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PLAN S AND THE ECONOMICS OF SCIENTIFIC JOURNAL PUBLISHING

by Karine Nyborg, Bård Harstad, Steinar Holden, Tore Nilssen, and Kjetil Storesletten[1]

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Editor's note:

Plan S[2] is an initiative for open-access science publishing that was launched by Science Europe on 4 September 2018. It is an initiative of 'cOAlition S', a consortium launched by the European Research Council and major national research agencies and funders, currently comprising funders from thirteen countries, most of them European. The plan requires scientists and researchers who benefit from research grants from Coalition S signatories to publish their work in open repositories or in journals that are available to all by 2020.

The 2013 San Francisco Declaration on Research Assessment (DORA)[3] signalled that individual and organizational signatories were committed to improve research by strengthening research assessment. The DORA Roadmap, adopted in 2018, is a two-year strategic plan for advancing global research assessment reform at the institutional, national, and funder level.

SUMMARY IN BRIEF

Securing open access to research will not remove the fundamental problem that commercial publishers have substantial market power. Thus, even if Plan S is successful, large commercial publishers are likely to put financial pressure on universities and funders in the future.

One underlying source of publishers' market power is the hierarchical ordering of journals' quality. Whether one likes it or not, such rankings are likely to arise as a response to asymmetric information. Plan S does not, and probably cannot, address the substantial information problems in research publishing. In the absence of journal hierarchies, other and more malign responses may easily arise, including discrimination along dimensions such as gender, age, personal networks, and the prestige of institutional affiliations.

Paywalls and subscription requirements are currently tools publishers use to exercise their market power. However, the underlying reason for publishers' market power is not this tool, but rather the fact that journals provide services that cannot, at least from the point of view of individual researchers, be easily replaced by the services of other journals. This will prevail even with open access. Rather than imposing very strict requirements on journals' business models, we would encourage funders to collaborate with academies and professional organizations. These organizations have the professional credibility to establish new but still highly regarded journals if needed. Funders can fully finance such journals, presumably at a reasonable cost, making subscription fees as well as publication fees redundant.

It is well-established in economics that, if so-called market failures are present, unregulated markets will not function efficiently. In scientific publishing, market failures abound. Below, we discuss some of them and their interplay, before concluding with respect to implications for the scientific publishing market, for the potential success of Plan S, and alternative approaches.

INFORMATION ASYMMETRIES

For many consumer goods, customers can evaluate the good's quality reasonably well before purchase, basing their purchasing decision on this assessment. For research papers, this is different.

A research paper basically consists of information. Even with open access, there are time and effort costs of familiarizing oneself with new research. Until the reader has actually read the paper, thus having already spent the time, effort and possibly monetary costs of access, he or she cannot independently evaluate the quality of a research paper.

Given the extremely large amount of research that exists, users cannot browse everything. They are left to rely on indicators of others' assessments when deciding which papers to read: citations, journal quality, personal knowledge of the author, information from colleagues, and so on. One cannot, of course, simply rely on authors' claims about the excellence of their own research: while the author knows the content of the paper, he or she is not impartial. Similarly, since no-one is an expert in all fields, readers also need to rely on others' assessments concerning the quality of the research.

For these reasons, there is a strong demand for quality indicators in research – which would prevail even if one decided, as postulated in the DORA declaration, to disregard the role such indicators play in hiring or funding decisions.

The (informal) journal hierarchy can be regarded as a response to this. It allows readers to lean on judgements of highly regarded expert editors and reviewers, guiding one's choices of what readings to prioritize and which findings to trust. Expert judgements of editors and reviewers are certainly not flawless, but are based on substantially better information on the topic at hand than is available to most readers.

If reasonably objective quality indicators such as citations and journal ranking measures were not available, readers would still be looking for signals of quality. As explored in the economics literature on limited information, this may lead to what is often called statistical discrimination: that is, readers choose what to read on the basis of possibly discriminatory signals that the reader rightly or wrongly believe to be correlated with research quality, such as the author's affiliation or educational background, age, or gender.

COORDINATION

While there may be a demand for a quality hierarchy from both readers and writers, it may still be somewhat arbitrary exactly *which journals* end up with higher quality. This is largely a question of self-fulfilling expectations: if most researchers – for whatever reason – expect a specific journal to have high quality, then the journal becomes attractive for readers as well as authors, thus attracting good and interesting submissions, thus attracting good reviewers and editors, thus in fact becoming good and interesting. Conversely, low expectations to a journal – or just uncertainty about whether a new journal will succeed – limit the number of good submissions, limiting in turn the actual quality of the journal.

These mechanisms are hard to influence for individual researchers. They can, however, be broken through coordinated efforts by the researcher community. The *Journal of the European Economic Association* provides a nice example of this. The EEA's previous official journal, the *European Economic Review*, was owned by a publisher refusing to make changes requested by the association. The association finally created a new journal, discontinuing its support of the previous one. In a very short time, expectations of these journals' quality changed, and the prestige of the new journal soon greatly exceeded that of the old one.

