

Measuring internationality without bias against the periphery

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Motivation

- ◇ “A single quantitative measure of internationality [...] would be an indispensable tool in the hands of authors, readers, editors, publishers and generally anyone interested in the evaluation of journals” (Buela-Casal et al., 2005, p. 45).

Purpose of the study

- ◇ Discuss previous approaches to measure internationality
- ◇ Propose a new indicator
- ◇ Present results on the basis of the indicator proposed

Internationality – Definition

- ◇ „International“ means between countries
- ◇ With regard to authorship international can refer to
 - ◇ Journals publishing authors from neighbouring countries
 - ◇ Journals publishing authors from all over the world

Previous approaches

- ◇ Zitt & Bassecoulard (1998) studied the distribution of authoring and citing countries and compared it with average profiles of a discipline
 - ◇ Their indicator is biased because it produces high rates of internationalization for US journals
- ◇ Zitt & Bassecoulard (1999) proposed an internationality indicator at the country-level that considers the relation of national vs. international-oriented publications of a country
- ◇ Perakakis et al. (2005) studied author distributions of 4 psychology journals by calculating the Gini-Coefficient
 - ◇ They found ambiguous results

Center and peripheral countries

- ◇ Englander and Smith (2013) state that “peripheral” is a contested but helpful term to refer to
 - ◇ Nations that are economically disadvantaged in terms of investments in R&D relative to the “center” regions of the world and where English is not the dominant language
- ◇ The indicator proposed is less biased against peripheral countries
 - ◇ It rates any geographically heterogeneous pattern of authors and readers (citors) as international

Internationality indicator – Calculation I

- ◇ Total publication counts are calculated
- ◇ Citations are included to reflect diversity of readership
 - ◇ Publication set from a single country is more international if it reaches a foreign readership

$$P = \sum_{Country} P_{country}$$

$$C = \sum_{Country} C_{country}$$

Internationality indicator – Calculation II

- ◇ Inspired by the Gini-Simpson-Index (Simpson, 1949)
- ◇ Interpreted as the probability of obtaining different countries when randomly choosing (with backplacing) two publications from the set of publications

$$I_o = 1 - \sum_{country} \frac{P_{country}^2}{P^2}$$

- ◇ The following statements hold:
 - ◇ $I_o = 1$ if and only if $P = 0$, and
 - ◇ $I_o = 0$ if $P_{country} = 0$ for all but one country

Internationality indicator – Calculation III

- ◇ Interpreted as the probability that a randomly chosen publication and another randomly chosen publication or citation are from different countries

$$I = 1 - \sum_{country} \frac{P_{country}}{P} \cdot \frac{C_{country} + P_{country}}{C + P}$$

- ◇ The following statements hold:
 - ◇ $I = 1$ if and only if $P = 0$,
 - ◇ $I = I_0$ if $C = 0$, and
 - ◇ $I = 0$ if $P_{country} = 0$ and $C_{country} = 0$ for all but one country.

Data

- ◇ **Web of Science** in-house database
- ◇ Publications and citations from **SCI-E**, **SSCI**, and **A&HCI**
- ◇ Source items are **Articles**, **Letters**, and **Reviews**
- ◇ Publication period: **2008-2011**
- ◇ **4-year** citation window
- ◇ **OECD category scheme**
 - ◇ 6 major fields
 - ◇ 42 disciplines (39 in WoS)
- ◇ **Fractional counting** of publications and citations on
 - ◇ Country level

Results – Internationality of disciplines

Table 1a. Overview of OECD disciplines and their Internationality score.

Rank	OECD Discipline	I- Score
1	Industrial Biotechnology	0.882
2	Nano-technology	0.868
3	Environmental biotechnology	0.855
4	Computer and information sciences	0.851
5	Mathematics	0.849
6	Physical sciences	0.847
7	Mechanical engineering	0.846
8	Environmental engineering	0.844
9	Civil engineering	0.841
10	Biological sciences	0.840
...		

