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Why is access to the scholarly journal literature so expensive?

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Abstract:
For more than thirty years the spiralling costs of scholarly journal subscriptions ("the serials crises") has been a hotly debated topic. Academics and librarians have pointed out the high profit levels of the major commercial publishers, despite the fact that the content is provided by unpaid authors and reviewers, which the publishers then resell to the universities of these same authors and reviewers. Publishers have attempted to justify their prices by cost increases, their IT-investments and the value they add. A useful framework for understanding the prevailing situation is Michael Porter's five forces framework for explaining the competitive situation in any given industry. Despite claims to the contrary the degree of market concentration in scholarly publishing is not higher than in many other industries, and not the main cause of the problem. But the fact that the big deals of different publishers are complements rather than substitutes, means that essentially the leading companies don't compete for customers, in contrast to other industries like 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 protected from the disruptive forces of the Internet. The protected competitive position and high profitability is also the major reason why the big subscription publishers have been rather slow in adopting the open access business model.

Introduction
During the past three decades there has been a continuing discussion about the subscription prices of peer reviewed journals, which have been rising faster than inflation. This phenomenon has been named the "serials crises" (Panich and Michalak, 2005). Although publisher-wide electronic licenses (ie. Science Direct, Springer Link) have largely replaced subscriptions to individual titles, the same price spiral seems to be continuing (Bosch et al, 2019).
A related issue is the slower than anticipated transition to Open Access journals. Compared to the early optimistic predictions 15-20 years ago, the growth has been linear with a rate of only around one percentage point of the market share per annum (Piwowar et al, 2018). The major commercial and society publishers 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 (hybrid OA).

University librarians and OA activists have spent much time trying to calculate “reasonable” journal publishing costs and criticizing leading publishers for pricing leading to excessive profits (Houghton et al, 2009; Schimmer et al, 2015). On the other side of the fence publishers have tried to justify their prices by their high costs (Van Noorden, 2013). The discussion has lately also concerned the pricing of articles in OA journals, so-called article publishing charges, APCs (Schönfelder, 2020).

What many information science specialists and OA activists discussing these issues seem to ignore is that peer review journal publishing is a market like the trade in any other commodities and services. Despite the fact 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 price been set in an interplay between supply and demand, as well as peculiarities of non-perfect markets characterized by oligopolies (a few big companies controlling the market).

The so-called five forces model by Michael Porter has for four decades been part of the standard curriculum at business schools for analyzing the competitive situation in different industries (Porter, 1980, 2008). The model is well suited also as a framework for a discussion of the situation in scholarly journal publishing. It offers plausible explanations both for the high pricing as well as 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 a particular industry. The five forces that Porter claims define the overall competitive situation are: industry rivalry, the bargaining power of suppliers, the bargaining power of buyers, the threat of new entrants and the threat of substitutes. The model is usually visually represented in a diamond-shaped figure where the industry rivalry is in the center, and the other four forces come from different directions. A low competitive intensity usually entails high profit levels for companies operating in that industry, and vice versa a high competitive intensity tends to lead to low profit levels. An extreme case is perfect competition, an abstraction from reality described in basic economic theory. The scholarly journal publishing market is very far removed from such a state. An illustration of the model, with key stakeholders from scholarly journal publishing indicated, is shown in figure 1 below.
Only a couple of previous authors have directly used Porter’s models as a conceptual lens to discuss scholarly journal publishing. McGuigan and Russell (2008) discuss in particular the roles of the content suppliers (authors and reviewers), the publishers and the customers (mainly university libraries) and note that a few publishers dominate the market and exhibit extremely high profit levels. Björk (2017) has proposed an extension of Porter’s model with two additional forces particular to this market, selective indexing services and funder mandates and APC funds.

