



Analysis

Influential publications in ecological economics revisited



Robert Costanza^a, Richard B. Howarth^b, Ida Kubiszewski^a, Shuang Liu^c, Chunbo Ma^d,
Gaël Plumecocq^e, David I. Stern^{a,*}

^a Crawford School of Public Policy, The Australian National University, Acton, ACT 2601, Australia

^b Environmental Studies Program, Dartmouth College, Hanover, NH 03755, USA

^c Land and Water Flagship, CSIRO, Canberra, ACT 2601, Australia

^d School of Agricultural and Resource Economics, University of Western Australia, Perth, WA 6009, Australia

^e INRA, UMR 1248 Agir, BP 52627, F-31326 Castanet-Tolosan Cedex, France

ARTICLE INFO

Article history:

Received 27 September 2015

Received in revised form 23 December 2015

Accepted 18 January 2016

Available online 30 January 2016

Keywords:

Bibliometrics

Ecological economics

ABSTRACT

We revisit the analysis of Costanza et al. (2004, *Ecological Economics*) of influential publications in ecological economics to discover what has changed a decade on. We examine which sources have been influential on the field of ecological economics in the past decade, which articles in the journal *Ecological Economics* have had the most influence on the field and on the rest of science, and on which areas of science the journal is having the most influence. We find that the field has matured over this period, with articles published in the journal having a greater influence than before, an increase in citation links to environmental studies journals, a reduction in citation links to mainstream economics journals, and possibly a shift in themes to a more applied and empirical direction.

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1. Introduction

Ecological economics is a transdisciplinary field of study. It is influenced by and has influence on a broad range of disciplines and topics. We revisit the analysis of Costanza et al. (2004) of influential publications in ecological economics to discover what has changed a decade on. We compare our findings with this previous work to determine how the journal and the field have changed in the intervening period. We analyze what literature has had the most influence on the field in the last decade, as indicated by citations made by articles published in *Ecological Economics* (*EE*), and which publications in the journal have had the most influence both on the field and on the wider scientific community. We also look at the most common topics of these influential papers to find which are the most important recent topics in the field.

There are, of course, well-known issues and limitations related to using citation analysis to assess influence (Costanza et al., 2004), including the following:

1. The influence of a publication can go well beyond academia, and citation analysis will not pick up this non-academic influence.
2. Quantity of citations is not the same as quality and does not indicate whether a publication has been cited in a positive or negative way, though the vast majority of citations are positive (Catalin et al., 2015).

3. The databases used contain only a subset (albeit large) of all articles and citations.
4. The academic review process is slow and citation analysis is, therefore, most useful for publications that are at least a few years old.
5. Similarly, influential older publications tend to be obliterated from citation counts while their influence does not diminish as their information becomes incorporated into common scientific knowledge (Merton, 1988).
6. Citation practices vary across disciplines and scientific communities, which means that comparisons across disciplines should be made carefully.

Despite these well-known limitations, citation analysis is a powerful and increasingly popular quantitative guide to the relative influence a publication has had on the academic community. Also, in this paper, we are looking at changes over time in comparison with the results of a previous study, and so we must use similar methods to those used in the previous study.

Another important caveat regarding our analysis is the question of whether the changes we find are due to changes in the field of ecological economics or due to changes in the management of the journal, *Ecological Economics*, and the market for publications in the field. In 2004, Robert Costanza had been editor for all but one year of our sample. In the past decade, Cutler Cleveland and Richard Howarth have been the editors. The numbers of submissions and published articles have both increased strongly and the journal has become more selective. There

* Corresponding author.

E-mail address: david.stern@anu.edu.au (D.I. Stern).

are also more alternative outlets for publications in this field. In our analysis, we attribute the changes we see to changes in the field itself, but recognize that these other factors may also be at play.

2. Literature Review

Costanza et al. (2004) carried out an analysis along similar lines to the current study and found a broad range of influences on the field of ecological economics. As the field was still quite young, classic articles in the broader environmental and economic literature were more influential on the field than were the articles actually published in *EE*. But the authors argued that this was likely to change as the field matured, as some articles published in the journal were receiving high numbers of citations per year. So, it is interesting to now follow up on that prediction.

Ma and Stern (2006) followed up Costanza et al.'s (2004) analysis by comparing *EE* and the *Journal of Environmental Economics and Management (JEEM)* in order to understand the differences between transdisciplinary ecological economics and mainstream environmental economics. They found that “there is a significant overlap between the two fields at the journal level – the two journals cite similar journals” but that “ecological economics tends to cite (but not be cited by) general natural science journals more often than environmental economics does, environmental economics cites more heavily from journals rather than other publications, and citations in environmental economics are more concentrated on particular journals and individual publications” (p491). There was much less similarity at the level of individual articles: “non-market valuation articles dominate the most cited articles in *JEEM* while green accounting, sustainability, and the environmental Kuznets curve are all prominent topics in *EE*” (p491). We are interested in finding out whether the pattern of citation links to the natural science literature has been sustained or not and how the topics of influential articles have evolved.

Castro e Silva and Teixeira (2011) showed how the topics covered in *EE* evolved from 1989 to 2009. They “note that ecological economics experienced an ‘empirical turn’ reflected in a shift away from exclusively formalized papers towards exclusively empirical and, to a larger extent, ‘formal and empirical’ ones” (p849). An interesting question is whether there has also been such a shift in influential papers or whether theoretical papers remain the more influential.

