ADVISOR REPORTS FROM THE FIELD

Elsevier: Among the World's Largest Open Access Publishers as of 2016

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Abstract

Highlights of this broad-brush case study of Elsevier's Open Access (OA) journals as of 2016: Elsevier offers 511 fully OA journals and 2,149 hybrids. Most fully OA journals do not charge article processing charges (APCs). APCs of fully OA journals average $660 US ($1,731 excluding no-fee journals); hybrid OA averages $2,500. A practice termed author nominal copyright is observed, where copyright is in the name of the author although the author contract is essentially a copyright transfer. The prospects for a full Elsevier flip to OA via APC payments for articles going forward are considered and found to be problematic.

Key Points

- Elsevier is now one of the world's largest OA journal publishers.
- Most of Elsevier's fully OA journals do not charge APCs, due to sponsorships.
- Elsevier OA involves a deceptive (deliberate or not) practice of author nominal copyright that is in essence copyright transfer.
- An Elsevier full flip to OA via APCs seems unlikely.

Introduction

This introduction will provide a very brief overview of OA, the two approaches to OA (archives and publishing), and the context of current research and major issues with respect to the APC business model that is used by a minority of OA journal publishers. Reference to the literature is limited to the most major and current studies and initiatives. Readers wishing to pursue the topic further are encouraged to look up citations from cited works.

OA, as stated in the introductory vision paragraph of the Budapest Open Access Initiative (2002), is a possible "unprecedented good," the "world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds." There are two major approaches to OA, via archives and publishing. This article focuses on OA journal publishing and one publisher in particular. No preference for one approach over another is implied by this focus.

A major challenge that must be overcome in order to achieve the potential unprecedented public good of Open Access is the transformation of the system of scholarly communication from one that is dependent on revenue from subscriptions and purchases (predominantly demand-side) to one that is funded on production for Open Access (predominantly supply-side). It is important to distinguish supply-side funding from APCs. Crawford (2016) conducted a major study of all journals listed in the Directory of Open Access Journals (DOAJ) as of Dec. 31, 2015 and reported that "71% of those journals do not charge APCs or other fees–and those free-to-submit journals published 44% of the articles in 2015." On behalf of the Scholarly Publishing and Academic Resources Coalition (SPARC), Crow (2009) published an overview of income models for Open Access in practice at the time, including APCs, advertising, internal or external subsidies, advertising, donations and fund-raising, endowments, in-kind support, and partnerships on the supply side, as well as demand-side models including value-added fee-based services. Examples of contemporary library partnerships to support Open Access that do not depend on APCs include Knowledge Unlatched (Open Access books), the Open Library of the Humanities, and arXiv (physics preprints). The Public Knowledge Project (2016), in cooperation with SPARC and a generous grant from the MacArthur Foundation, is conducting a multiyear study to "explore the feasibility of establishing publishing cooperatives that bring together libraries, journals, scholarly societies, presses, and others as a financially sustainable Open Access model for peer-reviewed scholarly publishing."

According to Morrison (2013), the current global spend by academic libraries is more than sufficient to fund a fully Open Access scholarly publishing system. There is *potential* to transition the system and achieve significant cost savings at the same time. However, cost savings should not be assumed; different scenarios could result in prices increasing, decreasing, or remaining about the same.

A key metric in assessing the potential cost-effectiveness of transformation to a supply-side system is average cost per article. Average cost per article is not the same thing as the APC business model. For example, assessing the cost-effectiveness of a fully sponsored OA journal that does not use APCs could involve calculating the average cost per article.

Nevertheless, the average APC is a useful metric to study the potential economics of transition to OA, for two reasons: a) the APC business method is currently used by some OA journals and so is useful as an actual price and b) because some fully OA publishers have achieved financial success with the APC model, the average APC is useful as a surrogate for potential average cost per article. For example, if a commercial OA publisher can achieve profits at an APC of amount X, then, all else being equal, a reasonably efficient OA publisher of comparative journals should be able to publish articles at a comparable rate (or less, especially if not-for-profit). Note that the APC is an imperfect surrogate for this purpose as some journals that use APCs also derive revenue from other sources such as print subscriptions or value-added versions of articles.