FINANCING PUBLIC GOODS

A research paper posted on an open-access platform

is a pure public good: anyone can use it without making the knowledge less useful to others, and everyone can access it. It is well-known in economics, however, that unregulated markets produce insufficient amounts of public goods. The reason is that it is hard to make users pay for services that can be accessed freely. During the last couple of decades, this insight has become painfully familiar to the music and news-media businesses.

Research papers are impure public goods, since it is possible to restrict access, e.g., by putting up paywalls. This is what many publishers have been using so far in order to ensure user payment. For journals to conform to Plan S, this solution will become infeasible. The funding issue thus becomes crucial.

Most research is funded by public bodies. The service provided by *journals* consists partly of making papers available and easily searchable. More importantly, journals provide quality screening by external and independent experts, serving two crucial functions: first, the advice and suggestions of reviewers and editors often substantially improve the quality of papers, thus being essentially an integrated part of the research process itself. Second, impartial experts' quality screening helps alleviate the information problem discussed above: while reviewers and editors should never accept papers containing errors or methodological flaws, other requirements, such as originality and general interest, are typically stricter in higher-quality journals.

Again, much of these evaluation efforts are funded by government bodies, since most reviewers and sometimes even editors are paid by universities and research institutions. Thus, the extra funding requirements for fully covering the cost of high-quality journal services should hardly be substantial. This does not, however, make funding concerns unimportant: a poorly designed system may involve unfortunate incentives and inefficiencies, creating new problems that were not present at the outset.

MARKET POWER

In the market for scientific publishing, a few large companies have substantial market power. This allows them to dictate subscription prices at presumably much higher levels than what would cover journals' costs.

Paywalls and subscription requirements are currently tools publishers use to exercise their market power. However, the underlying reason for publishers' market power is not this tool, but rather the fact that some of their journals provide services that cannot, at least from the point of view of individual researchers, be easily replaced by other journals.

If currently prestigious outlets such as *Science* or *Nature* were considered equivalent to any newcomer, their publishers would be unable to collect unreasonably high subscription fees: new publishers would then be attracted by the high profits, offering low-cost solutions that could easily outcompete the more expensive journals.

An important foundation for large publishers' market power is that outlets such as *Science* or *Nature* do in fact provide higher-quality services than others, both for readers and writers. From readers' point of view, the top of the hierarchy offers papers that are generally more carefully screened and more likely to be of general interest. For exactly the same reason, these outlets are, from writers' point of view, more likely to bring high-impact readers.

The question is whether, if paywalls and subscriptions are abolished and journals are to be funded by publication fees, publishers can exercise their market power through other means. Although the mechanisms will be different, it is likely that, to some extent, they can.

First, note that moving the payment from readers to writers will not in itself reduce the burden on universities, since both readers and writers are predominantly university employees.

For the sake of the argument, imagine for a moment that there are no restrictions on publication fees, just as there are currently no specific restrictions on subscription fees. Instead of demanding a high subscription fee, a publisher owning a high-quality journal could then exercise its market power simply by demanding very high publication fees. As before, the power to do so would depend essentially on the journal's prestige.

The impacts would be different than those in the current system: first, publishers would be unable to bundle together journals of different quality, requiring customers to purchase access to all of them if they want access to just some. Second, publishers would have an incentive to publish more papers and in this way undermine quality. Third, since profit maximizing high-quality publishers would demand the highest publication fees, high-quality publishing would become less feasible for low-income researchers, such as early career scholars between jobs and employees of developing country universities.

What if there is a maximum limit on publication fees? Plan S includes an intention to curb publishing fees, although no specific limits or other requirements have so far been established. The high-quality journals will still have a strong underlying market power, but the question is whether they will be able to exercise it.

Currently, universities and libraries are pressured to pay high subscription fees because not being able to read the best journals would jeopardize research quality. With publication fees, writers may be pressured instead of libraries. Not being able to publish in the best journals may also jeopardize research quality. Thus, publishers may use their market power to pressure fee limits upwards.

Second, if limits on publication fees are binding, commercial publishers with underlying market power may find other ways to exploit researchers' willingness to pay. For example, they may implement other payments in addition to the publishing fees, such as submission fees, or require researchers to serve as reviewers or on editorial boards in return for submission or publication.

COMMERCIAL VERSUS NON-COMMERCIAL PUBLISHERS

Not all scientific journals are owned or governed by commercial publishers. While non-commercial publishers may still demand subscription fees in order to cover journal costs, their aim is not to maximize profits, but rather to improve journal quality and increase its readership. Even when subscription-based, such journals may provide better access even to non-subscribers than the commercial journals. For example, all papers published in the journal of the American National Academy of Science, *Proceedings of the National Academy of Science,* are open access after an embargo period of six months.

