

# Why Is Access to the Scholarly Journal Literature So Expensive?

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For more than 30 years the spiraling costs of scholarly journal subscriptions, often called the “serials crisis,” have been a hotly debated topic. Academics and librarians have pointed out the high profit levels of the major commercial publishers, despite that the content they sell is provided by unpaid authors and reviewers. The publishers then resell it to the universities of these same authors and reviewers. Publishers have attempted to justify their prices by cost increases, their investments in information technology, and the value they add.

A useful framework for understanding the situation is Michael Porter’s five forces model for explaining the competitive conditions in an industry. Despite claims to the contrary, the degree of market concentration in scholarly publishing is not higher than that in many other industries, and it is not the main cause of the problem. But because the big deals of different publishers are complements rather than substitutes, the leading companies essentially do not compete for customers, in contrast to other industries, such as mobile phones or automobiles. The high barriers to new entrants, partly due to journal ranking lists and impact factors, as well as the low bargaining power of suppliers and customers, explain why this industry has been so well shielded from the disruptive forces of the Internet. The protected competitive position and high profitability are also major reasons why the big subscription publishers have been slow to adopt the open access business model.

## Background

During the past three decades, there has been a continuing discussion about the subscription prices of peer-reviewed journals, which have risen faster than inflation. This phenomenon has been named the “serials crisis.”<sup>1</sup> Although publisher-wide electronic licenses such as ScienceDirect or Springer Link have largely replaced subscriptions to individual titles, the same price spiral seems to be continuing.<sup>2</sup>

A related issue is the slower than expected transition to open access (OA) journals. Contrary to the early optimistic predictions 15 to 20 years ago, the growth has been linear, with a rate of only around 1 percentage point of the market share per annum.<sup>3</sup> The major commercial publishers and learned societies have been reluctant to flip existing titles or start new OA ones. Instead, they have opted for the risk-free alternative of subscription journals offering paid OA for individual articles, a model called hybrid OA.

University librarians and OA activists have spent much time trying to calculate “reasonable” journal costs and criticizing publishers for pricing leading to excessive profits.<sup>4</sup> On the other side of the fence, publishers have tried to justify their prices by their high costs.<sup>5</sup> The discussion has lately also concerned the pricing of articles in OA journals, so-called article processing charges (APCs).<sup>6</sup>

What many information science specialists and OA activists seem to ignore is that peer-reviewed journal publishing is a market like the trade in any other commodity or service. Despite that a large part of the raw material is provided pro bono by the academic community, scholarly publishing follows the same basic microeconomic rules of prices, set in an interplay between supply and demand, as well as the peculiarities of non-perfect markets characterized by oligopolies (a few big companies controlling the market).

The so-called five forces model by the economist Michael Porter has for four decades been part of the standard curriculum at business schools for analyzing the competitive situation in different industries.<sup>7</sup> The model is well suited also as a framework for a discussion of scholarly journal publishing. It offers plausible explanations both for the high pricing and for the slow transition to OA.

The purpose of Porter’s five forces framework is to analyze the key factors that together determine the competitive situation of an industry. The five forces that Porter claims define the overall level of competition are (1) industry rivalry, (2) the bargaining power of suppliers, (3) the bargaining power of buyers, (4) the threat of new entrants, and (5) the threat of substitutes. The model is usually visually represented in a figure where industry rivalry stands in the center and the other four forces come from different directions. A low competitive intensity usually entails high profit levels for companies in that industry, and a high intensity tends to lead to lower profits. An extreme case is perfect competition, an abstraction from reality described in basic economic theory. The scholarly journal publishing market is far removed from such a state. An illustration of the model depicting key stakeholders in scholarly publishing, is shown in Figure 1.