RESEARCH ON APCS

As discussed above, Crawford recently released a major study of APCs from 2011-2015. Key findings: over 10 thousand fully Open Access journals listed in DOAJ as of the end of 2015 had published over half a million articles in 2015 at an average cost of $665 USD or less.

Morrison et al. (2015) published a 2014 survey of DOAJ journals using APCs. Key findings were a global average APC of $964 USD

and a volatile sector as illustrated by the contrast between a mean of $964 USD and mode or most common APC of $0. That is, many publishers and journals that have clearly indicated that they plan to charge APCs are offering free publication at present as a way to attract content. Another finding was that a flat per-article charge is unusual, with about 90% of journals offering one or more variations in price based on such factors as the work involved (e.g., length of article, type of article, language editing), contributions to the journal or a parent society (membership, editing, reviewing), actual or presumed ability to pay, with some journals using traditional print-based page charges rather than a per-article charge. An updated version of the dataset from the 2014 DOAJ survey is available for download in a dataverse (Morrison, 2014) and a peer-reviewed version of the dataset and its documentation is available in a new type of publication designed to facilitate publication credit for open sharing of data (Morrison et al., 2016).

The 2014 global average APC of $964 USD reported by Morrison et al. (2013) is very similar to the 2011 global average of $906 USD reported by Solomon & Björk (2012). However, this average APC may not be valid predictor of future pricing if new journals that plan to charge APCs are offering free or very low-cost APCs to attract content.

The difference in these global average APCs and Crawford's 2015 finding of a much lower average of $665 USD reflects a difference in methods of calculations (which journals are included, journal v. article based calculations). Crawford included all journals while the 2014 Morrison et al. and the 2011 Solomon and Björk studies were limited to journals that charge APCs. All of these studies focus exclusively on fully OA journals, an important limitation.

Other research targets include both fully OA and hybrid journals. Solomon and Björk (2016) recently released a major study of 7,629 APC payment records from four European APC payment databases and 14,356 APC payments from five large North American based universities committed to APCs through the Pay it Forward project. They report an average APC of $1,775 to $1,865 USD for fully OA journals and $2,887 for hybrid journals. The amount for fully OA journals for this group is much higher than reported global average APCs. This is an important point because if budgets for APCs of groups wishing to support transition to OA via APCs are based on global averages they may be significant under-estimates if the journals local faculty wish to publish in have much higher average APCs.

FLIPPING TO OA VIA APCS: PROPONENTS AND ARGUMENTS FOR AND AGAINST

The Pay it Forward project is not the only group that is committed to a particular approach to transitioning to Open Access by flipping subscriptions payments to OA via APCs. In Germany, the Max Planck Digital Library is a leader in advocating this approach. As stated in the abstract of the Max Planck White Paper (Schimmer, Geschuhn & Vogler, 2015):

> This paper makes the strong, fact-based case for a large-scale transformation of the current corpus of scientific subscription journals to an Open Access business model. The existing journals, with their well-tested functionalities, should be retained and developed to meet the demands of 21st century research, while the underlying payment streams undergo a major restructuring.

This would require a global transformation. Advocacy for this approach was the focus of the 2015 Berlin 12 Open Access Conference. A major outcome of the Berlin 12 conference was a call for an *Expression of Interest in the Large-Scale Implementation of Open Access to Scholarly Journals* (OA 2020) (Max Planck Digital Library, 2015). As of May 19, 2016 there are 49 signatories to this call, of which 43 are from the EU and 6 from outside the EU (1 international, 4 South Korea, 1 Chile, 1 Turkey). This evidence suggests that support for a transition to OA via APCs currently receives more support from some areas of the world than others.

The United Kingdom was an early leader in advocating for, and funding, transition to Open Access through OA APCs. The first recommendation of the Finch report (2012), commissioned and accepted by the U.K. government, is:

> a clear policy direction should be set towards support for publication in Open Access or hybrid journals, *funded by* APCs [emphasis added], as the main vehicle for the publication of research, especially when it is publicly funded

The Research Councils U.K. (2012) announced a block grant mechanism "to fund article processing charges (APCs)" stating that the Research Councils "are committed to providing funding for APCs in the long term." The initial period was 2013-2015; after a review period, funding has been renewed.