Even reasonable subscription fees limit public access to the published research, which is at the outset not desirable. Nevertheless, unless the public sector fully covers these journal's costs, it is hard to identify business models that do not create undesirable side effects. While subscription fees can limit readership, especially among low-income researchers, publication fees can limit authorship, especially among low-income researchers; moreover, they create an incentive for journals to publish more articles, which will lower the quality of published research.

Subscription fees are widely used by, e.g., newspapers and popular magazines, music and audiobook streaming services, association memberships and so forth. If journals keep subscription fees low and embargo periods before open access short, subscription-based journals may not represent substantial problems. The main problem may be the substantial market power of a few commercial publishing companies.

CONCLUSIONS AND RECOMMENDATIONS

While the main aim of Plan S is to secure open access to publicly funded research, there appears to be another, perhaps equally important purpose underlying the plan – namely to reduce the market power of major scientific publishing companies, and the associated unreasonably high amounts of money going from universities, research institutions and libraries to these major publishing companies. We support both aims.

However, while the two aims are related, the market power of commercial publishers is unlikely to vanish in the absence of subscription fees. If Plan S succeeds in making publishers switch to publication fees, the most prestigious commercial journals are likely to i) demand high publication fees; ii) put pressure on research funders to accept increasingly high maximal publication fees; and iii) to put pressure on authors to contribute to the journal in additional ways, for example through submission fees and review obligations.

One factor behind the market power of major publishers is the existence of a journal hierarchy, which in turn originates from the substantial information problem facing readers of scientific literature. Neither Plan S nor DORA addresses these information problems. Thus, whether one likes it or not, a journal hierarchy is likely to prevail, and the market power of the most prestigious journals is also likely to prevail.

As discussed above, however, exactly which journals are associated with higher prestige is largely a question of shared expectations, and may be changed as a result of coordinated efforts among important actors with high credibility in the research community, such as professional associations and national academies. Such changes require hard work and careful planning to achieve, however, and cannot be done often.

European research funders are now attempting to achieve a somewhat similar disruption. Rather than affecting the position of specific journals in the research community, Plan S aims to make scientific journals abolish subscription- and paywall-based systems.

There is little in the contents of Plan S announced so far, however, that is likely to move research publishing activities away from oligopolistic commercial publishers. Even if Plan S turns out to be successful in achieving this shift of business models, and even when the potentially substantial transition problems have been overcome, it is likely that large commercial publishers will still have considerable economic power vis-a-vis universities and funders.

The power of the commercial publishers is probably a larger social problem than the fact that not all research is published completely open access. While both goals are well worth pursuing, we would discourage an approach focusing only on open access without directly addressing the issue of market power.

Rather than imposing very strict requirements on journals' business models, we would encourage funders to collaborate with academies and professional organizations. These organizations have the professional credibility to establish new but still highly regarded journals if needed. Funders can fully finance such journals, presumably at a reasonable cost, making subscription fees as well as publication fees redundant.

A system like this would take some time to establish, but would be free of the major problems of subscription based as well as publication-fee based journals.

One concern is the independence between funders and journals, that is, the need for arm-length distance. This must be taken seriously, but is not impossible to overcome. In this respect, much can be learnt from Norwegian systems for public support to literature and the news media.

Above, we have not discussed the substantial costs that may be associated with implementation of Plan S. Many others have pointed out these problems, which is why we have not emphasized them here.

However, we wish to express our deep and profound worry about the potentially long-lasting negative consequences if Plan S is to be implemented with the haste and lack of flexibility indicated in the available documents. We are, for example, highly concerned about the survival and continued quality of excellent, non-commercial but subscription-based research journals; the very unfortunate incentives for journals associated with publication fees; the ability of our PhD students and postdocs to move on to positions elsewhere; our ability to attract the best candidates for PhD, postdoc and tenure positions; for the prospects of international research collaboration, and the international visibility and credibility of European research.

Finally, for a plan of such disruptive character as Plan S, it is essential that due attention is paid to transition problems. In particular, it is vital that the interests of early-career researchers are cared for. This is a group that is already vulnerable, often facing very uncertain job prospects in spite of their long education and high skills. In the current highly international academic job market, European young scholars need to be concerned about the option of positions even in countries outside of Coalition S. If Plan S is to proceed without major amendments, we strongly encourage Coalition S to establish a specific and detailed plan for how the future careers of young European researchers are to be protected during the transition phase.

ENDNOTES

[1] All authors: Department of Economics, University of Oslo. Corresponding author: Karine Nyborg, email karine.nyborg@econ.uio.no.

[2] https://www.forskningsradet.no/servlet/Satellite?cid=1254036632829&pagename=VedleggPointer&target=_blank; https://www.forskningsradet.no/servlet/Satellite?cid=1254038095554&pagename=VedleggPointer&target=_blank.

[3] https://sfdora.org/.

