

Brief on Open-Archiving Policies

Context—

- Open science can accelerate scientific discovery while addressing systemic inequities in accessing and communicating scholarly and scientific research. At the same time, the inexorable growth of global research output suggests the need to drive excess costs out of research publishing.
- The rent-seeking behavior of many scholarly and scientific journal publishers has been well documented. Commercial STM publishers report operating margins between 30% - 40%, and profits (before interest and taxes) on federally funded research have been estimated between \$393 to \$523 million annually.¹
- Given the concentration of excess publisher returns in the heavily funded STEM disciplines, the most effective way to reduce relative publication costs over time will be through funder policies that drive excess costs out of the system. Reducing publisher margins—by even a modest amount to 15% – 20%—would cut the publishing costs for federally funded research by \$197 to \$262 million per year.
- The dynamics of the research publishing market are complex and attempts to engineer cost reductions via price caps and an emphasis on article charges—for example, through well-intended initiatives such as Plan S—have only increased costs and exacerbated market disparities.
- Open-archiving policies, however, serve the interests of taxpayers without attempting to control the potential secondary effects on the publishing market. Such policies can trigger natural market forces that will work their way through the research publishing system, driving out superfluous costs and encouraging cost-efficient alternatives.
- The best way to serve taxpayer interests is through open-archiving policies that require the posting of machine-readable versions of a funded author's accepted manuscript (AAM), with no embargo restrictions, to an open, interoperable repository, under a license that allows text and data mining. Such policies do not limit an author's choice of publishing outlet.
- To avoid favoring one business model over another, such a policy should make no provision for paying article charges. Although the AAM incorporates any changes from the peer review process, the substantive labor for that review represents an in-kind contribution of the research community. Any publisher costs for administering peer review represents a *quid pro quo* for the publisher's commercial appropriation of the research content.
- Article processing charges (APC) continue to increase at a rate that far exceeds inflation, with the average APC increasing from \$904 in 2011 to \$1,626.² Moreover, studies suggest that author demand

¹ Claudio Aspesi. "Public Research Benefits and Publishers' Profits." 2021.

² Morrison, H., Borges, L., Zhao, X., Kakou, T.L., Shanbhog, A.M. (2021). "Open access article processing charges 2020 – 2021." Preprint. *Sustaining the Knowledge Commons*. <https://ruor.uottawa.ca/handle/10393/42327>

for APCs is not price sensitive and market competition has not prevented APC hyperinflation³ and that APCs have a negative effect on author geographic diversity.⁴

- In contrast, the cost structures of open repositories allows them to scale cost effectively, driving down the marginal cost of open-archiving.⁵

Substitution issues & effects—

The broad implications of open archiving policies (including the extent to which openly archived articles might serve as substitutes for a published journal, the likely effects of the potential substitution on publisher returns and system costs, and the implications of mandates on various publishing models) are outlined below.

- The availability of a substitute—even an imperfect substitute—will affect the demand for any good, including peer-reviewed journals. However, the extent of the substitution effect is difficult to know at this point, and the substitution factors described here provide context for estimating what that effect might be.
- The details of an open-archiving policy have implications for journal business models—both subscription based and open; commercial and nonprofit—as they affect the extent to which the archived content serves as a substitute for the published journal. Salient policy requirements include the version of the article to be archived, the allowable time frame for deposit and access, and the criteria for qualifying repositories.
- While many researchers might prefer the published Version of Record (VoR) when preparing formal research publications of their own, the author’s accepted manuscript is viewed as an adequate substitute for the published version by many researchers and librarians.⁶ Moreover, the universal use of web-based discovery and retrieval tools tends to obscure the provenance of content, which can increase the extent to which preprints and the AAM may serve as substitutes.
- Studies of the manner and extent to which the final published version of an article differs from the author’s corrected manuscript indicate that, while the substantive content of the versions are the same, there are real differences between the author’s refereed, but not copy edited, manuscript and the publisher’s final version.⁷ The integrity of references appears to be the principal improvement added to the published version,⁸ and copyediting now appears to have as much to do with the accuracy of XML tagging as with sense and consistency of style. However, these improvements are not always sufficient to affect the value perception of end users.

