

## Pricing principles used by Scholarly Open Access publishers

Bo-Christer Björk,  
Swedish School of Economics and Business Administration,  
Helsinki, Finland  
Bo-Christer.Bjork@Hanken.fi

David Solomon,  
Michigan State University,  
Michigan, USA  
dsolomon@msu.edu

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### Abstract

The article processing charge (APC) is currently the primary method of funding professionally published Open Access peer reviewed journals. The pricing principles of 77 OA publishers publishing over 1000 journals using APCs were studied and classified. The most commonly used pricing method is a single fixed fee, which can either be the same for all of a publisher's journals or individually determined for each journal. Fees are usually only levied for publication of accepted papers, but there are some journals that also charge submission fees. Instead of fixed prices many publishers charge by the page or have multi-tiered fees depending on the length of articles. The country of origin of the author can also influence the pricing, in order to facilitate publishing for authors from developing countries.

## Introduction

Until the emergence of the World Wide Web the publication market for scholarly peer reviewed journals was relatively stable and pricing mechanisms well established. A two-tier pricing structure with one for individuals or society members and a higher price for the libraries representing larger groups of readers was usual. Demands for copies of individual articles were handled by the sale of issues or reprints and libraries could handle requests for journals they did not subscribe through inter-library loans.

The web changed the situation as major publishers began to digitize their journals, usually in parallel to continuing with the print versions. The rapid proliferation of digital dissemination has expanded the pricing options for the publishers in two directions, firstly towards the sales of large portfolios of e-journal content (“big deals”) and secondly towards the sales of individual article copies (“pay-per-view”). Of these the bundled e-licenses nowadays account for a large share of the publishers revenue, whereas the uptake of pay-per-view has been relatively low. King and Alvarado-Albertorio<sup>1</sup> provide a good overview of the situation.

Open Access emerged at first mainly as a movement led by individual scholars who were inspired by motivations similar to the ones underpinning the development of Open Source software or the establishment of the Wikipedia. They strived to make the results of scientific research available to anyone with Internet access. Typically university faculty had access to web servers, which allowed them to store articles creating small-scale journals and operating these journals on minimal budgets. Later many scientific societies, in connection with creating parallel e-versions of their existing paper journals made the digital versions freely accessible either initially or after a specified period of time. This was made possible by relatively secure revenue streams from their print versions and in particular in Latin America and Japan by using third party portals such as Scielo, Redalyc and J-Stage.

Around 2000-2002 a new category of professional publishers emerged that specialized in Open Access publishing. BioMed Central and Public Library of Science (PLoS) were the most notable of this new breed of publishers. Their business model focused on providing both high scientific quality and rapid and efficient dissemination services to the authors of the articles they published and the central source of revenue became the service charges levied on the authors. In the following we will use the term Article Processing Charge, (APC) to denote these fees. The mechanism of funding scientific peer reviewed OA-journals through such charges had previously been used by individual journals and described in a journal article<sup>2</sup>. Bio-Med Central and PLoS however are considered the two pioneers that raised the general awareness of the potential of APCs for funding OA publishing on a larger scale.

## The Article Processing charge – a reinvented revenue mechanism

Charging the authors as a means of funding scholarly publishing is not a new concept. This revenue source has been widely used in the past to complement subscription income, in particular by moderately priced society journals. Typically the charges have been in the form of page charges and charges for color photographs, both of which are related to paper printing costs. Machlup and Leeson<sup>3</sup> found for instance that page charges to authors represented approximately 20 % of journal publishing revenue for learned societies in the 1970s.

Following in the wake of BioMedCentral and PloS several dozen publishers have begun offering Open Access journals funded by different types of APCs. In addition to a large variation in the prices charged, from as low as 20 USD to almost 3000 USD, these publishers have experimented with different principles for establishing the price paid by the authors for publishing in OA journals. The APCs can for instance be per article or per page, prices can vary according to the country of origin of the author and the charges can be levied for submission or for publication. Fees for additional services such as expedited review or copy editing are also used by some publishers.

### Method

We decided to take a closer look at the pricing principles in use today, to classify them in some meaningful way and to study how commonly they are used. We started by searching the Directory of Open Access Journals (in August 2011) and found 1825 journals (out of a total of almost 7000) that had reported that they use APC funding. Starting with this data we identified the names of the publishers of these journals and reviewed their web sites collecting information about the principles used for the collection of APCs. We used a fixed category scheme for classifying the nature of the charges and noted relevant anomalies in additional comments.