In addition several authors have discussed the scholarly journal market and its characteristics, providing insights that are useful for this discussion. In an early paper Edlin and Rubinfeld (2004), who both are professors of law and economics, discuss this market from the viewpoint of anti-trust legislation, with a particular emphasis on the negative effects of the massive bundling of journal subscriptions to “big deal” electronic licenses. They note that the big discrepancy in the price rises for journals from commercial publishers compared to non-profits is a symptom of a non-functional market. Factors which have facilitated this is the growing rate of concentration in the industry due to mergers as well as the practice of non-disclosure clauses for the e-license contracts, which make it easier to use price discrimination. They 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 to “co-operate” in order for a journal to be successful. Strategic barriers are created via the big deals indirectly capturing an

**Figure 1. Porter’s five forces model, illustrated with key stakeholders in scholarly journal publishing**

Threat of substitutes

Threat of new entrants

Bargaining power of suppliers

Bargaining power of customers

Industry rivalry

Authors

Academic editors

Reviewers

Threat of substitutes

PMC

ArXiv

Institutional Repositories

ResearchGate

Sci-Hub

Threat of new entrants

Frontiers

BioMedCentral

Hindawi

PLoS

MPD

Ubiquity Press

Open Library of the Humanities

Elsevier

Wiley-Blackwell

Springer Nature Group

Taylor & Francis

Oxford University Press

American Chemical Society

Et al...

Oxford University Press

American Chemical Society

Taylor & Francis

Et al...

Threat of substitutes

University libraries and library consortia

Other subscribers

BioMedCentral

Hindawi

PLoS

MPD

Ubiquity Press

Open Library of the Humanities

Elsevier

Wiley-Blackwell

Springer Nature Group

Taylor & Francis

Oxford University Press

American Chemical Society

Et al...

Oxford University Press

American Chemical Society

Taylor & Francis

Et al...
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 Poinder (2011) 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.”

Bergstrom et al (2014), invoking Freedom of Information acts, collected data on 360 contracts between US universities and publishers. They measured the access prices paid by universities using an estimated cost per citation, a proxy of the usefulness of a publisher’s bundle of journals to researchers, and found that the prices to the journals of commercial publishers were markedly higher than the prices of society publishers and university presses.

In the following the scholarly publishing market is analyzed using Porter’s five forces. The analysis is partly subjective and not solidly based on empirical evidence, but hopefully provides new insights to readers unfamiliar with competitive strategy in the Internet Age. In 2017 the number English language peer reviewed journals indexed in Scopus was 33,000 publishing around 3 million articles yearly (Johnson et al 2018). It is important to bear in mind that this is an industry with a few big players and a long tail of thousands of small publishers. Many of the latter are scholarly societies, universities and university departments, and often just publish one journal. Nevertheless only a handful of big commercial, society and university press publishers dominate the English language STM market, with an estimated yearly publisher revenue of around 10 billion $.

**Industry rivalry**

Industry rivalry can partly be explained by the level of concentration among companies in a particular business field. Concentration rates can empirically for instance be measured using the Herfindahl–Hirschman Index (HHI). It is defined as the sum of the squares of the market shares of the firms within the industry (Shughart, 2020). 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 4 largest (CR$_4$) or the eight largest (CR$_8$). The HHI is more complex to calculate but more informative. For instance The Antitrust Division of the US Department of Justice considers Herfindahl indices between 0.15 and 0.25 to be ”moderately concentrated” and indices above 0.25 to be ”highly concentrated” (DOJ, 2010).

In business fields such as hair dressers or restaurants there are numerous small entities in every city competing fiercely for customers. At the other end of the spectrum are global industries demanding huge long-term investments like mobile phones or cars, where just a few companies dominate the global market. In mobile phones two companies (Samsung with 31 % and Apple with 27 %) currently have more than half the world market and the five biggest companies 81 % (Statcounter, 2020). The HHI Index for mobile phone manufacturing (using the market shares of the six biggest companies for the calculation) is 0.187. Car Manufacturing is more split among a dozen players, most of which with a decades long history. Here the five biggest have a 34 %
market share, and even the market leader Toyota has only 10,2% (Kallstrom, 2015). The HHI index using the shares for the five biggest is only 0.025. Scholarly journal publishing is less concentrated than the mobile phone business but more concentrated than car manufacturing. Based on comprehensive article data from Web of Science, the five biggest publishers published 56,6% of all Web of Science indexed papers in 2018. The share of market leader Elsevier was 23,0%. While article shares don’t necessarily correspond exactly to revenue shares it’s a reasonable enough proxy. The HHI index using the market shares of all WoS indexed publishers was 0.094.

