

# MONOPOLIES IN SCIENCE PUBLISHING: A BLACK HOLE FOR PUBLIC SPENDING?

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## ABSTRACT

*This paper provides a comprehensive account of the direct and indirect channels through which public expenditure benefits big academic publishing companies. Based on a meta-analysis of studies providing estimates of financial flows related to academic publishing and an accompanying survey, we estimate the annual financial flows of public expenditures to academic publishers in the field of social sciences in Austria. We find that about a fourth of annual basic public funding for academic research directly or indirectly benefits a small number of publishing companies. Based on our empirical findings we offer three main reform options for a more democratic and egalitarian form of academic publishing.*

**Keywords:** Monopolies, Science, Public Spending

**One Sentence Summary:** This paper estimates financial flows in academic publishing and provides reform options for science policy.

## INTRODUCTION

After the past decades witnessed the emergence of a variety of open-access (OA) models, OA, and, more generally, the aim to provide free access to scientific knowledge, have gained traction and became prominent topics in academic debates across all disciplines (Piwowar, 2018; Else, 2018; Noorden, 2013; Laakso, 2011). This strengthening of OA is undoubtedly related to a variety of factors, including big science funders starting to mandate OA for its grantees as well as new platforms for self-archiving (ResearchGate or Academic.edu) or illegal hosting (Sci-Hub & LibGen), which challenge the traditional business model of academic publishers. However, recently the big academic publishers also increased their efforts to push OA publishing, potentially indicating a shift in their dominant business model (Storbeck, 2018).

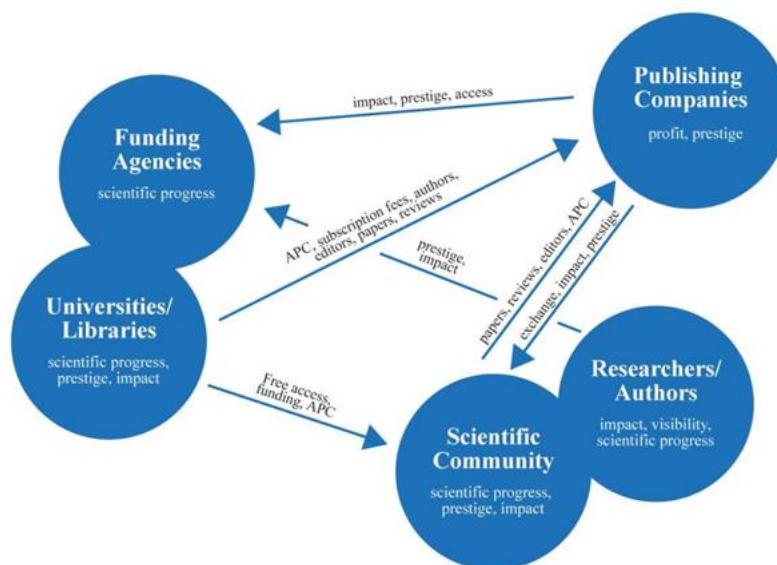
Yet, the field of scientific publishing continues to be a very lucrative market for a few dominant companies. More specific, particularly the “big five” (ACS, Elsevier, Springer, Taylor&Francis, Wiley-Blackwell) control about three fourths of the market and have profit margins of up to 40% (Stoy, 2019; Lawson, 2016; Larivière, 2015). In this regard, several studies criticized the black box of costs of academic publishing, i.e. high subscription fees and article processing charges (APC), intransparent “Big-Deals” between academic publishers and distinct national consortia of universities, libraries and national science funders. Although financial stress and concerns on unfair treatment by publishers have on some occasions led to cancellations of subscriptions in large European and U.S. universities (Laakso, 2011; Gaid, 2019), a few top publishing companies still hold a quasi-monopoly position in this market.

While most critical literature on academic publishing is focused on subscription fees and APCs, i.e. the “revenue side” of academic publishing companies, there is hardly any literature on their respective “cost side”, including inter alia the provision of their “product” by authors and reviewers. More specifically, rather surprisingly even critics hardly point to the fact, that academic publishers to a large extent benefit from the strong pressure to “publish or perish” and the academic practice of peer reviewing (see (Else, 2018; Smith, 2018) for notable exceptions). Against this backdrop, our study provides a comprehensive account of the direct and indirect

channels through which public expenditure benefits big academic publishing companies. Furthermore, we also estimate the annual financial flows of public expenditures to academic publishers in the field of social sciences in Austria. This way, we aim to open up the debate about the public value and costs of scholarly knowledge and ask whether and under what circumstances public subsidies for economically successful publishing companies can be justified. Eventually, we provide three main suggestions for a more democratic and egalitarian form of academic publishing.