Only a few previous authors have directly used Porter’s models as a conceptual lens to consider scholarly journal publishing. Glenn McGuigan and Robert Russell discuss the roles of the content suppliers (authors and reviewers), the publishers, and the customers (mainly university libraries), and they note that a few publishers dominate the market and collect extremely high profits.<sup>8</sup> This author has proposed an extension of Porter’s model with two additional forces particular to this market, selective indexing services and funder mandates requiring that grant recipients make their work widely available.<sup>9</sup>

Several other authors have provided useful insights into the scholarly journal market and its characteristics. In an early paper, Aaron Edlin and Daniel Rubinfeld, who both are professors of law and economics, discuss this market from the viewpoint of antitrust legislation, with an emphasis on the negative effects of the massive bundling of journal subscriptions into “big deal” electronic licenses.<sup>10</sup> They note that the big

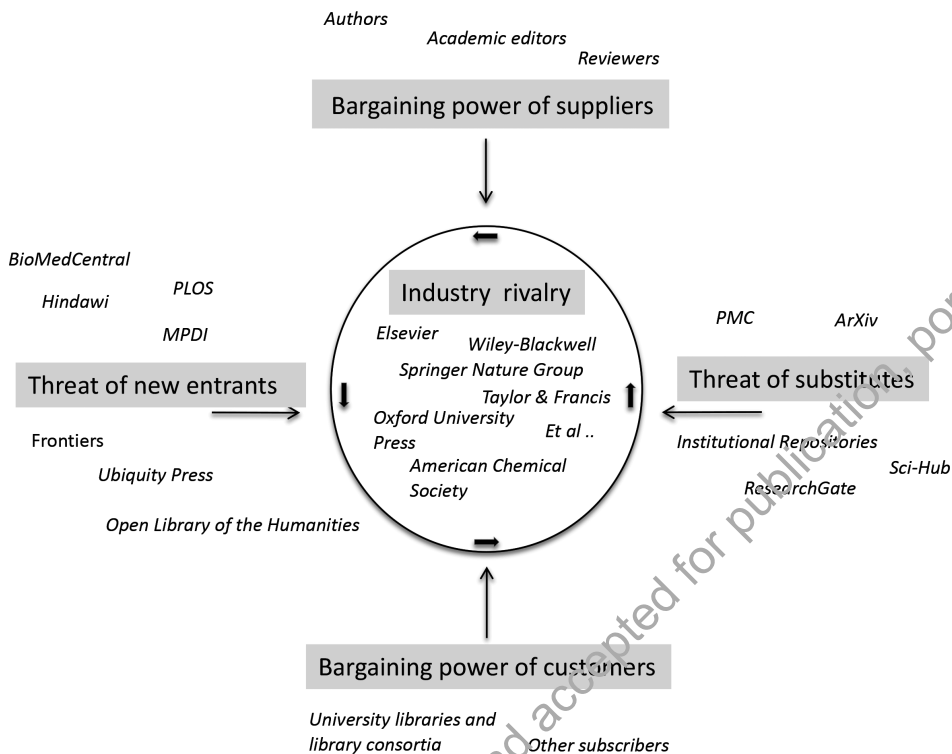


Figure 1. An illustration of Michael Porter's five forces model, a method for analyzing the level of competition, in scholarly journal publishing, showing the industry's key stakeholders.

discrepancy between the price increases for journals from commercial publishers and those for journals from nonprofits is a symptom of a nonfunctional market. Factors that have facilitated this difference include the growing concentration in the industry due to mergers as well as the practice of nondisclosure clauses for the e-license contracts, which make it easier to use price discrimination. Edlin and Rubinfeld further discuss two types of barriers to new entering publishers and journals. Structural barriers are caused by the complex networks of authors, editors, reviewers, publishers, indexing services, libraries, and readers needed for a journal to succeed. Strategic barriers are created via the big deals indirectly capturing an increasing share of overall library acquisitions, thus crowding out journals from smaller publishers, not to mention aspiring new entrants. In his account of how the big deal has evolved, Richard Poynder describes this crowding out in a colorful way: "In short, the Big Deal turned out to be a cuckoo: Once in the nest, it tends to consume everything, throwing out the other fledglings in the process."<sup>11</sup>

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Theodore Bergstrom, Paul Courant, R. Preston McAfee, and Michael Williams, invoking Freedom of Information acts, collected data on 360 contracts between United States

universities and publishers.<sup>12</sup> They measured the access prices paid by universities using an estimated cost per citation, a proxy of the usefulness to researchers of a publisher's bundle of journals, and found that the prices of commercial publishers were markedly higher than those of scholarly societies and university presses.