Thus looking at the scholarly publishing market from a legal antitrust viewpoint it does not appear to be particularly concentrated. But the fierceness of industry rivalry in a particular industry is not only dependent on the concentration rate. An at least equally important factor is whether the goods or services sold are substitutes or complementary. Despite the fact that the mobile phone industry has only a few big players competition is extremely tough, since each customer usually has just one mobile phone in current use, and hence competition based on price, quality and brand image is strong. In this industry two companies who dominated the market around the millennium shift, Nokia and Ericsson, have both more or less disappeared since they couldn’t keep up with the technical development race. Likewise car manufacturing is a market of substitute products, especially since most manufacturers have a range of models in different price and quality categories.

Examples of classic complimentary goods include the combination of cars, car maintenance and petrol or computer printers and print ink cartridges. Using more of one good results in more use of the other. In microeconomic terms complimentary goods have negative cross elastic demand functions, meaning that the demand of a good is increased when the price of its complimentary good is decreased.

Scholarly publishing offers a peculiar special case of complementary goods. If we look at the articles contained in the big deal e-licences of any of the leading publishers (ie Science Direct or SpringerLink), then a full understanding of the content of read articles often requires following up many of the references, a majority of which are likely to be in journals belonging to the e-licences of the other leading publishers. Readers having access to Nature typically also want access to Science.

A further key factor distinguishing this market from for instance cars or mobile phones is that the end customers don’t pay for the access themselves. Access to the scholarly journal literature is from the academic readers viewpoint essentially a perceived as a public good, paid with tax payers money, university endowments or tuition fees. The end “customers” are thus not price sensitive. Instead the libraries as middle men try to balance between their budget restrictions and the requests of the scientists and teachers. And libraries at bigger universities will need to cater to the needs of scientists and teachers from all fields of science, and consequently will meet a lot of internal resistance from faculty if they try, for cost reasons, not to sign on to any one of the big deals of the leading publishers. If scholars would have to pay for pay per view for all articles they read from their own discretionary or project funds the situation would be totally different (this is probably the major reason that pay per view has never really 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 his suppliers for energy, raw materials, intermediate products used to produce the product etc. This is true for physical products like buildings, restaurants and cars. In the publishing and entertainment industries the suppliers are best seller authors, film stars, artists and athletes, who get their fair share of the final revenue collected by intermediaries such as book stores, movie theaters, sports channels, Netflix etc.

The scholarly peer reviewed journal business is different. The authors of the articles usually don’t get any monetary compensation and neither do the peer reviewers. Some academic editors get compensation, either directly personally or so that they for instance can hire an assistant. But even in those cases the remuneration is not in any way comparable to the value they add to the journal. According to a study of the UK research Information Network (RIN, 2008) the estimated cost of peer review is globally around £1.9billion per year, using average salaries for academics as a basis. This constituted around 23 % of the total publishing cost.

How can this work? Part of the explanation is the ethos and culture of research, in which authors are not paid and academics are supposed to volunteer as peer reviewers. In the yearly itemized work plan which my head of department has to approve I specify how many hours I aim to use for peer review work. In addition to pure altruism and sense of academic duty authors also engage in a barter trade with the journal, they provide their articles for free in exchange for efficient dissemination and branding. And in the longer run this results in more citations and a longer publication list for them, which in turn results in better positions, tenure etc. Economists have in fact numerically calculated the marginal effect on salaries resulting from the publication of journal articles (Tuckman and Leahey, 1975), (Gibson et al 2017).

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

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 authors are mostly explicitly forbidden to submit to more than one journal at a time, often leading to the loss of valuable time if the manuscript is rejected after a lengthy review process and is eventually published in another journal. The situation is further exacerbated by the so-called Inglefinger rule (Angell and Kassirer, 1991), which restricts the dissemination of research results before formal publication. In certain fields preprint archives have become popular precisely in order to facilitate rapid dissemination, due to the long waiting times for publication.
If thus the bargaining power of authors, peer reviewers and editors in terms of getting paid more for their work is almost non-existent, are there ways in which they can use their positions to affect journal pricing or OA policies? There have indeed been a number of high-visibility attempts. In 2001 a number of scientists, including former NIH director and Nobel Laureate Harold Varmus initiated a web-based petition and pledge where they demanded that all publishers would make their articles open access after no later six months. Or else the 28,000 academics that had signed the petition would stop submitting to and reviewing for the journals not complying. The petition in itself failed, but triggered the founding of the non-profit OA publisher Public Library of Science (PLOS). It also influenced the debates that led to the formulation of the hugely influential NIH open access policy, first as a voluntary one in 2004, and later as compulsory in 2008.