Shearer's (2015) report on the Berlin 12 OA conference for the Association of Research Libraries notes some of the challenges for a global transformation to Open Access as conceived at Berlin 12. Willinsky talked about one alternative, publishing cooperatives, and argued that APCs would not work in all contexts. Researchers in North America account for about 30% of the articles published in Web of Science. North American libraries expressed concern about the costs of scholarly publishing under an APC scheme as well as pragmatic concerns about the approach; for example, while subscriptions purchased are coordinated at a national level in a number of European countries, there is no such coordination in North America.

Recently, David Schulenberger (2016), a senior fellow working for the U.S.-based Association of Public and Land-Grant Universities (APLU) analyzed the prospects for this model and published a brief paper whose title succinctly captures the conclusions: "substituting article process charges for subscriptions: the cure is worse than the disease." In brief, Schulenberger's analysis is that a simple flip from subscriptions to APCs would result in overall higher prices due to increased market control by commercial monopolies due to transition from negotiations from relatively library, sophisticated library purchasers to many individual author-purchasers.

Those who are aiming for a "large-scale transformation of the current corpus of scientific subscription journals to an Open Access business model," included the Max Planck society as cited above, must of necessity include Elsevier as the current world's largest publisher of scholarly journals. The purpose of this article is to document the current status of Open Access at Elsevier and to analyze the potential for Elsevier to flip to Open Access, as well as the potential consequences if the flip occurs. This research draws on a number of resources, including several separate but related original sub-studies of Open Access at Elsevier.

To summarize, there is considerable interest in flipping the economics of scholarly journal publishing to support OA. This is an interest of intense current research and advocacy, with the E.U. and the U.K. pushing for a global flip of the current system via APCs with North American researchers and libraries expressing some concern about APCs and interest in other models, particularly publishing cooperatives. It is important to note that most OA journals do not use APCs, the average cost per article is not the same as the APC business method, global APC averages could underestimate local requirements to support this approach, and that the financial impact of flip-

ping to APC is not known, with the APC market described as volatile and possibly worse than the disease of high subscription prices. It is in this context that this research examines Elsevier's OA offerings as of 2016.

Method and Results

This section describes the methods and results of the following four sub-studies on a study-by-study basis for purposes of clarity. Each sub-section describes the goals, rationale, method and results for one sub-study.

SIZE AND GROWTH OF ELSEVIER OPEN ACCESS JOURNAL PORTFOLIO

Goal and rationale: to document the current extent of Elsevier's fully Open Access and hybrid journals in terms of number of journals and the rapid growth of Elsevier's Open Access journal portfolio as one of the criteria for assessing the potential for Elsevier to flip to Open Access and to serve as a baseline for future comparison.

Method: Elsevier's 2016 list of Open Access article processing charges was downloaded from the Elsevier website and converted from PDF to excel to facilitate analysis. Journals were sorted by type (OA for full OA and hybrid for journals that combine OA with subscriptions) to obtain the numbers of journals in each category and to prepare for a comparative description of Elsevier's APCs (see next section). Historical information was obtained from a 2011 APC study (Solomon & Björk, 2012), a 2014 DOAJ OA APC survey (Morrison et al., 2015), and contributed by Solomon (2016).

Results: No Elsevier journal was included in the 2011 APC sample. This means that Elsevier either had no journals listed in DOAJ at that time, or too few to merit attention. Solomon reported to the author via e-mail that a study in 2013 found that "In August 2013 they [Elsevier] had 46 OA journals which increased to 72 by December that year. Many at that time had very few or no articles." Note that the number of OA journals on a publisher's website does not always match the number in DOAJ due to the DOAJ vetting process; publishers may not have submitted titles, new titles may be in the DOAJ vetting queue or may not meet the DOAJ criteria. For example, DOAJ does not include journals that publish less than five peer-reviewed articles per year.

In the 2014 DOAJ sample, seven Elsevier journals were listed in DOAJ. A DOAJ search for journals by publisher conducted by the author in May 2016 found 152 journals listed under Elsevier, making Elsevier the fifth largest publisher in DOAJ. Similarly, Elsevier is now the sixth largest publisher of OA articles in DOAJ, with 27,947 articles.