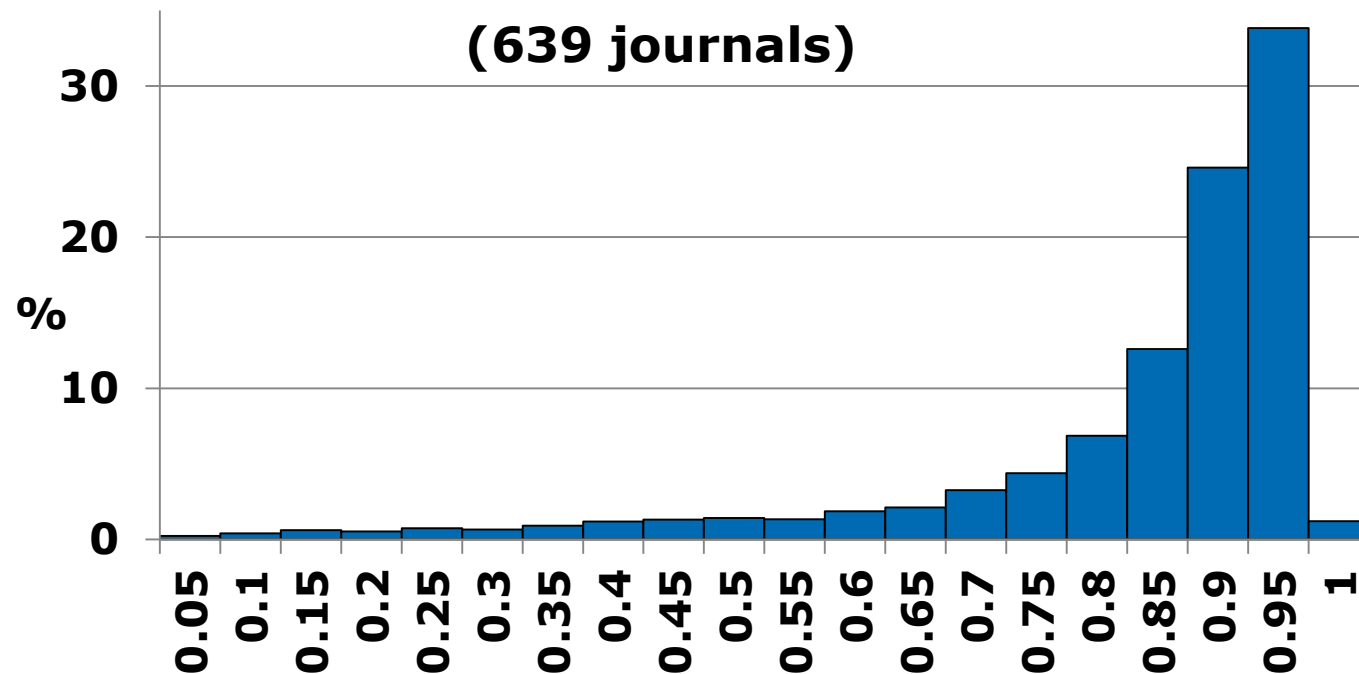
Results – Internationality of disciplines

Table 1b. Overview of OECD disciplines and their Internationality score.

Rank	OECD Discipline	I- Score
...		
30	Media and communications	0.691
31	Political Science	0.652
32	Sociology	0.651
33	Philosophy, ethics and religion	0.647
34	Educational sciences	0.629
35	History and archaeology	0.606
36	Art (history of arts, performing arts)	0.589
37	Languages and literature	0.572
38	Other humanities	0.560
39	Law	0.449