Over the years there have been similar attempts to get scholars to pledge to boycott submitting manuscripts and working as peer reviewers for particular publishers, but by and large they have not been successful (Heyman et al, 2016). The editors and whole editorial board of some journals have also resigned in protest against the pricing policies of the publishers of their journals and started new Open Access journals with moderate APCs in stead (Jaschik, 2015, Chawla, 2019).

*In conclusion the bargaining power of suppliers is virtually non-existen*t.

**Bargaining power of customers**

When the publishers first started to offer the big deals just prior to the millennium shift, there was no clear formula to determine the price. So mostly the contracts were based on the sum of the earlier print subscriptions from the publisher in question, adding a mark-up of typically 5-15 % (Bergstrom et al, 2014). This was justified by the fact that the number of accessible titles increased several times over. The duration of the contracts was typically 3-5 years with annual price increases of around 6 %. After the first deals the libraries found themselves in a strong lock-in situation, since not renewing them would have been extremely cumbersome and costly and meant reduced service to the academics. Thus any time such a contract is renewed, the university is facing 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 more or less forced to provide the access to its faculty, one way or the other. Also when journals were still being distributed in paper form, libraries kept full ownership of older journal copies in their archives, even if they cancelled subscriptions. For e-licences this situation is contractually and technically more complicated, which creates and even stronger lock-in situation.

In recent years there have been several attempts by consortia and individual universities to threaten cancellations of big deals, if the publishers in question don’t lower their prices (as well as demands concerning OA publishing options and payments). (Else, 2018), (McKenzie, 2019). Eventually the deals have usually been made, but it’s extremely difficult to ascertain what the effects of the pressure have been.
The big publishers have thus been able to effectively use price discrimination to globally extract as much revenue as possible. Since the marginal cost of opening up electronic access to each extra consortium or university is very low, what’s driving pricing is each customer’s ability to pay, as expressed for instance in the overall budgets of the university sector of the country in question and their libraries. Both Finland and Serbia have national university library consortia negotiating the e-licenses with the leading publishers. As an example the national e-license costs with the major publishers for Finland were around 26 mill USD in 2012 (FinELib 2012) and for Serbia 2 mill USD (Poynder 2013), that is on much lower level (at the time Finnish GDP per capita was around 6 times that of Serbia). Such price discrimination is facilitated by the insistence on non-disclosure clauses in the agreements (Bergstrom et al, 2014).

Wenzler (2017) proposes that universities are trapped in a collective action dilemma in dealing with the big publishers. All universities would benefit from collaborating closely in getting better terms for their electronic journal access, but it is often very difficult to collaborate across traditional institutional boundaries. A step in this direction has been in the setting up of national university library consortia in many European Countries, and regional ones in the US (ie OhioLink). But the publishers strategy is dealing with the consortia or universities on a one by one basis, and mostly the deals are not transparent due to the non-disclosure clauses usually included in the agreements.

In conclusion the bargaining power of customers is low.

Threat of New Entrants

In many industries low barriers to new entrants ensure a healthy competitive environment. The cost of establishing a new hairdresser salon is low. At the other end of the spectrum are industries requiring huge investments in R&D like mobile phones, pharmaceuticals or aircraft. Nowadays the cost of establishing a new electronic only peer reviewed journal is low. Many OA journals have been set up using open source software like OJS and public portals like Scielo in Latin America. And start-ups like Ubiquity press claim to be able to handle the technical aspects of e-publishing at a much lower cost than the commercial publishers. The low technical cost of publication has also attracted a number of entrepreneurs to set up so-called “predatory” journals, web sites fraudulently claiming to conduct peer review and promising fast publication for a modest fee (Shen and Björk, 2015). Setting up a globally successful new high quality journal is on the other hand very challenging. The OA journal eLife which has set as target to compete in the same league as Nature and Science, was started with initial funding of 18 million £ from the Howard Hughes Medical Institute, Wellcome Trust and Max Planck Society in 2012 (Callaway, 2016).