The number of fully OA journals that have been processed and added by DOAJ is not the complete picture. According to Elsevier's downloadable OA article processing charges spreadsheet, Elsevier now offers 511 fully Open Access journals. This is more than the 405 titles listed on Hindawi's own website (this number is different from the count in DOAJ which includes predecessor titles). De Gruyter lists 435 Open Access journals. The total for BioMedCentral, Springer, and Nature combined (all owned by Springer) is over 600 journals. This is evidence that Elsevier is among the world's largest publishers of OA journals, as measured by number of journals.

In addition to the 511 fully OA journals included on Elsevier's price list, there are 2,149 hybrid journals listed with their APC prices. This makes a total of 2,660 full or hybrid OA journals at Elsevier, which appears to be equal, or be very close to being equal to, Elsevier's total title list.

ELSEVIER OA APCS

Goal and rationale: document Elsevier's 2016 OA APCs for current analysis and future longitudinal studies and compare hybrid and fully OA APCs.

Method: the Elsevier OA APCs were sorted by price to calculate central tendencies and frequencies by price band for the OA and hybrid journal categories.

Results: Of the 511 fully OA journals, 315 or 62% indicate an APC of $0 with the statement "fee not payable by author," apparently reflecting a large number of society and university sponsors hosting their journals with Elsevier. This is a marked contrast with the hybrid journals. Only 4 of the 2,149 hybrid journals, or .002% had APCs of 0 and "fee not payable by author." The average APC for all journals was $2,204 USD. However, there was a marked difference between fully OA and hybrid journals. The average APC for OA journals was $660 USD ($1,731 USD if no-fee journals are excluded), in contrast with an average APC of $2,500 USD for hybrid journals. Figures 1 and 2

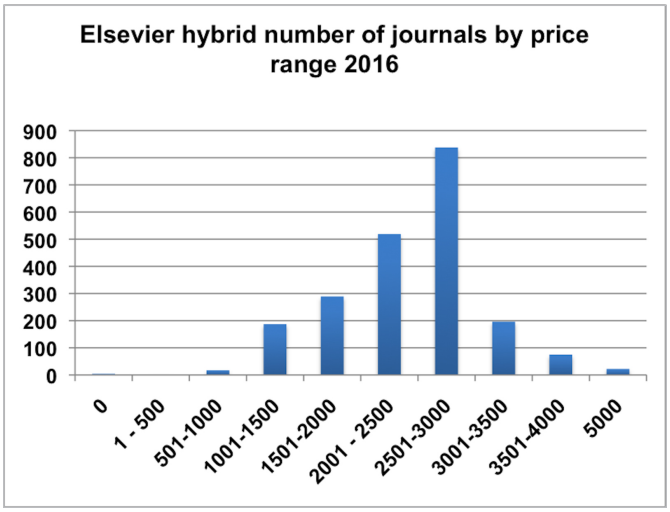

FIGURE 1 **Elsevier Hybrid Number of Journals by Price Range 2016**

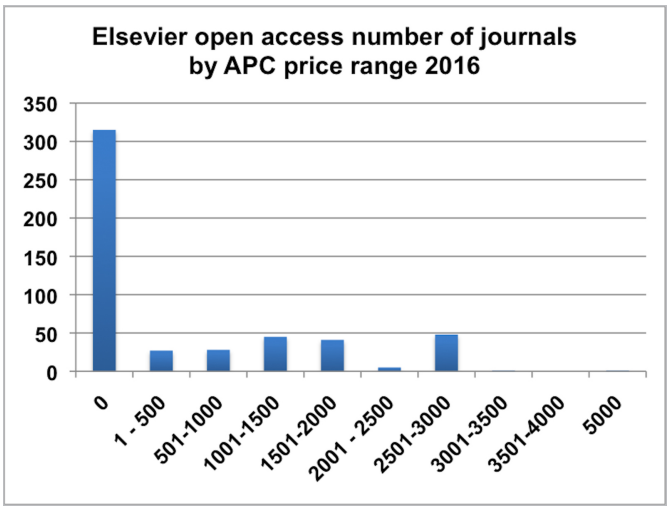

FIGURE 2 **Elsevier Open Access Number of Journals by APC Price Range 2016**

TABLE 1 Number of Journals by APC Price Range, Hybrid and OA Journals

Price Range in USD$	Number in Range: OA	Number of journals in range: hybrid
0	315	4
1-500	27	2
501-1,000	28	17
1,001-1,500	45	187
1,501-2,000	41	289
2,001-2,500	5	519
2,501-3,000	48	838
3,001-3,500	1	196
3,501-4,000		75
5,000	1	22
Total	**511**	**2,149**

illustrate the price skew with fully OA journals towards the low end of the $0 to $5,000 USD price range in contrast with the price skew of hybrid journals towards the high end of the $0 to $5,000 price range.

