000396	0.000536	***D***
Social Choice and Welfare	0.000773	0.000438	0.000398	0.000575	***D***
Journal of Economics (Zeitschrift für Nationalökonomie)	0.000763	0.000424	0.000391	0.000529	***D***
World Economy	0.000722	0.000402	0.000369	0.000521	***D***
Contemporary Accounting Research	0.000715	0.000393	0.000366	0.000479	***D***
Journal of Policy Analysis and Management	0.000703	0.000388	0.000360	0.000474	***D***
Review of Industrial Organization	0.000698	0.000390	0.000358	0.000496	***D***
Review of Accounting Studies	0.000686	0.000376	0.000351	0.000455	***D***
International Finance	0.000676	0.000375	0.000346	0.000465	***D***
Finance and Stochastics	0.000672	0.000373	0.000344	0.000462	***D***
International Journal of Urban and Regional Research	0.000670	0.000369	0.000343	0.000455	***D***
Mathematical Social Sciences	0.000667	0.000379	0.000344	0.000502	***D***
Journal of Risk and Insurance	0.000620	0.000344	0.000318	0.000424	***D***
Insurance: Mathematics and Economics	0.000610	0.000345	0.000314	0.000452	***D***
Journal of Environmental Planning and Management	0.000590	0.000326	0.000302	0.000401	***D***

Australian Journal of Agricultural and Resource Economics	0.000587	0.000330	0.000302	0.000426	***D***
International Tax and Public Finance	0.000531	0.000301	0.000273	0.000396	***D***
Econometrics Journal	0.000510	0.000280	0.000261	0.000340	***D***
Annals of Regional Science	0.000497	0.000279	0.000256	0.000362	***D***
Fiscal Studies	0.000489	0.000273	0.000251	0.000342	***D***
Applied Economics	0.000479	0.000267	0.000245	0.000350	***D***
International Review of Law and Economics	0.000456	0.000257	0.000235	0.000333	***D***
Bulletin of Indonesian Economic Studies	0.000443	0.000248	0.000228	0.000316	***D***
Growth and Change	0.000433	0.000244	0.000223	0.000314	***D***
China Economic Review	0.000417	0.000233	0.000215	0.000299	***D***
National Tax Journal	0.000401	0.000219	0.000205	0.000259	***D***
Economics of Transition	0.000380	0.000214	0.000195	0.000280	***D***
Journal of Policy Modelling	0.000375	0.000213	0.000193	0.000280	***D***
Journal of Macroeconomics	0.000337	0.000190	0.000174	0.000247	***D***
Feminist Economics	0.000333	0.000181	0.000170	0.000219	***D***
Environment and Planning C	0.000328	0.000184	0.000169	0.000238	***D***
Telecommunications Policy	0.000322	0.000183	0.000166	0.000239	***D***
International Journal of Finance and Economics	0.000320	0.000179	0.000165	0.000227	***D***
Journal of Housing Economics	0.000302	0.000171	0.000156	0.000226	***D***
Macroeconomic Dynamics	0.000290	0.000162	0.000149	0.000207	***D***
Journal of African Economies	0.000289	0.000161	0.000149	0.000204	***D***
Agricultural Economics	0.000289	0.000161	0.000148	0.000205	***D***
Review of International Studies	0.000277	0.000152	0.000142	0.000185	***D***
Information Economics and Policy	0.000267	0.000151	0.000138	0.000200	***D***
Population Research and Policy Review	0.000263	0.000147	0.000135	0.000188	***D***
Environment and Development Economics	0.000248	0.000139	0.000128	0.000178	***D***
Contemporary Economic Policy	0.000247	0.000137	0.000127	0.000172	***D***
Jahrbücher für Nationalökonomie und Statistik	0.000235	0.000125	0.000119	0.000148	***D***
Canadian Journal of Agricultural Economics	0.000224	0.000121	0.000114	0.000144	***D***
Economic Modelling	0.000204	0.000114	0.000105	0.000146	***D***
Mathematical Methods of Operations Research	0.000167	0.000091	0.000085	0.000110	***D***
Resources Policy	0.000166	0.000092	0.000085	0.000116	***D***
Japanese Economic Review	0.000155	0.000083	0.000079	0.000098	***D***
Economic and Industrial Democracy	0.000148	0.000080	0.000075	0.000098	***D***
Journal of Futures Markets	0.000147	0.000081	0.000075	0.000097	***D***
German Economic Review	0.000136	0.000074	0.000070	0.000089	***D***
Post-Soviet Affairs	0.000125	0.000068	0.000063	0.000084	***D***
European Journal of Industrial Relations	0.000119	0.000063	0.000060	0.000076	***D***
Economics and Philosophy	0.000118	0.000062	0.000060	0.000074	***D***
Journal of Applied Statistics	0.000117	0.000064	0.000060	0.000079	***D***
Journal of Post Keynesian Economics	0.000116	0.000062	0.000059	0.000073	***D***
Journal of Labor Research	0.000105	0.000057	0.000053	0.000070	***D***
Japan and the World Economy	0.000103	0.000057	0.000053	0.000070	***D***
European Review of Economic History	0.000098	0.000053	0.000050	0.000063	***D***
European Journal of Health Economics	0.000097	0.000052	0.000049	0.000062	***D***
Economics and Human Biology	0.000097	0.000051	0.000049	0.000060	***D***
Open Economies Review	0.000096	0.000052	0.000049	0.000065	***D***
Economic Development Quarterly	0.000092	0.000050	0.000047	0.000061	***D***
Journal of Economic Education	0.000091	0.000049	0.000046	0.000060	***D***
Journal of International Trade and Economic Development	0.000088	0.000047	0.000044	0.000055	***D***
Journal of Economic Issues	0.000081	0.000043	0.000041	0.000053	***D***

Developing Economies	0.000080	0.000043	0.000041	0.000053	***D***
South African Journal of Economics	0.000079	0.000042	0.000040	0.000053	***D***
Journal of Portfolio Management	0.000078	0.000041	0.000039	0.000049	***D***
Natural Resources Journal	0.000076	0.000041	0.000039	0.000049	***D***
Australian Economic Review	0.000073	0.000039	0.000037	0.000046	***D***
Review of Development Economics	0.000071	0.000038	0.000036	0.000046	***D***
Geneva Risk and Insurance Review	0.000066	0.000035	0.000033	0.000040	***D***
Statistical Papers	0.000060	0.000032	0.000030	0.000036	***D***
Defence and Peace Economics	0.000059	0.000031	0.000030	0.000037	***D***
New Political Economy	0.000058	0.000030	0.000029	0.000035	***D***
Geneva Papers on Risk and Insurance: Issues and Practice	0.000045	0.000024	0.000023	0.000028	***D***
History of Political Economy	0.000041	0.000021	0.000021	0.000024	***D***
Eastern European Economics	0.000035	0.000018	0.000017	0.000022	***D***
Post-Communist Economies	0.000026	0.000014	0.000013	0.000016	***D***
African Development Review	0.000011	0.000005	0.000005	0.000006	***D***
European Journal of the History of Economic Thought	0.000010	0.000005	0.000005	0.000005	***D***
Applied Economics Letters	0.000010	0.000005	0.000005	0.000006	***D***