### The Field of Academic Publishing: Four Channels of Support for Academic Publishers

In recent decades there is a trend to present the academic field more and more as a competitive market, mediating the scarce resource of scientific prestige. In this process, academic publishers have benefited from the economization of science, i.e. a strong stratification logic based on journal impact factors, citations and academic rankings (for a recent critical account see the DORA initiative). From a birds-eye view the field of academic publishing is composed of five main actors with partly countervailing goals, claims and perspectives: (i) authors, (ii) academic publishing companies, (iii) funding agencies (iv) universities and libraries and (v) the scientific community. Figure 1 provides an overview of the mutual relations of the actors in the field.



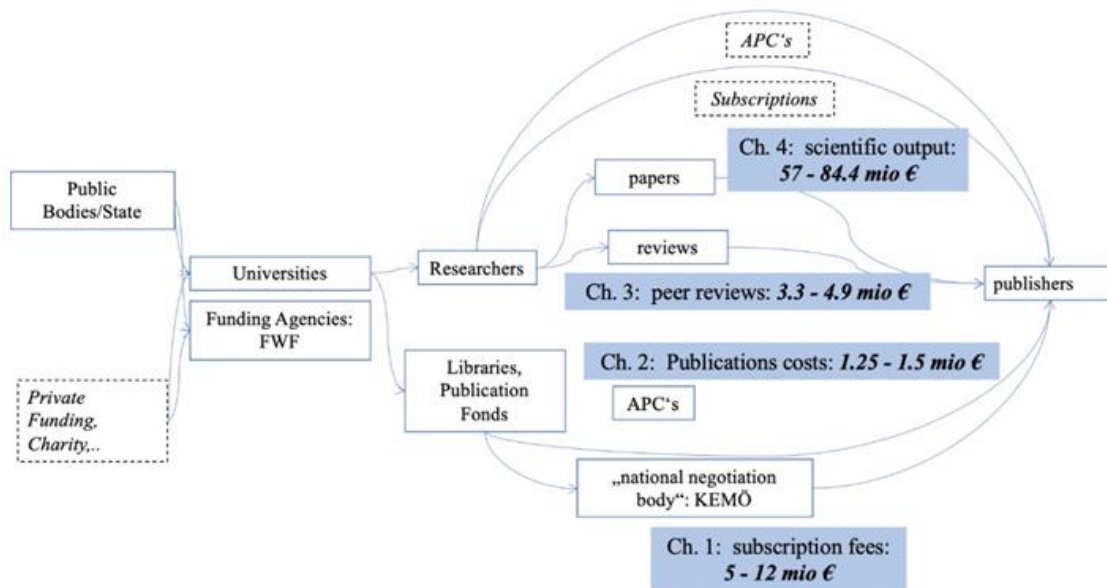
**FIGURE 1**  
**STYLIZED CONSTELLATION OF ACTORS IN THE FIELD OF ACADEMIC PUBLISHING**

In all, the combination of the incentive structures of the current academic system and the intrinsic motivation of individual researchers and academic institutions, offers a very lucrative business model for publishing companies. Apart from several tolls and fees, they receive papers (their “product”) and reviews (their “quality control”) for free. Yet, preparing scientific output and peer-reviewing is part of the scholarly duties of researchers and thus their work is financed by their employers, typically universities. In other words, while scientific knowledge and peer-reviewing are perceived as public goods by academic institutions (and hence largely publicly funded), publishing companies transform these public goods into private goods and receive very high profit margins in exchange. In sum, we distinguish four main channels for publishers to obtain public funding:

- Channel 1: subscription fees, mainly paid by university libraries
- Channel 2: APCs and submission fees, paid either by universities or funding agencies, in rare cases also by individual researchers

- Channel 3: the provision of reviews and journal editorship for journals – free of charge
- Channel 4: the provision of research papers – the main input – free of charge

While the relevant monetary flows to as well as the services provided by publicly employed researchers for the market of academic publishing are typically intransparent and often subject to confidential agreements, we employed the schematic four-channels-model for an explorative case study of academic publishers' access to public funding in the field of social sciences in Austria. The study rests on two pillars: a meta-analysis of 22 studies providing estimations of costs incurred by the public sector in accordance with our channels-model and a survey conducted among a full sample of Austria social scientists to supplement our analysis. While data for channel 1 and 2 can be taken from existing estimates covering the publishing-related expenditures of Science funds and universities in Austria and Europe (Larivière, 2015; Buschmann, 2015), we employ our survey data to estimate the average time spent to produce the "public goods" (see appendix for data and calculations). Summing up the estimated costs incurred by the public sector across all four channels, the Austrian state provides academic publishers in the field of social sciences by a minimum of approximately € 67 Mio and a maximum of approximately € 103 Mio (Puehringer, 2021). This amount represents about a fourth of the annual basic funding Austrian universities receive from the government in the field of the social sciences (Figure 2). Given that the products sold by academic publishers critically rely on the inputs provided 'in-kind' by publicly funded researchers this is best interpreted as an intransparent form of public subsidization.