Table 1 gives the number of journals by price range in USD for fully OA and hybrid journals.

To explore how Elsevier is offering OA journals with no APCs, a sample of 10 OA journals with $0 APC or "fee not payable by author" was systematically drawn from the Elsevier APC price list (approximately every 30th title alphabetically was sampled). Nine of the ten journals (90%) are sponsored by societies and/or institutions. Eight of the ten clearly indicate that the society retains copyright along with Creative Commons user licenses (in the other cases copyright notices indicate Elsevier). Eight of the ten have articles appearing on the Elsevier website starting 2011 or later. One, apparently fully owned by Elsevier, has articles going back to 1998. One journal's articles appear on the journal's own website. This suggests that sponsorships are likely the primary reason these journals do not charge an APC.

COPYRIGHT OWNERSHIP: AUTHOR NOMINAL COPYRIGHT

Goals and rationale: clicking on the "supports Open Access" link discussed above uncovered information suggesting a broad-based *exclusive* licensing approach that is in effect a copyright transfer arrangement underlying the Elsevier OA articles, as did the statements about copyright ownership by Elsevier and its society partners.

Method: information on copyright and licensing from Elsevier's WebPages was copied on May 18, 2016 and analyzed.

Results: The Elsevier Copyright webpage states (as of May 18, 2016):

> In order for Elsevier to publish and disseminate research articles, we need publishing rights. This is determined by a publishing agreement between the author and Elsevier. This agreement deals with the transfer or license of the copyright to Elsevier and authors retain significant rights to use and share their own published articles. Elsevier supports the need for authors to share, disseminate and maximize the impact of their research and these rights, in Elsevier proprietary journals* are defined below.

For Subscription Articles	For Open Access Articles
Authors transfer copyright to the publisher as part of a journal publishing agreement, but have the right to:	Authors sign an exclusive license agreement, where authors have copyright but license exclusive rights in their article to the publisher.** In this case authors have the right to:
Share their article for Personal Use, Internal Institutional Use and Scholarly Sharing purposes, with a DOI link to the version of record on ScienceDirect (and with the Creative Commons CC-BY-NC- ND license for author manuscript versions)	Share their article in the same ways permitted to third parties under the relevant user license (together with Personal Use rights) so long as it contains a CrossMark logo, the end user license, and a DOI link to the version of record on ScienceDirect.
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The webpage also provides a link to "Download a sample publishing agreement for Open Access articles for authors choosing a commercial user license <https://www.elsevier.com/__data/assets/pdf_file/0011/99668/Sample_-JPLA_CC-BY-4-0.pdf> and non-commercial user license <https://www.elsevier.com/__data/assets/pdf_file/0012/99669/Sample_-JPLA_CC-BY-NC-ND-4-0.pdf>."

The publishing agreement for the commercial user license states:

License of publishing rights - I hereby grant to the Journal an *exclusive* [emphasis added] publishing and distribution license in the manuscript identified above and any tables, illustrations or other material submitted for publication as part of the manuscript (the "Article") in all forms and media (whether now known or later developed), throughout the world, in all languages, for the full term of copyright, effective when the Article is accepted for publication. This license includes the right to enforce the rights granted by this license against third parties and to sublicense such rights…

Scholarly communication rights - I understand that I retain the copyright in the Article and that no rights in patents, trademarks or other intellectual property rights are transferred to the Journal. *As the author of the Article, I understand that I shall have the same rights to reuse the Article as those allowed to third party users* [emphasis added] (and the Journal) of the Article under the CC-BY License.

Summary: the Elsevier approach to copyright for OA articles is described as author nominal copyright, that is, copyright in the name of the author while rights under copyright are transferred to Elsevier for their exclusive use, and authors become third parties with respect to their own works.

FINANCIAL ANALYSIS OF THE FEASIBILITY OF A FULL ELSEVIER OPEN ACCESS FLIP

Goal and rationale: the purpose of this study is to analyze the cost requirements for Elsevier to flip to Open Access and retain its current revenue and profit.