Hoepner et al. (2012) revisited the question of influential publications in environmental and ecological economics covering articles published in a group of 14 environmental and resource economics journals including *EE* in the period from 2000 to 2009. Their main indicator is citations per annum, which gives recently published papers more equal weight, and they distribute citations to authors and institutions on a fractional basis. They rank individual publications, authors, journals, and institutions with, at times, counterintuitive results. For example, Costanza ranks as the 61st most influential author. Spash (2013) criticized this analysis mainly for combining ecological and environmental economics together and thus giving a heavier weight to mainstream environmental economics, as more such journals were included. As Spash stated, Hoepner et al.'s (2012) research design also excludes important influences on ecological economics that are outside of the economic mainstream. These are included in our study.

Plumecocq (2014) compares ecological economics research published in *EE* and *Environmental Values* with research published in *JEEM* and *Environmental and Resource Economics* using textual data analysis. His results “point to the increasing importance of the evaluation of ecosystem services in ecological economic discourse”. This causes him to “question the kind of transdisciplinarity promoted by ecological economics” (p458). Our results will show how the topics covered by the most cited papers in the field, including ecosystem services valuation, have evolved in the last decade.

3. Methods and Data

3.1. Identifying the Influential Publications

Our main analysis is based on a set of the most influential articles that we constructed as described in the following. First, we distinguish between inward and outward influences. Inward influence occurs when publications are cited in articles published in *EE*. Outward influence occurs when articles published in *EE* are cited in other publications.

To measure inward influence, we compiled a database of all the sources cited in articles in *EE* over 11 years, 2004–2014, and selected those that received more than 15 citations in the journal in this period. We excluded institutional authors such as the IPCC and UN. We also collected the total number of citations to the identified publications in the *Web of Science (WoS)* as a whole and in *Google Scholar (GS)*. We used a variety of techniques to ensure that we had a comprehensive list of publications that received more than 15 citations in the journal in the period, and that all of the citations to a publication were counted. First, we made a substantial effort to identify orphaned citations – citations to an article that should have been added to the total but were listed separately because of small variations in the recorded details of the publication. We examined all publications that have 10 or more citations and combined all orphaned citations. This gives a more comprehensive list of articles that received more than 15 citations.

We used the following approach to collect WoS citations. For journal articles that have correct DOIs, we used these DOIs to identify the articles and collect the associated WoS citations. For journal articles whose DOIs were missing or entered into the database incorrectly, we used a combination of the author's name and year of publication to identify the publication and collect its WoS citations.

For monographs and edited books, we followed the approach used by Costanza et al. (2004). The titles of monographs and edited books recorded in the WoS database show substantial variation. We first searched for the author's or editor's name(s) together with the publication year in order to pick up all the variations on a title in the WoS database. Next, we searched for all these variations of the titles without the year and the author's and editor's name(s). This yields a large list of possible references to the volume. For example, we first searched for John Rawls' *A Theory of Justice* (1971) (using “Cited Reference Search”) as:

Cited Author: Rawls J*

Cited Year (s): 1971

This search identified 57 title entry variations, which we then used in a “Cited Work” search.¹

We collected WoS and GS citations to journal articles between April 17 and 23, 2015. We collected GS citations to books on 3 May 2015 and WoS citations to books between 17 April and 19 May 2015.

¹ The search terms entered in this case were: Cited Work: 'THEORY JUSTICE' OR '1971: A Theory of Justice' OR '1971: A Theory of Justice' OR '7HEORY OFJUSTICE' OR 'THEORY JUST' OR 'THEORY JUSTICE ROUTL' OR 'A THEORY OF JUSTICE' OR 'THEORY JUSTICE REV E' OR 'A theory of justice (Théorie de la justice)' OR 'A theoryofjustice' OR 'THEORY SOCIAL JUSTIC' OR 'ATHEORY JUSTICE' OR 'J RAWLS THEORY JUSTI' OR 'THEORY JUSTICE' OR 'PREFACE THEORY JUSTI' OR 'STHEORY JUSTICE' OR 'TEORIA GIUSTIZIA' OR 'TEORY JUSTICE' OR 'THEOLY JUSTICE' OR 'THEOR JUSTICE' OR 'THEORIE GERECHTIGKEI' OR 'THEORY JSUTICE' OR 'THEORY JUSTICE' OR 'THEORY JUSSETICE' OR 'THEORY JUSINCE' OR 'THEORY JUSTICE' OR 'THEORY JUSTIC' OR 'THEORY JUSTICD' OR 'THEORY JUSTICE 1' OR 'THEORY JUSTICE 90 91' OR 'THEORY JUSTICE CAMBR' OR 'THEORY JUSTICE FAIRN' OR 'THEORY JUSTICE OUP' OR 'THEORY JUSTICE OXFOR' OR 'THEORY JUSTICEE' OR 'THEORY JUSTICER' OR 'THEORY JUSTICEW' OR 'THEORY JUSTICS' OR 'THEORY JUSTICW' OR 'THEORY JUSTIDE' OR 'THEORY JUTICE' OR 'THEORY OFJUSTICE' OR 'THEORY PRACTICE' OR 'THEORY USTICE' OR 'THEORYJUSTICE' OR 'THEORYN JUSTICE' OR 'THEORY JUSTICE' OR 'THEORY JUSTICE' OR 'THEORY JUSTIC' OR 'THEORY JUSTICE' OR 'THEORYR JUSTICE' OR 'THEORY JUSTICE' OR 'TREATISE JUSTICE' OR 'A Theory of Justice' OR '3HEORY JUSTICE' OR 'THEORY JUSTICE 3' OR 'THEORY JUSTICE TJ' OR 'A THEORY JUSTICE'

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