³ Shaun Yon-Seng Khoo. “Article Processing Charge Hyperinflation and Price Insensitivity: An Open Access Sequel to the Serials Crisis.” *LIBER Quarterly*, May 2019. doi: [10.18352/lq.10280](https://doi.org/10.18352/lq.10280).

⁴ Audrey C. Smith, Leandra Merz, Jesse B. Borden, Chris K. Gulick, Akhil R. Kshirsagar, Emilio M. Bruna; Assessing the effect of article processing charges on the geographic diversity of authors using Elsevier’s “Mirror Journal” system. *Quantitative Science Studies* 2021; 2 (4): 1123–1143. doi: https://doi.org/10.1162/qss_a_00157

⁵ See R. Johnson, Pinfield, S. and Fosci, M. (2016), Business process costs of implementing “gold” and “green” open access in institutional and national contexts. *J Assn Inf Sci Tec*, 67: 2283–2295. <https://doi.org/10.1002/asi.23545> and John W. Houghton. “Economic Implications of Alternative Publishing Models: Self-archiving and Repositories.” *LIBER Quarterly* 19 (3/4), February 2010: 275 – 292.

⁶ Beckett and Inger 2005.

⁷ Wates and Campbell 2007; Goodman *et al.* 2007.

⁸ Representing approximately 43% of copy editing changes according to Wates and Campbell 2007.

- Reliability of access will also affect substitution. Content deposited in interoperable and well-indexed repositories, as mandated by an effective archiving policy, is easier to discover, and provides a more effective substitute for the published journal, than scattered content for which discovery is less reliable.
- Open archiving mandates that attempt to mitigate substitution effects—by allowing embargoes, limiting deposit to preprints, and limiting repository posting options—serve to perpetuate existing publishing costs and inequities. By contrast, a proposed open-archiving policy that requires immediate deposit of the AAM in an open repository would facilitate systemic cost reductions by embracing, rather than avoiding, the substitution effects of openly archived articles.
- Reviewing the potential implications of open-archiving policies on research publishing costs suggests the effects would be largely uniform under various publishing models.
 - In the context of subscription journals, including those using a contingent OA model (e.g., Subscribe-to-Open), the substitution effect translates into reduced value relative to price. As the proportion of open content increases, a publisher will need to reduce subscription prices to prevent subscribers from canceling. At the same time, the open content will not provide a perfect substitute, and a publisher should be able to capture the value-added by editorial selection and enhanced functionality (e.g., citation links, multimodal presentation, formatting, better discovery, etc.).
 - Article publication charges will face similar downward pressure as the perceived value of the fee will be based on the difference in article version, journal selectivity, and enhanced functionality and discoverability. Funder subsidies for APCs would be ill-advised, as they would undermine these cost savings by introducing a third-party payer hazard and requiring APC price caps and other inefficient market controls.
- Variations in platform functionality can differentiate the published content from open archived versions. Access via the publisher's platform often provides CrossRef-enabled reference linking, advanced search functionality, dynamic content alerting, multimedia and interactive article elements, and support for mobile devices. The absence of this functionality could reduce the extent to which the archived version would provide an acceptable substitute for the published journal, increasing the relative value of the paid subscription or APC.
- At the same time, the value that users perceive in the publisher platforms appears to be decreasing with time. In some cases, this has been accelerated by the use of web-scale library discovery services, which allow users to download content PDFs without interacting with a publisher's platform, thus discounting the value of publisher-provided tools and platform features.
- Typically, only a portion of a journal's research content will be covered by an open-archiving policy, and research articles do not necessarily represent all of a journal's content. For example, reviews, letters, editorials, and other communications comprise a significant percentage of some journals' content. The retained value of a subscription price will reflect the proportion of content not covered by the open archiving policy. Similarly, if APCs are set to cover the costs of non-research material, they should retain that value as well.

- While an open-archiving policy will affect the publishing sector, the direct public benefits in terms of reduced costs, equity of participation, and accelerating the pace of discovery outweigh proprietary interests.
- As noted above, an open-archiving policy with no embargo should encourage other research funders to eliminate embargoes, exceptions, and other provisions that limit the effectiveness of their existing open-archiving mandates. In this way, a single, simple, global approach could harness natural market forces to drive out excess publishing costs.