# Globalization of Science

## **Evidence from authors in academic journals by country of origin**

Vít Macháček and Martin Srholec

 Think-tank IDEA of the Economic Institute of AS CR

**Introduction**

To which extent are scientific outputs published in global in contrast to local journals? How does this tendency differ across countries and disciplines? And how much has this publication landscape changed over the last decade or so?

Science knows no limits and boundaries. Scientific inquiry has therefore gone global long before the economy or culture. Yet this does not necessarily mean that science has been global to the same extent everywhere and anywhere.

The aim of this study is to show just that. We provide fresh and unique evidence on the globalization of science that allows for a comparison over space, fields and time, namely for xxx **countries** in 4 broad and 27 narrow **disciplines** over 2005 to 2017.

The study is based on six **journal-level indicators** of globalization. The benchmark indicators are derived from the composition of authors by the country of origin. For comparison, we also use data on the number of documents by the country of origin and English-written documents.

The journal-level indicators are then used to produce **aggregated** figures at the level of countries and disciplines. These results are standardized between 0 and 1, where 0 refers to the lowest and 1 to the highest globalization.

The analysis is based on data for 34 964 **journals** downloaded using the Scopus API from the **Scopus citation database** (month 2018). The list of journals and assigned disciplines is taken from the **Scopus Source List** (xxx version).

Globalization of science should not be confused with its quality (or relevance); they are likely to be related in many interesting ways, depending of the discipline, but they are measured differently and capture different phenomena.

The results are presented in a user-friendly and interactive way that allows readers to customize the output. The result should be of interest not only to academics and research managers but also to policy-makers and broader audience across the globe.

For earlier studies of the IDEA think tank on related topics, including on **local journals** and **predatory publishing**, see **here**.

MOVE TO “journal-level indicators” The methodology builds on Zitt and Bassecoulard (1999), who proposed some of the indicators and the aggregation process. However since any systematic evidence is very scarce. Some evidence is estimated in Aman (2016), but their estimation does not take into account the research sector size.

#### Using the application

Each point depicts the globalization index of a respective country and discipline in a given year. For more details see definition of the **journal-level indicators** and **aggregation** procedure.

Use the upper dropdown menus to customize the output. One can compare either:

1. **countries** within a discipline, or
2. **disciplines** within a country;

the main dimension is fixed by the button X. Up to ten items can be included in the comparison. Switch between different indicators in the third dropdown menu.

Moving the cursor over a point displays its value and over the connecting lines displays the name of the particular series.

The dashed grey line shows average of the main dimension, i.e. either for the world or all disciplines.

Keep scrolling down for more information and presentation of the key overarching findings.

Use the menu in the top-centre to jump at any time between the main parts of the study.

**Good to know before using**

* Large year-by-year jumps is some series can be driven by adding (or removing) important journals in Scopus.
* The globalization indexes are standardized between 0 and 1 across all countries (xxx), narrow disciplines (27) and years (13).
* Results for country groups are computed as simple averages of member countries. Germany has the same weight as Luxembourg, etc.
* Results for broad and narrow disciplines are calculated separately from scratch; the former are not simply aggregations of the latter.
* Only data on document types of a journal article, review and conference paper are taken into account.
* Journals are fully counted in each discipline, to which they are assigned. Large interdisciplinary journals may affect results for smaller disciplines.
* Comparison of indicators within a country or a discipline could be misleading, hence not facilitated.
* For the sake of robustness, only journals with at least 30 documents in the given year are included in the calculations.
* Only results of the aggregation to countries and disciplines based on reliable data from at least 30 journals are reported.
* Smaller countries and disciplines suffer from gaps in the displayed results due to insufficient data.
* Overall, one should be careful when interpreting results for smaller countries and disciplines with relatively thin data.