Results Reverse Flips

This section presents the key summary statistics of our dataset. In total, we identified 159 journals that converted from fully open access to a subscription-based business model including hybrid open access. Figure presents a breakdown of these journals by the year when this switch occurred. While the earliest reverse flip happened in 2004, the majority of journals changed their business model from 2013 onward (N = 96).

Table provides summary statistics about the journal age at the year of the reverse flip. Large age differences can be observed, ranging from one year of existences to 124 years. Around 42% (N = 66) of all journals found started before 1990 These findings suggest that not all journals in our sample were born fully open access or online journals, but some might underwent more than one business model change in the course of history.

Table 1: Summary statistics for journal age at time of reverse flip

	Journal Age in Years
Mean	24
Median	16
Standard Deviation	22
Minimum	1
Maximum	124
Q1	6
Q3	36

Reverse flipped journal could be found across all discplines. Table and Figure present a breakdown by top-level discipline. Table presents absolute and percentage of reverse flips per discpline. Figure provides a breakdown of discipline by journal age at the time of the reverse flip, shown as proportion of the total number of reverse flip journals in the dataset. The colored areas represent the distribution of journals per discipline.

Table 2: Breakdown of reverse flip journals by discipline

Discipline	Number of Journals	Proportion (in%)
Health	41	25.8
LS	24	15.1
Mult	2	1.3
PSM	54	34.0
SSH	38	23.9
Total	159	100.0

Breakdown by indexing

We investigated the indexing status of the reverserly flipped journals in large bibliometric databases. Table summarizes

Breakdown by publisher

The dataset allows to analyse the extent of reverse flips across publishers. For this aim, publisher names for every journal were obtained using Crossref, and if not available, added manually. In case of a change of publishing house (To Do, describe the dynamics in methods section and, if possible, quantify it), the current

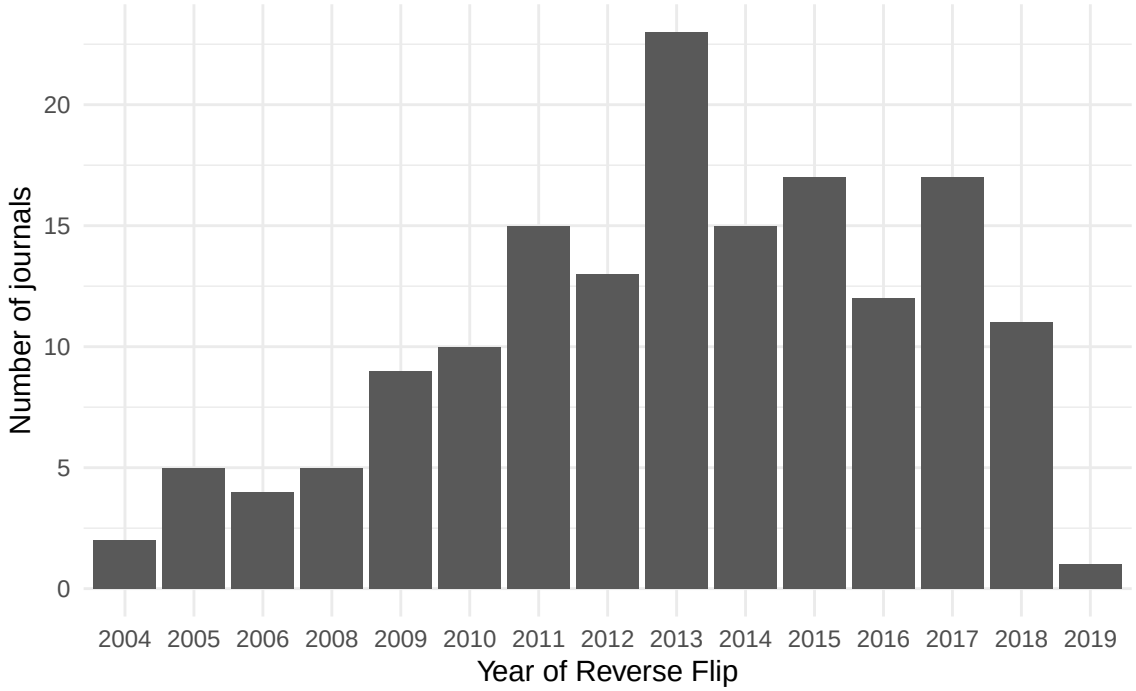


Figure 1: Number of journals converted from fully open access to a subscription-based business model per year. For three journals, no date information could be obtained.