Method: Data from Elsevier and its parent company Relyx was analyzed to get a ballpark figure for the average APC amount that would be needed to replace existing subscriptions revenue.

Results: One key piece of data is the average number of articles published by Elsevier per year. According to the Elsevier Books & Journals webpage as of May 2016, "Every year, we accept and publish more than 250,000 articles." According to the Relyx (Elsevier's parent company) most recent annual report (Relyx, 2015), it's 400,000 articles.

The other key piece of data is the revenue specific to Elsevier's journals. This is difficult to estimate precisely as the revenue from book sales, while a small percentage of Elsevier business, is not detailed in the annual report. The Relyx annual report indicates that the 2015 STM revenue was 2,070 million GBP and the adjusted operating profit was STM adjusted operating profit 760 million GBP (37% profit). Converting to USD at the rate of 1.4451 ([omitted for blind review] currency converter May 12, 2016), that's revenue of $2,991,357,000 USD (close to $3 billion USD) and operating profit of $1,098,276,000 USD ($1 billion USD). Note that Elsevier's publishing operations are listed under STM to distinguish from other company operations such as risk and business analytics, legal (LexisNexis – publishes laws and a handful of journals but predominately not a publisher) and exhibitions. Publication of journals and books in social sciences and humanities is subsumed in Elsevier's STM revenues. Note that STM revenue includes the services Scopus, ScienceDirect, SciVal, and HESI in addition to journal revenue.

Using these figures I've come up with the following estimates of how much an average APC would need to be to replace all of their STM revenue.

> $11,965 USD is the average APC needed to provide the company with $3 billion in revenue based on average annual article production of 250,000.
>
> $7,479 USD is the average APC needed to provide the company with $3 billion in revenue based on average annual article production of 400,000.
>
> $5,115 USD is a low-end estimate average APC that limits revenue to the current 76% of revenue from electronic products as reported by Elsevier and eliminates a further 10% of revenue assuming this would come from book sales. This amount assumes annual article production of 400,000.
>
> $3,222 USD is a really low-end and probably unrealistic estimate APC based on cost recovery (63%) of the $5,115 amount (i.e., this is the most optimistic estimate from the payer's perspective but would eliminate Elsevier profit).

All of these estimates are above the current high end of the Elsevier APC price range, significantly higher than traditional per-average global spend on subscriptions of about $4,300 and the APCs of successful commercial and not-for-profit Open Access publishers. The exception is the final unrealistic estimate that would be lower than current spend but still significantly higher than prices of other successful Open Access publishers.

DISCUSSION AND CONCLUSION

With 511 fully OA journals, Elsevier is now among the world's largest OA journal publishers in terms of number of OA journals available. This is a recent development. In 2011 Elsevier did not even register on the radar for a major study of fully OA publishing, and as recently as 2013 there were only 46 OA journals.

The average Elsevier APC varies considerably depending on whether one counts only fully OA journals and whether one counts journals that do not charge APCs. The lowest average of $660 USD for all OA journals is less than 40% of the average of $1,731 USD when journals whose fees are not payable by the author are not included.

The majority of Elsevier's fully OA journals (over 300 journals) have APCs of $0 and an indication that fees are not payable by the author. A sample of 10 of these journals found that 9 of the 10 are sponsored by societies or institutions. More information would be needed to assess whether the societies or institutions intend and are able to provide ongoing sponsorship or whether this is a transitory situation, e.g., reflecting one-off transitional sponsorship or possibly a below-cost Elsevier contract designed to attract publishing partners (a common business strategy that readers are likely familiar with—e.g., cable, smartphone, or internet service providers offering free service very low pricing for the first 6 months for new customers).

The average APC for hybrid journals of $2,550 USD is 32% higher than the average of $1,731 USD for OA journals, excluding journals that do not charge fees from both types of journals. This is ironic given that all hybrid journals benefit from another revenue source, subscriptions.

Elsevier's approach to author publishing agreements for OA is a contradictory and (whether deliberate or not) deceptive practice of author nominal copyright, which is actually a full transfer of rights under copyright with a commitment to naming the author as the copyright owner. Elsevier's statement: "As the author of the Article, I understand that I shall have the same rights to reuse the Article as those allowed to third party users (and the Journal) of the Article under the CC-BY License" makes this very clear, as does this section from the License Grant: I hereby grant to the Journal an exclusive publishing and distribution license in the manuscript identified above and any tables, illustrations or other material submitted for publication as part of the manuscript (the "Article") in all forms and media (whether now known or later developed), throughout the world, in all languages, for the full term of copyright, effective when the Article is accepted for publication.