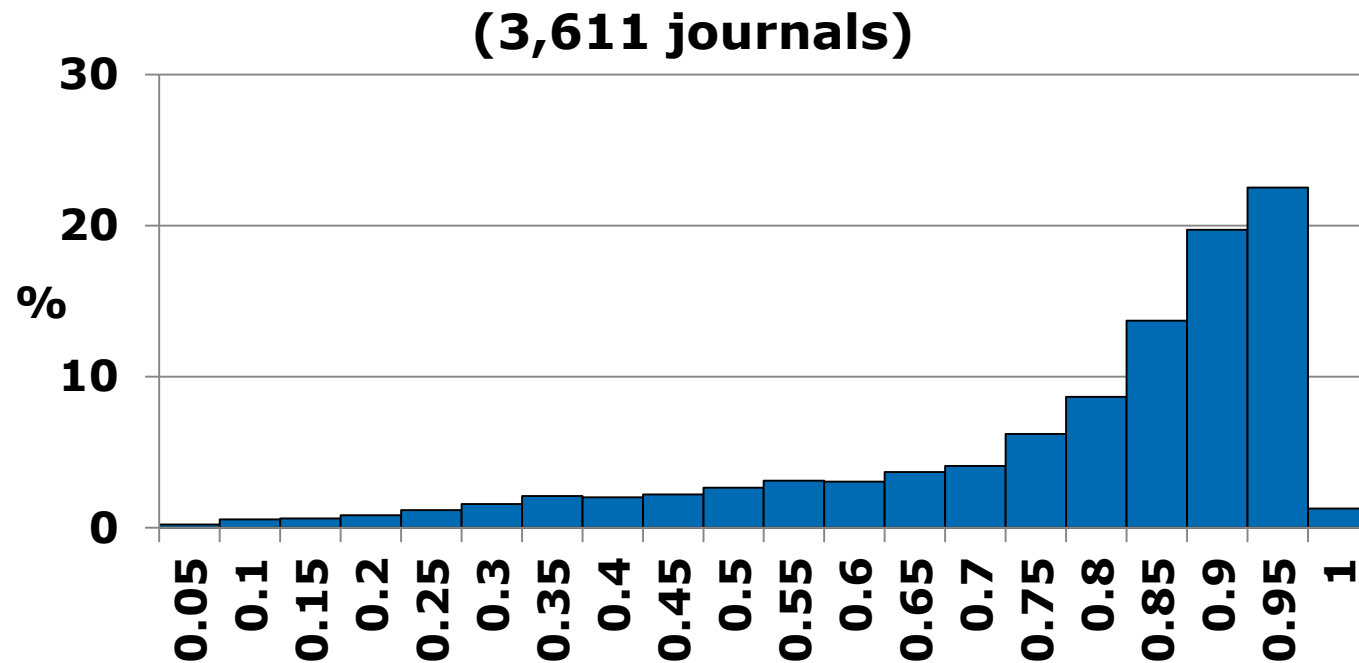
Results – Internationality of fields

Figure 1a. Distribution of journals according to their internationality score in the **Natural Sciences**.