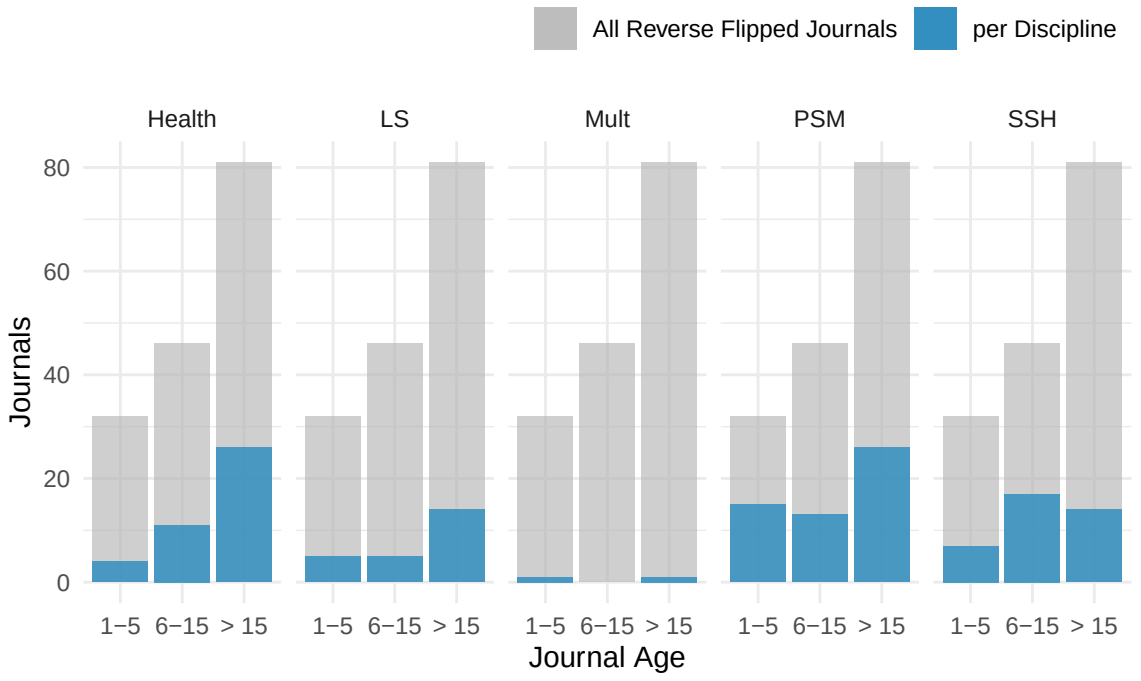


Figure 2: Discipline by journal age at the time of reverse flip, shown as proportion of the total number of reverse flip journals in the dataset. The colored areas represent the distribution of journals per Discipline.

publisher name was used. In total, 46 different publishing houses with reversely flipped journals are included in our dataset.

Table shows the top 5 publishers based on the number of journals in their subscription-based portfolio that were converted from fully open access. These five publishers comprise a total 103 journals, representing 65% of all journals found. The remaining 41 publishers are represented in the category "Other". The extent of reverse flips across publishers reflects roughly the general market shares in scholarly publishing where the large commercial publishers Elsevier BV, Springer Nature, Informa UK Limited and Wiley also dominate.

Table 3: Top 5 publishers based on number of journals converted from from fully open access to a subscription-based business model

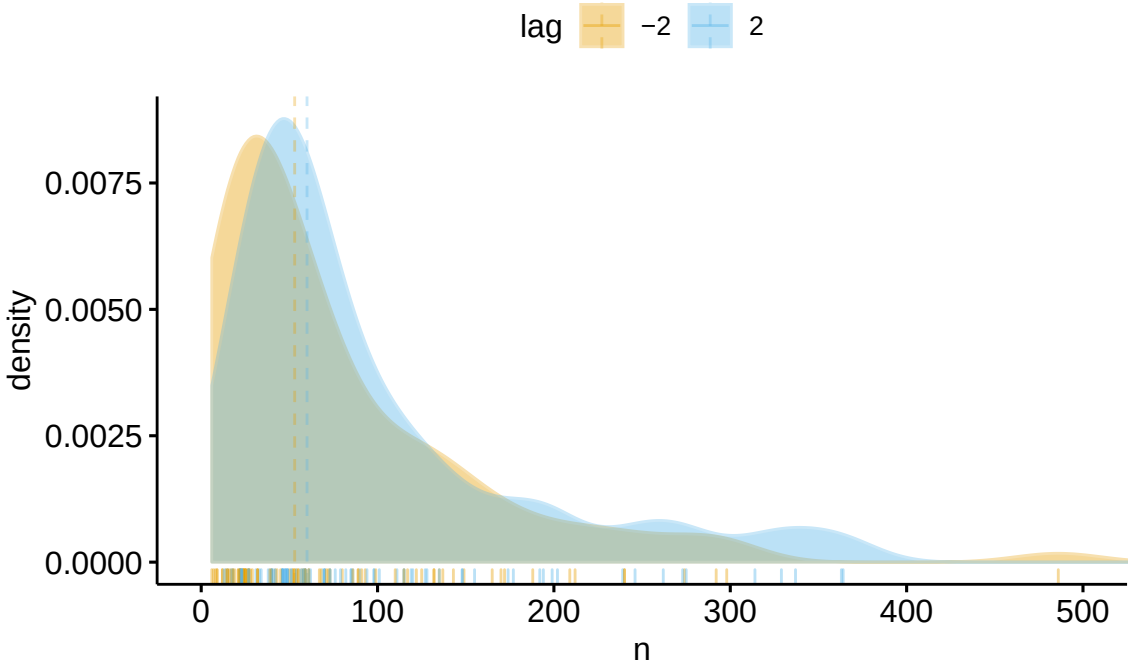
Publisher	Reversely flipped journals	Proportion (in%)
Springer Nature	41	25.8
Elsevier BV	37	23.3
Informa UK Limited	13	8.2
Walter de Gruyter GmbH	7	4.4
Wiley	5	3.1
Other	56	35.2
Total	159	100.0

Breakdown by publication volume

Using our dataset, we retrieved all Crossref indexed articles from 2000 onwards. Articles metadata from 142 journals were registered with Crossref. In total, these converted journals published 214,570 articles in this period.

Publication volume across journals varies.

Comparing yearly article volumes two years before and two years after the flip reveals little change. The median article volume increased marginaly from 53 to 60 articles. Figure illustrate the distribution before and after the flip.



Breakdown by subject

Breakdown by citation impact

To investigate whether the citation impact of a journal changed after the journal was converted to a toll-access business model, we used the source normalized impact per paper (SNIP) indicator from the CWTS. We were able to match 123 journals. Figure illustrates the SNIP distribution of reverse-flip-journals two years before and after the conversion. The latest SNIP values were reported for 2017. Accordingly, only journals where the flip happened in 2015 or earlier were taken into account (N = 82).

Figure suggests that there is no statistical difference on SNIP values before and after the business model change.