In scholarly publishing strong barriers to entry exist in other ways. Due to the “Publish or Perish” culture, publishing in older established journals from prestigious publishers is preferred, and it can be exceedingly difficult to recruit the best authors, editors and peer reviewers for new aspiring journals. In addition citation indexing services further strengthen the position 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. WoS has always been very restrictive in including new journals in the index, and even for accepted journals it takes a couple of years to get an
impact factor. A good example of the effect of getting an impact factor is the megajournal PLOS ONE, which started a phenomenal growth in submissions and articles in 2010, after it announced receiving its first IF of 4.4.

In particular branches of science ranking lists of top journals also strongly favor the incumbent journals. Business schools all over the world compete for the best scholars, students and big donations and in that race quality accreditations from bodies like the Association to Advance Collegiate Schools of Business (AACBS) are crucially important. And in the granting of such accreditations articles in journals included in ranking lists like the Financial Times top 50 management journals 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 publishing arena have been Open Access Publishers. Publishers like Public Library of Science, Hindawi and MDPI have managed to gain a foothold and stay independent, while others like BioMedCentral, Dove Medical Press, Frontiers Media and Medknow Publications have been acquired by the big commercial subscription publishers.

**In conclusion the threat from new entrants is low.**

**Threat of substitutes**

Throughout history substitutes have in many industries totally transformed or disrupted industries. Steamboats replaced sailing ships and the automobile 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 CD:s and DVD:s. Hotels and taxis are currently to some extent threatened by 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 according to current laws 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 peculiar kind of substitute for original scholarly journal articles in the form of manuscript versions self-archived by the author. While these are not perfect substitutes (delays in availability due to embargoes, lacking final copy-editing) using them has nevertheless been proposed as the solution to the access and affordability problems (Harnad et al, 2005). As long as the uptake was low and in no way threatened subscriptions, publishers were quite permissive of self-archiving. But with time the major publishers have responded by gradually tightening embargo rules included in the publishing agreements with authors. At one point Elsevier actually allowed self-archiving without delays in institutional repositories, but only in cases where the university in question did not have an OA mandate (Björk, 2013).

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

Scholarly publishing has also not escaped from pure piratism. The SciHub site has neither asked for consent from the authors nor the publishers for illegally downloading more than 50 million journal articles directly from the publishers’ websites (Bohannon, 2016). From a moral view many academic readers nevertheless see this as more justified than in content such as music or movies, given that the research results should be seen as a public good and that the extra open access does not in any way hurt the authors.

Self-archiving has never become so popular as getting even close to 100 % coverage, thus offering 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.

**In conclusion the threat of substitutes is low.**

**A comparison with 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 a number of examples and compare them to scholarly journal publishing. The sources used for this are not based on empirical scientific studies, but are mainly simple case studies and reports found using a web search combing “industry name” with “Porter five forces”. Clearly industries differ a lot, many are only governed by the 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 operators 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 quite low, since a lot of the costs have already been sunk in developing the medicine or marketing. Hence drug companies can use price discrimination depending on the “customers” willingness and ability to pay, and how big the clients are. Mostly patients don’t directly pay for their medicines, but the costs are absorbed by health insurances or free public health care. Which means the end customers don’t react strongly to the pricing of the drugs. This is similar to the setup with scholarly articles, academics and university libraries. It has often been observed that US clients pay more than other countries like Canada and even with the United States there are big differences in the prices paid by different stakeholders (Kesselheim et al 2016). In Finland individuals using public health care pay a percentage of prescription drug costs out of their own pocket, but the government’s share is not
determined as a fixed percentage of the price of each brand of a particular medicine, but rather based on the price of the cheapest generic alternative. Thus patients are to some extent price sensitive. Pharmacists are actually 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 competitive scene is strongly effected by copyright and patent law. A peculiar case of regulation is the European directive which stipulates that certain important sports events, such as the Olympics 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 strength of the five forces in a number of industries. In addition the degree of industry concentration is indicated in separate row. Like scholarly journal publishing, mobile phones, automobiles and prescription drugs are global industries, wireless networks are national and hotels local. Video streaming is partly global (ie Netflix) but due to language issus also partly national.
Table 1. The strength of the five forces in a number of industries