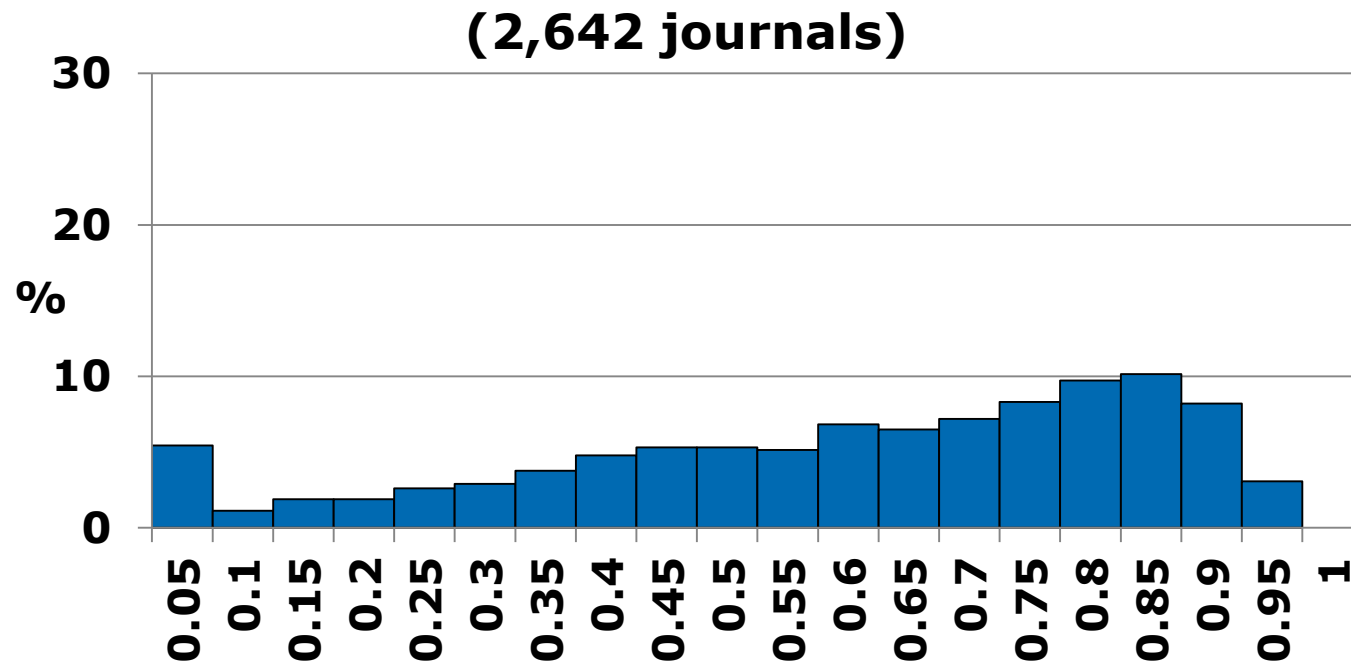
Results – Internationality of fields

Figure 1b. Distribution of journals according to their internationality score in the **Medical and Health Sciences**.



Results – Internationality of fields

Figure 1c. Distribution of journals according to their internationality score in the **Humanities**.



Results – Internationality of countries

Figure 2a. Distribution of journals according to their internationality score in the **Natural Sciences**.

Rank	Country	I-Score	Rank	Country	I-Score
1	Netherlands	0.876	11	Iran	0.842
2	Spain	0.884	12	United States	0.836
3	Italy	0.880	13	Turkey	0.830
4	France	0.872	14	Japan	0.825
5	Germany	0.870	15	South Korea	0.811
6	United Kingdom	0.869	16	Poland	0.807
7	Switzerland	0.867	17	India	0.797
8	Taiwan	0.864	18	Brazil	0.762
9	Australia	0.859	19	China	0.735
10	Canada	0.855	20	Russia	0.564

Results – Internationality of countries

Figure 2b. Distribution of journals according to their internationality score in the **Medical and Health Sciences**.

Rank	Country	I-Score	Rank	Country	I-Score
1	Netherlands	0.851	11	South Korea	0.779
2	Italy	0.844	12	United States	0.753
3	United Kingdom	0.838	13	Iran	0.745
4	China	0.832	14	France	0.738
5	Taiwan	0.825	15	Turkey	0.735
6	Switzerland	0.824	16	Germany	0.734
7	Japan	0.822	17	Spain	0.728
8	Canada	0.799	18	Poland	0.677
9	India	0.799	19	Brazil	0.667
10	Australia	0.790	20	Russia	0.409

Results – Internationality of countries

Figure 2c. Distribution of journals according to their internationality score in the **Humanities**.

Rank	Country	I-Score	Rank	Country	I-Score
1	Netherlands	0.725	11	Germany	0.598
2	Japan	0.741	12	Canada	0.596
3	Iran	0.719	13	China	0.589
4	India	0.701	14	Spain	0.580
5	Switzerland	0.679	15	France	0.564
6	South Korea	0.670	16	United States	0.520
7	Taiwan	0.668	17	Poland	0.491
8	Australia	0.663	18	Brazil	0.466
9	United Kingdom	0.658	19	Turkey	0.408
10	Italy	0.603	20	Russia	0.282

Conclusions

- ◇ The internationality indicator proposed is less biased against peripheral countries
- ◇ Internationality remains a “mathematically fuzzy entity” and an “Internationality Index” has to be constructed from the combination of weighted criteria (Buela-Casal et al., 2005, p. 45)
- ◇ Future research may consider additional criteria such as
 - ◇ Language of publications
 - ◇ Editorial boards
 - ◇ Geographical distance

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End of presentation

 Questions and comments