

Scientific publishers are producing more papers than ever Concerns about some of their business models are building

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Scientific publishing has long been a money-printing operation, with many big publishing houses reporting profit margins of between 30% and 40% year after year. The long-standing business model is watertight. Articles, which are written and reviewed by academics, are locked behind paywalls. Universities and research institutions then pay through the nose for access to them via subscriptions that cost millions of dollars a year.

In the past decade, however, this model has been challenged by a rise in funders mandating that the research they pay for must be free for anyone to read. A host of publishers have, therefore, adopted a new business model to enable “open access”: levying an article-processing charge—ranging from \$1,000 to \$10,000 per paper, paid for by the scientists submitting the research—to cover their publishing costs.

Both business models continue to do well; the number of academic papers published each year has doubled since 2010 (see chart 1). In a new study published in *Quantitative Science Studies*, Mark Hanson of the University of Exeter and colleagues set out to identify where this explosion of papers has come from and—if possible—to assess whether a drive for quantity has affected quality.

For their paper, entitled “*The strain on scientific publishing*”, the authors analysed publicly available data from journal websites managed by ten big publishing houses. According to the paper, of the ten publishers in their data set, all those operating for profit had increased their output since 2013. But the authors found that this increase occurred in different ways depending on the publishers’ business model.

Roughly half of the new papers since 2013 came from the large traditional publishers *Elsevier*, *Taylor & Francis*, *Springer Nature* and *Wiley* (although these publishers operate some journals that have a fully or partially open-access model, the majority still require subscriptions). Together, these five increased their yearly output of papers by roughly 61% between 2013 and 2022. They did so by increasing both the number of journals in their portfolio and the number of papers per journal.

The study found that the remainder of the increase came from the newer for-profit open-access-only publishers, *Frontiers*, *Hindawi* and *mdpi*. A decade ago, these companies published around 4% as many papers as the traditional publishers. By 2022 they were publishing a third as many. Dr Hanson and his colleagues determined this rapid growth was achieved mainly through the embrace of special issues: groups of articles published together and focused on a single topic outside the journal’s usual publication schedule.

Rather than being managed by the journal’s permanent editorial staff, special issues are typically the responsibility of guest editors. These temporary editors solicit submissions from other scientists in their network. According to Dr Hanson’s team, between 2016 and 2022 the number of special-issue articles produced by the three largest for-profit open-access publishers rose by a factor of 12. These companies now publish four times as many special issues as regular papers (see chart 2). This rise in special-issue papers comes alongside signs that they are being edited more quickly. For traditional publishers the median turnaround time for articles across all issues is roughly 130 days, but with huge variability (in some cases, reviewers may ask for an experiment to be re-run from scratch). In the for-profit open-access journals the median turnaround time was squeezed down from around 74 days in 2016 to just 38 in 2022, with markedly reduced variability (see chart 3). The researchers also found that, within *mdpi* and *Hindawi*’s portfolio of journals, those with more special issues were rejecting fewer submissions.

The worry is that lower-quality articles could be slipping into these special issues. In May this year *Wiley*, which bought *Hindawi* in 2021, announced it would be shutting down 19 former *Hindawi* journals after more than 11,300 papers, mostly

published in special issues, were retracted.

The publishers themselves reject any suggestion that these data imply a decline in quality. Wiley stressed its commitment to research integrity. mdpi attributes its shortened turnaround times to more staff and new tools to improve efficiency. A spokesman from Frontiers said that “Review turnaround time cannot be used as a simple proxy for either research integrity or quality.” Both mdpi and Frontiers insist that special issues are subject to the same peer-review process as regular papers. And there are upsides to special issues: they can be valuable ways for scientists to aggregate information from different research communities, for example, said Hannah Hope, who leads open-research initiatives at Wellcome, a funder.

Still, some funding bodies are trying to stem how much science is published in such journals. **In February this year the Swiss National Science Foundation (snsf) stopped paying processing charges for papers published in special issues.** Previously, according to Matthias Egger, the president of the National Research Council of the snsf, 80-90% of the publishing fees paid by the snsf went towards such special-issue articles, to the tune of around SFr10m (\$10.6m) between 2018 and 2023.

From January 2025 the Gates Foundation will stop paying open-access fees altogether—any researchers they fund must instead use free-to-access preprint servers to share their work. The foundation says the move will help avoid some of the issues Dr Hanson and his team have identified. By making it more expensive for researchers to place their work in open-access journals, it may also limit the number of papers these journals publish. Until more funders join in, however, the tide of new papers is likely to keep on rising. ■

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