<table>
<thead>
<tr>
<th>Degree of concentration</th>
<th>Scholarly journal publishing</th>
<th>Video Streaming</th>
<th>Mobile phones</th>
<th>Hotels</th>
<th>Prescription drug manufacturing</th>
<th>Automobile manufacturing</th>
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<tr>
<td>Industry rivalry</td>
<td>Medium</td>
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</table>

| 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 |

The comparison indicates that despite it’s only moderate degree of industry concentration scholarly publishing has low strengths for all the forces. This should then logically imply high average profit rates. The operating profit levels for Elsevier, Springer, Wiley-Blackwell and Taylor&Francis, were in fact all in the range 32-42 % in 2010-2012 (The Economist 2013).

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 which are far removed from the conditions typical for a well-functioning competitive market, and which

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provide a plausible explanation for the high and continuously rising prices and the profitability levels achieved by the publishers.

A closely related question is why taking into use the new Open Access business and revenue model has been surprisingly slow. Open Access is in the interest of almost all other stakeholders involved in the process (Suber, 2012). Also, a number of studies have indicated that the total systemic costs of disseminating scholarly journal articles should be lower using the OA instead of the subscription model (Houghton et al 2009). The major reason appears to be, that the incumbents have lacked incentives to start changing a hugely successful business model. In stead of converting subscription journals to OA journals, and funding the publication by author charges (so-called APCs), the have in stead opted for offering hybrid OA to the majority of their subscription journals or acquiring successful OA publishers. Critics have in fact accused publishers of “double-dipping”, that is charging twice for the same content.

The bigger society publishers are in a slightly different position. In addition to the direct effects on revenue, they also have to take into account the effects on their membership numbers. An individual 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 society and university publishers, since operating single independent subscription income journals has become more and more difficult in the squeeze of the big deals. Another option has been close cooperation with major commercial publishers, in which case their journals have been included in the big e-licenses. Many of the OA journals 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 full OA journals indexed in Scopus was only 9 % for publishers located in the USA, UK, Netherlands or Germany, while the share was 34 % for all other countries combined (Björk and Korkeamäki, 2020). This is explained by the fact that all the major commercial, society and university press publishers are located in the former four countries, while smaller non-profit publishers, often also publishing in other languages than English, dominate in the latter.

The gradual movement towards increasing Open Access has in stead been strongly influenced by the regulatory activities of major funders and governments. The OA recommendation and later mandate adopted by the NIH has been particularly influential. Since it required mandatory deposit of a manuscript version of any journal article resulting from its funding at the latest 12 months after publication it has in fact led to several hundred biomedical journal practicing delayed OA with typically that embargo period (Laakso and Björk, 2013).

The OA policies of the EU have also been important. One milestone was the requirement that all reporting resulting from the Horizon 2020 R&D programme (2014-2020) should be available OA. Also important was the recommendation of the Commission “On Access to and preservation of scientific information” which encouraged all member states to put publicly funded research results in the public domain (EC, 2018). This has resulted in country level mandates in several member states.

Some big researcher funders, such as the UK Wellcome Trust, have in addition to requiring OA from their award recipients, also started earmarked APC funding, used for paying APCs
in full OA and hybrid OA journals. Similarly ministry of education level funders have in some European countries (eg UK, Norway, Austria) established APC funds which universities can requisition the APC expenditures from.

Conclusions

This author does not wish to make any value judgement on the current 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 of some big scholarly societies. The analysis above of their competitive position and comparison to selected other industries should highlight why they feel no need to change strategy.

The leading publishers are thus in my opinion only likely to start accelerating 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 up the hybrid option for their journal portfolios has entailed very 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, which has been put forward by a number of big national research funders in Europe (Rabesandratana, 2019). The plan requires scientists who receive funding from publicly funded research organisations to publish their work in open repositories or in OA journals by 2021. Plan S is structured around ten principles, and 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 however not big enough to have significant influence on the publishers.

A promising new strategy is instead the signing of transformative licence 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 also hybrid OA for all articles with corresponding authors working in the institutions belonging to the consortium. If such deals become commonplace this would enable a publisher to gradually transform its journals to full OA at around the same income level as before.
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