This article will analyze the scholarly publishing market using Porter's five forces. The analysis is partly subjective and not solidly based on empirical evidence, but it may provide new insights to readers unfamiliar with competitive strategy in the Internet age. In 2017, the number of English-language peer-reviewed journals indexed in Scopus was 33,000, publishing around 3 million articles yearly.<sup>13</sup> The industry has a few big players and thousands of small publishers. Many of the latter are scholarly societies, universities, and university departments, and often publish just one journal. A handful of big commercial publishers dominate the English-language market for science, technology, and mathematics, with an estimated yearly revenue of around \$10 billion.

### Industry Rivalry

Industry rivalry can partly be explained by the level of concentration among companies in a business field. Concentration rates can be measured using the Herfindahl-Hirschman Index (HHI), defined as the sum of the squares of the market shares of the firms within the industry.<sup>14</sup> Sometimes only the 50 largest companies are counted. In an industry with just one monopoly player, the index would be 1, and for a pure competition industry, it approaches zero. A simpler measure is the concentration ratio, which calculates the total market share of the largest firms, for instance, the four or eight largest. The HHI is more complex to calculate but more informative. The Antitrust Division of the U.S. Department of Justice considers Herfindahl-Hirschman indexes between 0.15 and 0.25 to be "moderately concentrated" and indexes above 0.25 to be "highly concentrated."<sup>15</sup>

In such business fields as hairdressing or restaurants, numerous small entities in every city compete fiercely for customers. At the other end of the spectrum are global industries demanding huge long-term investments, such as the manufacture of mobile phones or automobiles, where just a few companies dominate the market. In mobile phones, two companies (Samsung with 31 percent and Apple with 27 percent) currently have more than half the world market, and the five biggest companies have 81 percent.<sup>16</sup>

The HHI Index for mobile phone manufacturing (using the market shares of the six biggest companies for the calculation)

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is 0.187. Car manufacturing is divided among a dozen players, most of them with a decades-long history. The five biggest have a 34 percent market share, and even the market leader Toyota has only 10.2 percent.<sup>17</sup> The HHI Index using the shares for the five biggest automakers

is only 0.025. Scholarly journal publishing is less concentrated than the mobile phone business but more so than car manufacturing. Based on comprehensive data from Web of Science, the five biggest publishers issued 56.6 percent of all Web of Science indexed papers in 2018. The share of market leader Elsevier was 23.0 percent. While article shares



do not correspond exactly to revenue shares, they are a reasonable proxy. The HHI Index using the market shares of all Web of Science indexed publishers was 0.094.

Looking at the scholarly publishing market from a legal antitrust viewpoint, it does not appear particularly concentrated. But the fierceness of rivalry in an industry depends on more than the concentration rate. A factor at least equally important is whether the goods or services sold are substitutes or complementary. Despite that the mobile phone industry has only a few big players, competition is extremely tough, since most customers have just one mobile phone at a time. As a result, competition based on price, quality, and brand image is strong. In this industry, two companies who dominated the market until about 2000, Nokia and Ericsson, have both declined since they failed to keep up with the technical development race. Likewise, automaking is a market of substitute products, especially since most manufacturers have a range of models in different price and quality categories.

Examples of classic complementary goods include the combination of cars, car maintenance, and gasoline, or computer printers and print ink cartridges. Using more of one results in more use of the other. In microeconomic terms, complementary goods have negative cross elastic demand functions, meaning that the demand for them increases when the price of their complementary goods decreases.

Scholarly publishing offers a special case of complementary goods. If we look at the articles in the big deal e-licenses of any leading publisher (for example, ScienceDirect or SpringerLink), a full understanding of the content often requires looking up the accompanying references, many in journals belonging to the e-licenses of other leading publishers. Readers having access to *Nature* typically also want to consult articles in *Science*.

A further key factor distinguishing this market from that selling cars or mobile phones is that the end customers do not pay for the access themselves. Access to the scholarly journal literature is, from an academic reader's viewpoint, perceived as a public good, paid for with taxpayers' money, university endowments, or tuition fees. The end "customers" are thus not price sensitive. Instead, the libraries as intermediaries try to balance their budget restrictions with the requests of the researchers and students they serve. Libraries at bigger universities must cater to the needs of scholars and teachers from many fields and consequently will meet internal resistance from faculty if they try, for cost reasons, to refuse one of the big deals of the leading publishers. If

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academics had to pay for all articles they read from their own discretionary or project funds, the situation would be different (this is probably the major reason that pay per view has never caught on). In conclusion, the scholarly publishing business is moderately concentrated, but the overall industry rivalry is low.