There were 512 publishers in our initial list of publishers. Due to the labor involved in data collection we surveyed all publishers that published at least two APC-journals but sampled 50 of the 421 single journal publishers. During the data collection we found that many of the publishers, in particular single-journal publisher, did not in fact charge APCs and discarded them. In the end we collected detailed data for 77 publishers. A useful way to organise the data for further analysis is by the size of the journal portfolios. In table 1 the publishers have been grouped in three size categories and further classified into six categories based on their business models and possible background organisation. Public Library of Science for instance was classified as a professional non-commercial publisher.

Table 1. The type of publishers in the different size groups in our data material

Type of publisher	Size of publisher's OA portfolio		
	Single journal (24 publishers)	2-9 journals (35 publishers)	≥ 10 journals (18 publishers)
Commercial publisher	13%	69%	83%
Professional non-commercial publisher	0%	9%	6%
Scientific society or professional association	58%	6%	11%
University press	17%	11%	0%
University, University Department, Research Institute	4%	6%	0%
Individual scientist or group of scientists	8%	0%	0%
	Σ 100 %	Σ 100 %	Σ 100 %

The data shows very clearly how commercial publishers are mostly to be found in the multi-journal category and how society publishers dominate the single journal category.

We found three central principles for APC charges; 1) charging for submitting a manuscript or for publishing an accepted article, 2) The same fee for all articles or a fee dependent on some characteristics of the article (such as page length) and 3) A uniform fee for all authors or discounts or waivers for some categories of authors. We found several variations on each of these principles. In addition some journals charge for extra services such as fast track review or offer price reductions for prolific authors. The different variations are described in the following discussion and illustrated with case examples.

## Submission vs. Publications Charges

Since part of the costs of publishing a peer reviewed journal accrue from managing the peer review process it is only logical that service charges could also be levied for submissions to OA journals, in particular in high-quality journals with high rejection rates. This practice is, however, rather uncommon we expect due to the fear that this would deter potential authors.

The Academic and Business Research Institute levies both submission and publication charges for its 17 Open Access journals. The submission fee is 45-95 USD based on the length of the manuscript and 195 to 395 USD for publication. An independent journal using submission fees is the Journal of Medical Internet Research, which charges a submission fee of 90 USD and a publication fee of 1900 USD.

A very interesting publisher in this respect is also Copernicus Publications, which publishes a number of journals on behalf of the European Geosciences Union. Currently 14 of the journals published come in two editions, a discussion forum version for submitted papers and a final journal version. The Discussion forum is similar to a preprint server for papers submitted to the journal. The idea is that

manuscripts can be published within a few days in the Discussion series, after only a very cursory screening by editorial board members who check that the manuscript is within the scope of the journal and that it meets basic scientific quality standards. After that reader comments and formal peer reviews are openly posted together with the discussed manuscripts. Those that pass the formal peer review are eventually published as full papers in the corresponding journal. A fee is levied for publication in the discussion forum but no additional fee is charged for publication in the full journal. Atmospheric Chemistry and Physics for instance charges 24-39 Euros per page (depending on the technical format and quality of the manuscript) for it to be placed in the discussion forum.

## Fixed price schemes

Having a standard fixed price for all articles in a particular journal is by far the most common option with just over 70% of all publishers and 75% of commercial publishers using this model. There are, however, two major variations. There can be price differentiation between the different journals from the same publisher, or the publisher can opt for a single price across its full portfolio of journals. Hindawi for instance, which has a wide range of journals, has APCs in the price range of 300-1500 USD. The largest publisher with a single price scheme is Bentham Open which charges 800 USD for research articles in all of its approximately 200 journals. Interestingly the pricing of optional paid open access in “hybrid journals” by traditional subscription publishers like Springer tend to have similar uniform pricing schemes.

## Variable price schemes: article dependent

It is quite common to have the APC depend on the characteristics of the manuscript. The pricing of Copernicus Publications mentioned above is dependent on both the length and the format of the manuscript (submitting in LaTeX is for instance less expensive than Microsoft Word). Similar to page charges used for print journals in the past some publishers charge extra for photographs, use of color and other features.

Page charges come in two major variations. The price either being linearly dependent on the number of pages or with a number of thresholds where the price increases. Optics Express, for instance, charges 1018 USD for articles of up to six pages, 1743 USD for articles between 7-15 pages and 145 USD for each extra page exceeding that. Other publishers such as Scientific Research Publishing and Frontiers charge a base fee for up to a specified number of pages and then an additional fee for each page over that limit. Approximately 14% of the publishers charged by the number of pages and another 16% charge either a flat fee plus page charges over a specified number of pages or a number of thresholds with price increases.

Although Bentham Open was mentioned as an example of a publisher using a single uniform APC for all its journals Bentham has different prices for different types of articles such as research articles, reviews or letters. This type of pricing was less common accounting for only 7 % of the publishers. In most cases where such

differentiation based on article categories was found, the majority of articles fell clearly into one category.