This statement from the Scholarly Communication Rights section is similarly deceptive: "I understand that I retain the copyright in the Article and that no rights in patents, trademarks or other intellectual property rights are transferred to the Journal." Retaining copyright is not compatible with granting an exclusive publishing and distribution license for the full term of copyright. Patents and trademarks are different areas of intellectual property law from copyright; there is no tradition of transferring patent or trademark rights in the process of publication. This statement is not necessary; the author does not retain any rights normally transferred in the course of publication.

This practice of author nominal copyright is important because Elsevier is in essence acquiring exclusive copyright for OA articles, even those that appear with the author's name as copyright owner and use Creative Commons licenses. Elsevier (or in some cases society partners) is in effect the copyright owner and the Licensor under Creative Commons terms. Copyright owners are in no way obliged by CC licenses to continue to make works available under the terms of a particular license. If I own the copyright in a work, I can post a copy today under a CC-BY license, then take it down tomorrow and replace it with another copy under All Rights Reserved. If someone downloaded and used yesterday's CC-BY licensed copy, I cannot revoke the terms, but if I did not make a copy yesterday, I am stuck with All Rights Reserved. For this reason my recommendation to all authors publishing works with Elsevier for OA is to actively make use of their third party rights to archive a copy of their work with the CC-BY license in their institutional repository. Maintaining a copy of paperwork proving that Elsevier and the author agreed to publish under CC terms also seems prudent.

Some OA activists will be disappointed in the society ownership of copyright of many of Elsevier's Open Access journals. I see this as healthy. The alternative is likely not a vision of pure creative commons licensing with only attribution to the author; the alternative seems to be more likely to be Elsevier copyright retention. Societies and institutions that retain their copyright are free to seek alternative hosts or partners whenever their contracts with Elsevier come up for renewal.

Realistic APC prices that would be required to sustain Elsevier revenue and profit based on dividing Elsevier's stated revenue by Elsevier's two different reports of article production range from over $5,000 to close to $12,000 USD per article. The low-end estimate is higher than estimated global academic library spend (Morrison, 2013).

Even if every article produced by Elsevier from this day forward were OA through APC funding, it is important to note that Elsevier derives considerable revenue through subscriptions and pay-per-view for a very substantial collection of back issues, and for search services such as Scopus and Science Direct. It seems likely that even if signatories of the *OA020: Expression of Interest in the Large-Scale Implementation of Open Access to Scholarly Journals* were to be joined by every university and research organization worldwide, and even if they were to collectively agree to pay more than current spend to transition Elsevier moving forward to Open Access publication, Elsevier would continue to seek subscriptions and pay-per-view revenue for back issues, and paying for OA articles should not be assumed to include payment for search services that libraries and researchers might continue to see as "must-haves."

Limitations and suggestions for further research

The small size of the sample of fully OA journals means that the results with respect to society and university ownership of journals with no APCs, are not generalizable.

SUGGESTIONS FOR FURTHER RESEARCH:

- Comprehensive study of the 511 fully OA Elsevier journals
- Research on whether other publishers are using the deceptive author nominal copyright approach
- Repetition of this study in subsequent years to determine trends in pricing and copyright practices

Conclusion

In conclusion, in recent years Elsevier has emerged from near-invisibility in the OA landscape to become among the world's largest OA publishers as measured by the number of journals, with 511 fully OA journals and 2,149 hybrid journals. The (intentional or not) deceptive practice of author nominal copyright, (i.e., copyright in the name of the author concealing an exclusive license that is in effect a full copyright transfer) is troubling. The APCs that would be required to retain Elsevier's current revenue and profit in a full shift to OA are not realistic. Libraries and others wishing to support a full flip to OA via APCs are advised to consider the likelihood that Elsevier would continue to seek substantial revenue through copyright ownership in back issues and for search services even if all articles moving forward were paid OA via APCs. In summary, the author cautions that the complexity and potential costs of transitioning Elsevier to full Open Access should not be underestimated.

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