### **Bargaining Power of Suppliers**

In most industries, a substantial part of the price of the final product consists of the prices that the producer has paid for the energy, raw materials, and supplies used to

produce the goods or services. This is true for physical products such as buildings, restaurants, and cars. In the publishing and entertainment industries, the suppliers are best-selling authors, film stars, artists, and athletes, who get a share of the final revenue collected by intermediaries such as bookstores, movie theaters, sports channels, and video streaming services.

The scholarly peer-reviewed journal business is different. The authors of the articles seldom get any monetary compensation, and neither do the peer reviewers. Some academic editors get compensation, either directly or to enable them to hire an assistant. But even in those cases, the remuneration is not comparable to the value they add to the journal. According to a study by the United Kingdom's Research Information Network, the estimated cost of peer review globally is around £1.9 billion per year, using average salaries for academics as a basis.<sup>18</sup> This constitutes around 23 percent of the total publishing cost.

How can this model work? Part of the explanation is the ethos and culture of research, in which authors are not paid and academics are expected to volunteer as peer reviewers. Many faculty submit yearly itemized work plans to their department specifying how many hours they intend to use for peer-review work. In addition to pure altruism and sense of academic duty, authors also engage in a form of barter with the journal, providing their articles for free in exchange for efficient dissemination and branding. In the longer run, they get more citations and a longer publication list, which in turn results in better positions, tenure, and other benefits. Economists have even calculated the effect on salaries resulting from the publication of journal articles.<sup>19</sup>

For senior editors who work for a journal, the motivations are slightly different. Accepting an editorship for a leading journal (often a three-year appointment) carries with it great prestige and the opportunity to increase your network. For junior colleagues, accepting peer-review assignments for the better journals also increases their chances of getting valuable contacts, eventually moving up the ladder.

In almost any functioning market, a seller can negotiate with several potential buyers simultaneously and then choose the one offering the best terms. But in the case of peer-reviewed journals, most authors are explicitly forbidden to submit to more than one journal at once, often leading to the loss of valuable time if the manuscript is rejected after a lengthy review process, even if it is eventually published elsewhere. The situation is further exacerbated by the so-called Inglefinger rule, named for an editor of the *New England Journal of Medicine*, which restricts the dissemination of research results before formal publication.<sup>20</sup> In certain fields, preprint archives have become popular precisely to facilitate rapid dissemination, due to the long waiting times for publication.

If authors, peer reviewers, and editors have little or no power to bargain for better pay for their work, can they use their positions to affect journal pricing or OA policies? There have been some highly visible attempts. In 2001, a group of scientists, including Nobel Prize winner Harold Varmus, initiated a Web-based petition demanding that publishers make their articles open access after no more than six months. The 28,000 academics who signed the petition vowed to stop submitting to and reviewing for journals that did not comply. The petition failed, but it triggered the founding of the nonprofit OA publisher Public Library of Science (PLOS). It also influenced the debates that led



to the formulation of the hugely influential National Institutes of Health (NIH) open access policy, first as a voluntary guideline in 2004, and later as compulsory in 2008.

Over the years, similar attempts have tried to get scholars to boycott submitting manuscripts and working as peer reviewers for particular publishers, but few have succeeded.<sup>21</sup> The editors and whole editorial board of some journals have even resigned in protest against the pricing policies of their publishers and started new open access journals with moderate APCs instead.<sup>22</sup>

### Bargaining Power of Customers

When publishers first started to offer big deals just prior to 2000, there was no clear formula to determine the price. Most contracts were based on the sum of the earlier print subscriptions from the publisher, adding a typical markup of 5 to 15 percent.<sup>23</sup> Publishers justified the charges by the fact that the number of accessible titles increased several times over. The duration of the contracts was typically three to five years, with annual price increases of around 6 percent. After the first deals, the libraries found themselves locked in, since not renewing the subscriptions would have been extremely cumbersome and costly and meant reduced service to library users. Any time such a contract is renewed, the university faces a take it or leave it situation. A big publisher operating globally can well survive without the revenue from any single university or consortium, but the university is forced to provide the access to its faculty and students, one way or another. Also, when journals were still distributed in paper form, libraries kept full ownership of older copies in their archives, even if they canceled their subscription. E-licenses are contractually and technically more complicated, which makes the situation more unyielding.