**FIGURE 2**  
**FOUR-CHANNELS MODEL OF ACCESS TO PUBLIC FUNDING FOR ACADEMIC PUBLISHERS. AN ESTIMATION FOR THE SOCIAL SCIENCES IN AUSTRIA, BASED ON (Lawson, 2016)**

### Strategies to Reclaim the Public Good Scientific Knowledge

We found that a substantial share of public funding benefits, directly or indirectly, a small number of top publishing companies. While the open access movement initiated an ongoing debate and several positive developments regarding channel 1 and 2 of our model – subscription fees, APCs and submission fees – channels 3 and 4, *i.e.* the free provision of peer reviews and research papers are largely understudied. Against the background of our empirical results, we conclude that academic publishing is in urgent need of institutional reform and thus suggest three main reform options in the field of science policy (Table 1).

<b>Table 1</b>		
<b>REFORM OPTIONS TO DEMOCRATIZE ACADEMIC PUBLISHING</b>		
<b>Reform option</b>	<b>Main objective</b>	<b>Main actors</b>
Anti-trust policy in academia	<ul style="list-style-type: none"> <li>• Break up oligopolies and monopolies</li> <li>• Establish true costs of research output</li> </ul>	Government authorities Public funding agencies
Socialization of academic publishing	<ul style="list-style-type: none"> <li>• Reclaim the monopoly in science publishing exclusively for publishers dedicated to the public interest of scientific progress</li> <li>• de-commodify scientific knowledge</li> </ul>	Government authorities Academic institutions Academic associations
Block-chain solution for academic publishing	<ul style="list-style-type: none"> <li>• Blockchain technology for publication and peer - review</li> <li>• Decentralize academic publishing</li> </ul>	Government authorities; Scientific community

First, given the quasi-oligopolistic position of few big academic publishing companies we suggest a far-reaching anti-trust policy and market regulation organized by public funding agencies and/or the government. While individual academic institutions are confronted with severe power differentials in negotiations with big publishing companies, common efforts of universities, funding agencies and the state could establish a level playing field. Yet, the expansion of OA publishing and recent efforts for OA and transparency on EU and U.S. level hint to ongoing movements in this direction. However, we argue that institutional reforms should not be restricted to the “revenue side” of publishing companies (e.g. cheaper “big deals”, lower APCs). Rather, government authorities and public funding agencies have to stress their role of (indirect) supplier of the public good of scientific knowledge.

In this vein, a second and more radical reform option in the field of science policy would be the socialization of academic publishing, which could also result in a “complete switch to OA without publishers” (Knoche, 2020). Hence, we argue that while scientific progress is a common main goal of academic institutions, funding agencies and the scientific community, private publishing companies are obliged to maximize their profits and thus push the commodification of academic output. Yet, government authorities or academic institutions could reclaim the monopoly of academic publishing. More precisely, (i) the national funding agencies, (ii) publicly owned publishing companies, (iii) public universities or (iv) academic associations could be granted the exclusive right to publish journals. Consequently, publicly funded researchers would have to be obliged to publish their research output in these set of outlets, dedicated to the public interest of scientific progress. Indeed, at least the latter two forms of public publishing have been a common practice in the field of academic publishing for a long time.

Eventually, a third technical solution would be to apply blockchain technology for academic publishing. Blockchain is a peer-to-peer data application organized in a decentralized but secure manner. The basic idea of blockchain applications for scientific communication is to provide secure, decentralized interaction platforms to replace intermediaries of (market) organization by distributed network technology. Academic publishers being one typical example of such intermediaries. Blockchain is able to assure property rights of authored work by individual researchers in a secure way by combining cryptographic and algorithmic methods. In any case the success of such a technological solution will strongly depend on the actual design and its dimension and not least the political will to break existing power structures in academic publishing. Otherwise existing power relations might just be transferred onto the digital sphere.

Nevertheless, a blockchain approach bypasses several problems in the field of academic publishing. Transparency along the process of research, that is, from the registration of a study to the publication of the results can be implemented. This is particularly relevant for the

replication of results. Further, the tendency to only publish successful results of experiments could be overcome by greater transparency along the research. OA policy on the blockchain could surpass the current system where payments to publishers are shifted from payments from readers to payments from authors rather than actually being accessible for everyone without restriction (Rossum, 2018; Wang, 2020).

In all, we suggest three main reform options for the field of academic publishing. While they have different main objectives and address different key actors, they follow the common overarching goals of a more democratic and egalitarian form of knowledge dissemination and scientific progress.

## FUNDING

This research was funded in whole, or in part, by the Austrian Science Fund (FWF) [ZK60-G27]. For the purpose of open access, the author has applied a CC BY public copyright licence to any Author Accepted Manuscript version arising from this submission.

**Competing Interests:** Authors declare no competing interests.

**Data and Materials Availability:** All data is available in the main text or the supplementary materials.

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