## **Variable price schemes: author dependent**

Many Open Access journals have acknowledged the difficulty authors from developing countries have in financing the APCs and provide APC waivers for authors who can demonstrate a need. This is especially important for biomedical journals, which tend to be more expensive than journals other fields. Just over 22% of the publishers provided waivers, many requiring the author to request the waiver and provide some documentation of need.

Other publishers address this issue by charging authors from developing countries a lower APC than authors from developed countries. OMICS Publishing Group has one of the most comprehensive schemes with a three-tier pricing structure (1800 USD, 1300 USD, 900 USD) based on the World Bank Country Classification into high-income, middle-income and low-income economies.

Some publishers charge higher prices for foreign authors. The journals of Pelagia Research Library have for instance a publishing charge of 50 USD for international authors and 1000 Indian Rupees ( $\approx$  20 USD) for Indian authors. Similarly society journals often have a membership discount.

## **Extra charges**

A few publishers offer authors a faster review and article production times for an extra payment. Academic and Business Research Institute charges an expedited review fee of 165 USD that guarantees a completed review within 10 business days or less. Additionally, some publishers like the Swiss publisher MDPI charge extra for manuscripts that the editor feels require extra language editing. This type of editing fee is more common in Asia.

## **Bypassing the author: Institutional memberships**

In many cases the APCs are not paid by the authors themselves but rather by their employer or the research funder<sup>4</sup>. In our previous study we found regional differences in this respect as 39% of authors from lower income countries paid APCs out-of-pocket compared with only 11% in higher income countries<sup>5</sup>. Increasingly research funders include APCs as allowable costs in their standard contracts and a number of universities have created funding schemes to facilitate funding for authors who don't have recourse to external grant money<sup>6</sup>.

Some OA publishers are offering agreements to universities and research funders, which would cover predetermined numbers of APCs at slightly reduced prices, further lowering the threshold of authors to submit to OA journals. BioMedCentral for instance currently lists 383 “members” and “supporter members” that have entered

into this type of agreement. About 8% of the publishers advertised their willingness to enter into some type of institutional membership relationship with universities or other employers.

## How common are these different mechanisms

The following table gives more comprehensive summary data about how common the different pricing mechanisms were among the publishers we studied. The percentages for the four first options (variations on fixed fees and page charges) add up to 100 % for each size category since the choices were mutually exclusive. There were a couple of publishers who had price differentiation also for page charges (i.e. Copernicus Publications), but these were not recorded systematically in our data collection. The seven later options can be used in different combinations with the fixed price and page charge variants.

Table 2. The popularity of different pricing principles for three different size categories of publishers. The first four options (two types of fixed pricing and page charges each) are mutually exclusive and sum to 100%.

Pricing principle		Size of publisher's OA portfolio		
		Single journal (24 publishers)	2-9 journals (35 publishers)	≥ 10 journals (18 publishers)
Fixed price	Same for all journals	Not applicable	37%	11 %
	Individually priced journals	42%	54%	55 %
Page charge	Per page linear	29%	9%	6%
	Per page multi-tier	29%	0%	28 %
		∑ 100 %	∑ 100 %	∑ 100 %
Type of article	By type of article	4%	3%	17 %
Author dependent price	Waiver possible	13%	14%	50 %
	Multi-tier country pricing	8%	31%	11%
	Institutional membership	4%	0%	28%
	Discount for society members	13%	3%	11%
Submission fee		17%	3%	6 %
Fast track option		8%	3%	17%

## Conclusions

In the same way as innovative entrepreneurs in other fields such as digital sales of music and mobile telephony, OA publishers have experimented with different pricing mechanisms. Many of the pricing principles correspond directly with the cost structure of publishing whereas other with the author's ability to pay. Among the big ( $\geq 10$  journals) publishers, mainly commercial companies, the individual journal by journal pricing using fixed prices seems to be the dominant mode. Waivers for less endowed authors are used by half of these publishers. Institutional membership schemes are quite common in this category.

A slight majority of the single journal publishers use page charges rather than fixed pricing. Since the majority of these are scientific societies we could speculate that they as publishers historically might be familiar with using page charges also in subscription journals. Submission charges are quite rare, especially among the bigger publishers.

Open Access publishing has grown very rapidly over the last decade, with an annual growth rate of 18 % in the number of journals and 30 % in the number of articles<sup>7</sup>. The share of OA journals using APC-funding is still only around a quarter of all OA journals, but their share in the number of articles is much larger. This business model seems to be here to stay. Hopefully our study can help in illustrating the range of options OA-publishers have in the pricing of their services.

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