In recent years, several consortia and individual universities have threatened cancellations of big deals if the publishers do not lower their prices or meet demands concerning OA publishing options and payments.<sup>24</sup> Eventually, the deals have usually been made, but it is difficult to ascertain the effects of such pressure.

The big publishers have thus effectively used price discrimination to globally extract as much revenue as possible. Since the marginal cost of providing electronic access to an extra consortium or university is very low, what drives pricing is each customer's ability to pay, as expressed, for instance, in the overall budgets of the university and its libraries. Both Finland and Serbia have national university library consortia negotiating e-licenses with the leading publishers. As an example, the national e-license costs with major publishers for Finland were around 26 million U.S. dollars in 2012 and for Serbia 2 million U.S. dollars<sup>25</sup> at a time when Finland's production of goods and services per capita was around six times that of Serbia. Such price discrimination is facilitated by the insistence on nondisclosure clauses in the agreements.<sup>26</sup>

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**A big publisher operating globally can well survive without the revenue from any single university or consortium, but the university is forced to provide the access to its faculty and students ...**

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John Wenzler proposes that universities are trapped in a collective action dilemma in dealing with the big publishers.<sup>27</sup> All universities would benefit from collaborating closely to negotiate better terms for their electronic journal access, but it is often difficult to work across traditional institutional boundaries. A step in this direction has been the setting up of national university library consortia in many European countries and regional groups such as the Ohio Library and Information Network (OhioLINK) in the United States. But the publishers' strategy is to deal with the consortia or universities one by one, and most deals are not transparent due to the nondisclosure clauses they include.

### Threat of New Entrants

In many industries, low barriers to new entrants ensure a healthy competitive environment. The cost of establishing a new hairdressing salon is low. At the other end of the spectrum are industries requiring huge investments in research and development, such as mobile phones, pharmaceuticals, or aircraft. Nowadays the cost of establishing a new electronic-only peer-reviewed journal is low. Many OA journals use open source software such as Open Journal Systems (OJS) and publish cooperatively through such portals as Latin America's Scientific Electronic Library Online (SciELO). Start-ups like Ubiquity Press claim to handle the technical aspects of e-publishing at a much lower cost than commercial publishers do. The low cost of publication has also attracted entrepreneurs to set up so-called "predatory" journals, websites fraudulently claiming to conduct peer review and promising fast publication for a modest fee.<sup>28</sup> Setting up a globally successful new high-quality journal is, on the other hand, very challenging. The OA journal *eLife*, which aspires to compete in the same league as *Nature* and *Science*, started with initial funding of £18 million from the Howard Hughes Medical Institute, Wellcome Trust, and Max Planck Society in 2012.<sup>29</sup>

Other strong barriers block entry into the scholarly publishing industry. Due to the "publish or perish" culture, academics prefer their work to appear in older, established journals from prestigious publishers, and so new aspiring journals find it difficult to recruit the best authors, editors, and peer reviewers. In addition, citation indexing services further strengthen the position

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of established journals and publishers. Particularly important is Journal Citation Reports, which calculates so-called impact factors based on citations registered in the Web of Science. Web of Science has always been slow to include new journals in the index, and even accepted journals take a few years to acquire an impact factor. An example of the effect of an impact factor is the journal *PLOS ONE*, which experienced phenomenal growth in submissions and articles in 2010 after it announced receiving its first impact factor of 4.4.

In some branches of science, lists ranking top journals also strongly favor the incumbent publications. Business schools all over the world compete for the best scholars, the most students, and the biggest donations, and in that race, quality accreditations from

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such bodies as the Association to Advance Collegiate Schools of Business are crucially important. In the granting of such accreditations, lists that rank publications, such as the 50 management journals used by the *Financial Times* to compile its list of research ranks for business schools, have considerable weight. Publishing in highly ranked journals also plays a major role in the competition for tenured positions.

Since the year 2000, almost all noteworthy new entrants into the scholarly journal arena have been open access publishers. Such publishers as Public Library of Science, Hindawi, and MDPI (Multidisciplinary Digital Publishing Institute) have managed to gain a foothold and stay independent. Others, such as BioMedCentral, Dove Medical Press, Frontiers Media, and Medknow Publications, have been acquired by the big commercial subscription publishers.

### Threat of Substitutes

Throughout history, substitutes have totally transformed or disrupted many industries. Steamboats replaced sailing ships, and the automobile took over from horses and carriages. The Internet and Wikipedia rapidly destroyed the market for printed or subscription-based encyclopedias, and streaming of music and movies has rapidly overtaken CDs and DVDs. Hotels and taxis have lost business to the Internet-enabled peer-to-peer services Airbnb and Uber.

In the case of scholarly publishing, authors have traditionally granted the publishers exclusive copyright to the articles, which expire 70 years after the death of the author. From a legal viewpoint, this has provided an extremely strong protection for the commercial interests of the publisher.

The green OA movement has tried to offer a substitute for original scholarly journal articles in the form of manuscript versions self-archived by the author. These are not perfect substitutes; for example, there are delays in availability due to embargoes, and the articles lack final copy editing. Their use has nevertheless been proposed as the solution to the access and affordability problems.<sup>30</sup> As long as the uptake was low and in no way threatened subscriptions, publishers were permissive of self-archiving. But with time, the major publishers have gradually tightened embargo rules included in the publishing agreements with authors. At one point, Elsevier allowed self-archiving without delays in institutional repositories, but only in cases where the university in question did not have an OA mandate.<sup>31</sup>

A few high-volume subject repositories such as arXiv and PubMed Central and the institutional repositories that almost all leading universities nowadays offer usually abide by the publishing agreements that authors have signed with journals. But other channels do not. Although academic social networks (ASNs) such as ResearchGate and Academia.edu have tried to implement many features borrowed from other social media, their main use is for authors to upload copies of their articles. Since few ASNs control the legality of the copies, authors often upload the published versions, which has led to take-down notifications from publishers. Two ASNs, Mendeley and SSRN, have recently been acquired by Elsevier.

Scholarly publishing has also not escaped from pure piracy. The SciHub site has not asked for consent from authors or publishers for illegally downloading more than

50 million journal articles directly from the publishers' websites.<sup>32</sup> From a moral view, many academic readers nevertheless see these downloads as more justified than those of music or movies, given that many people view the research results as a public good and that the extra open access does not in any way hurt the authors.

Self-archiving offers only a partial patchwork of access to the closed subscription-based scholarly literature. Hence it has not seriously threatened the bargaining situation and profitability of the big publishers.

### How the Five Forces Work in Other Industries

Estimating the magnitude of the five forces in different industries is a matter of subjective evaluation. Nevertheless, it can be instructive to look at some examples and compare them to scholarly journal publishing. The sources used for this comparison are not empirical scientific studies but mainly simple case studies and reports found using a Web search combining "industry name" with "Porter five forces." Clearly, industries differ greatly. Many are only governed by global or local market forces, while others, where the product or service is essential for society, are strongly regulated by governments. Government intervention guaranteeing mobile phone number portability when changing providers has, for instance, dramatically reduced the switching costs and increased competition.

An interesting market with some similarities to scholarly journal publishing is the prescription drug market. Like scholarly publishing, the marginal costs of producing each dose of medicine can be low, since much of the expense comes in developing the drug or marketing it. Hence drug companies can use price discrimination depending on the customers' willingness and ability to pay, and how big the clients are. Few patients directly pay for their medicines; instead the costs are absorbed by health insurance or free public health care. As a result, the end customers do not react strongly to drug pricing. This resembles the setup with scholarly articles, academics, and university libraries. Customers in the United States pay more for their prescription drugs than people in other countries, such as Canada. Even within the United States, the prices paid by different people vary greatly.<sup>33</sup> In Finland, individuals using public health care pay a percentage of prescription costs out of their own pocket, but the government's share is based on the price of the cheapest generic alternative. Thus, patients are to some extent price-sensitive. Pharmacists are instructed to ask clients at the counter if they would prefer to switch to a cheaper alternative if the doctor has prescribed a more expensive brand.

In other industries, the competition is strongly affected by copyright and patent law. A peculiar case of regulation is the European directive which stipulates that certain important sports events, such as the Olympic Games and the World Cup in soccer, must also be available to viewers freely without subscriptions, even if the rights have been bought by pay TV channels.

Table 1 shows the degree of industry concentration and the strength of Porter's five forces in selected industries. Like scholarly journal publishing, mobile phones, automobiles, and prescription drugs are worldwide industries. Video streaming is partly global, as Netflix is, but due to language issues also partly national.

The comparison indicates that scholarly publishing, despite its moderate degree of industry concentration, has low strengths for all five forces. This should then logically

**Table 1.**  
The degree of concentration and the strength of Michael Porter's five forces for measuring the level of competition in selected industries

	Scholarly journal publishing <sup>†</sup>	Video streaming <sup>‡</sup>	Mobile phones <sup>‡</sup>	Hotels <sup>§</sup>	Prescription drug manufacturing <sup>#</sup>	Automobile manufacturing <sup>**</sup>
Degree of concentration	Medium	High	High	Low	Medium	Medium
Industry rivalry	High	High	High	High	High	High
Bargaining power of suppliers	Low	Medium	Low	High	Medium	Medium
Bargaining power of customers	Low	High	High	High	Medium	High
Threat of new entrants	Low	Medium	Low	Medium	Low	Low
Threat of substitutes	Low	Medium	Low	Medium	Medium	Low

<sup>†</sup>Vincent Larivière kindly provided the Scopus data used in calculating the HHI (Herfindahl-Hirschman) Index, a measure of market concentration used to determine market competitiveness, for scholarly publishing.

<sup>‡</sup>Natasha Sahjwani, "How These Five Competitive Forces Can Shape Your Strategy," *Digital Marketing* (blog), November 7, 2017, <https://www.brightpod.com/boost/how-these-five-competitive-forces-can-shape-your-strategy>.

<sup>§</sup>Abhijeet Pratap, "Porter's Five Forces Analysis of Smartphone Industry," *Notesmatic*, November 25, 2019, [notesmatic.com/2019/11/porters-five-forces-analysis-of-smartphone-industry/](https://notesmatic.com/2019/11/porters-five-forces-analysis-of-smartphone-industry/).

<sup>#</sup>Pimpong Tavitiyamana, Hailin Qu, and Hanqin Qiu Zhang, "The Impact of Industry Force Factors on Resource Competitive Strategies and Hotel Performance," *International Journal of Hospitality Management* 30, 3 (2011): 648–57.

<sup>\*\*</sup>Adamkasi, "Porter Five Forces Analysis of US Pharmaceutical Industry," *Porter Analysis*, 2017, <https://www.porteranalysis.com/porter-five-forces-analysis-of-us-pharmaceutical-industry/>.

<sup>††</sup>Ray Uzwyshyn, "The US Auto Industry in 2013: Five Forces to Consider," *Automotive Industries*, 2012, <https://www.aionline.com/2012/11/the-us-auto-industry-in-2013-five-forces-to-consider/>.

imply high average profit rates. Elsevier, Springer, Wiley-Blackwell, and Taylor & Francis achieved profits in the range of 32 to 42 percent from 2010 to 2012.<sup>34</sup>

### Reasons for the Slow Uptake of Open Access Publishing

So far, we have mainly focused on the competitive position of the major subscription publishers, the bulk of whose business comes from selling bundled e-licenses to major universities and library consortia. The analysis highlights circumstances that are far removed from the conditions typical for a well-functioning competitive market and that provide a plausible explanation for the continuously rising prices and high profitability levels achieved by the publishers.

A related question is why the new open access business and revenue model has been surprisingly slow to catch on. Open access would benefit almost all stakeholders involved in the process, except for big publishers.<sup>35</sup> Also, studies have indicated that the

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total systemic costs of disseminating scholarly journal articles should be lower using OA instead of the subscription model.<sup>36</sup> The major reason for the slow uptake appears to be that the incumbents have little incentive to change a hugely successful business model. Instead of converting

subscription journals to OA and funding the publication by article processing charges (so-called APCs), publishers have instead opted for offering hybrid OA for many of their subscription journals or acquiring successful OA publishers. Critics have in fact accused publishers of “double-dipping,” charging twice for the same content.

The bigger scholarly societies have a slightly different position when they become publishers. In addition to the direct effects on revenue, they also must consider the effects on their membership numbers. A free or low-priced subscription to the print version of a journal has traditionally been an important membership bonus.

Converting existing journals to open access has mainly been left to smaller learned societies and university publishers, since operating single, independent subscription journals has become more and more difficult in the squeeze of the big deals. Another option has been close cooperation with major commercial publishers, so that the journals of small publishers have been included in the big e-licenses. Many OA publications available through the big commercial publishers are in fact published on behalf of scholarly societies, who sponsor the OA availability as part of their mission.

In 2017, the share of fully OA journals indexed in Scopus was only 9 percent for publishers in the United States, United Kingdom, the Netherlands, or Germany, while it was 34 percent for all other countries combined.<sup>37</sup> All the major commercial, scholarly society, and university press publishers operate in the former four countries, while smaller nonprofit publishers, often publishing in languages other than English, dominate in the latter.

The gradual movement toward increasing open access has been strongly influenced by the regulatory activities of major funders and governments. The OA recommendation and later mandate adopted by the NIH have been particularly influential. Since the



NIH required mandatory deposit of a manuscript version of any journal article resulting from its funding no later than 12 months after publication, several hundred biomedical journals delayed OA until after that embargo period.<sup>38</sup>

The OA policies of the European Union have also been important. One milestone was the requirement that all reporting resulting from Horizon 2020, a research and development program that provided funding from 2014 to 2020, should be available OA. Also important was the European Commission's "Recommendation on Access to and Preservation of Scientific Information," which encouraged all member states to put publicly funded research results in the public domain.<sup>39</sup> This has resulted in country-level mandates in several member states.

Some big research funders, such as the United Kingdom's Wellcome Trust, have in addition to requiring OA from their award recipients also earmarked funding to pay for APCs in full OA and hybrid OA journals. Similarly, ministry of education funders in some European countries, including the United Kingdom, Norway, and Austria, have established funds from which universities can requisition the APC expenditures.

## Conclusions

This author does not wish to make any value judgment on the business practices of the leading publishers. They act in a perfectly rational way, delivering profits to their shareholders in the case of commercial publishers, and providing a surplus to subsidize other activities in the case of some big scholarly societies. The analysis of their competitive position and comparison to selected other industries should highlight why they feel no need to change strategy.

The leading publishers will thus, in the author's opinion, only accelerate conversion of their established journals to OA once they judge that their profit levels are not at risk. So far, acquiring successful start-up OA publishers and opening the hybrid option for their journal portfolios have entailed little risk.

The other scenario is that major research funders and universities can exert enough pressure on publishers to force a conversion. This is, for instance, the aim of Plan S, put forward by several big national research funders in Europe.<sup>40</sup> The plan requires scientists who receive funding from publicly funded research organizations to publish their work in open repositories or in OA journals by 2021. Plan S explicitly rules out hybrid OA in the longer term. Currently the volume of articles covered by the funding of the signatories of Plan S is too small to have a significant influence on the publishers.

A promising new strategy is the signing of transformative license deals between national library consortia and individual publishers. In such deals (also called publish and read), a consortium pays a lump sum including both the traditional subscription access to all journals of a publisher and hybrid OA for all articles with corresponding authors who work in institutions belonging to the consortium. If such deals become commonplace, this approach would enable publishers to gradually transform their journals to full OA at around the same income level as before. For libraries, it would secure a more predictable transition period. Also, the need to invest time and money in the green alternative of institutional repositories would decrease. And lastly, authors could continue publishing in exactly the same journals as before.



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## Notes

**Editor's note:** Due to the timeliness of this review article's subject matter and its high relevance for readers of *portal: Libraries and the Academy*, the editors decided to publish it with minimal changes as a longer than usual editorial.

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