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Pinfield, S., Salter, J. and Bath, P.A. (2016) The "total cost of publication" in a hybrid open-access environment: Institutional approaches to funding journal article-processing charges in combination with subscriptions. Journal of the Association for Information Science and Technology, 67 (7). pp. 1751-1766. ISSN 2330-1635

https://doi.org/10.1002/asi.23446

The "Total Cost of Publication" in a Hybrid Open-Access Environment: Institutional Approaches to Funding Journal Article-Processing Charges in Combination With Subscriptions

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As open-access (OA) publishing funded by article-processing charges (APCs) becomes more widely accepted, academic institutions need to be aware of the "total cost of publication" (TCP), comprising subscription costs plus APCs and additional administration costs. This study analyzes data from 23 UK institutions covering the period 2007–2014 modeling the TCP. It shows a clear rise in centrally managed APC payments from 2012 onward, with payments projected to increase further. As well as evidencing the growing availability and acceptance of OA publishing, these trends reflect particular UK policy developments and funding arrangements intended to accelerate the move toward OA publishing ("Gold" OA). Although the mean value of APCs has been relatively stable, there was considerable variation in APC prices paid by institutions since 2007. In particular, "hybrid" subscription/OA journals were consistently more expensive than fully OA journals. Most APCs were paid to large "traditional" commercial publishers who also received considerable subscription income. New administrative costs reported by institutions varied considerably. The total cost of publication modeling shows that APCs are now a significant part of the TCP for academic institutions, in 2013 already constituting an average of 10% of the TCP (excluding administrative costs).

Received September 15, 2014; revised October 6, 2014; accepted October 6, 2014

 DOI: 10.1002/asi.23446

Introduction

As open-access (OA) begins to enter the mainstream of scholarly publishing, the ways in which OA business models work in practice are coming under increasing scrutiny. "Gold" OA, the publishing of OA articles in journals, is often funded through prepublication article-processing charges (APCs), payments for which need to be made by authors (or their institutions or funders). In the case of "fully OA" publishers, such as the Public Library of Science (PLOS), the business relationship between universities and publishers is based entirely on payment of APCs. However, a large number of publishers now operate a hybrid subscription/OA model offering the option to pay an APC in order to make a particular article open within an otherwise subscription-based journal. Such a model means that the business relationship between universities and publishers becomes more complex, consisting of APC payments *in combination* with subscriptions. It is becoming increasingly important therefore that institutions understand the total costs for a given publisher's products to manage their resources effectively.

This is particularly important in the context of the current "double dipping" debate (Anderson, 2013; Björk & Solomon, 2014b; Crotty, 2014; Suber, 2012a, 2012b). *Double dipping* is the term used to describe a publisher gaining from two income streams, APCs *and* subscriptions, in a way that its overall income from the same customer rises. Universities have understandably become concerned about double dipping, insisting that as a publisher's income from APCs increases, it should reduce subscription prices commensurately. A number of publishers have given general "offsetting" undertakings of this sort (e.g., Elsevier, 2014). A minority of publishers have also provided details of the

resulting pricing model (e.g., Royal Society Publishing, 2013). However, the position remains unclear given that, even where undertakings have been made, their real impact is often difficult to verify (Björk & Solomon, 2014b). This creates an urgent need for universities to understand total costs of subscription *and* OA publishing in order, for example, to factor it into negotiations with publishers. Where these negotiations are taking place at the consortial level (as is common), it is essential that these total costs are understood across different institutions.

Calculating subscription costs and APCs is, however, not straightforward. Subscription costs paid by institutions, particularly for "big deals" (packages of journal titles), vary considerably between different institutions. Prices are normally agreed as a result of negotiations with publishers and, in some cases, subject to contractual nondisclosure agreements. APC prices are advertised by publishers, but amounts actually paid by institutions may depart from list prices for a number of reasons. For instance, institutions commonly take advantage of APC prepayment schemes offered by publishers, which normally result in discounts. The journal publishing market is therefore characterized by considerable complexity, variability, and a lack of transparency, making the calculation of total costs of subscriptions and APCs for institutions challenging.

There are also other challenges for institutions, which have cost implications. The fact that APCs may, in many cases, involve a series of micropayments by institutions makes monitoring and managing them difficult. Many universities have responded to this by coordinating the payments of APCs across the institution. Typically, this involves the library or research support office managing a "central fund" for APC payments to which authors can apply (Eckman & Weil, 2010; Fernandez & Nariani, 2011; Nariani & Fernandez, 2011; Pinfield, 2010b; Pinfield & Middleton, 2012). Though such an arrangement can make setting up prepayment schemes easier, it can, at the same time, create new administrative costs for the library or research office. Such costs are often in danger of being "hidden," given that they are often funded by reallocating resources from other activities.

It is important therefore that institutions understand the "total cost of publication" (TCP) in the current environment (Willetts, 2014). The TCP in this context consists of:

- APC payments made either for individual journal articles or as part of bulk prepayment schemes
- Subscriptions for either individual journal titles or packages
- Additional administrative costs for managing APCs.

Understanding the TCP is particularly important in the current higher education policy environment. Many research funders now have policies in place encouraging OA and explicitly allowing the cost of APCs to be included in research grant proposals as part of the direct cost of research, or as part of the indirect organizational costs (overheads). In the United Kingdom, the Wellcome Trust pioneered such an approach, allowing authors to fund APCs through direct grants or claim against block grants given by the Trust to institutions in receipt of high levels of Wellcome funding (Pinfield, 2006; Terry, 2005; Walport & Kiley, 2006). More recently, the major publicly funded research sponsors in the United Kingdom, Research Councils UK (or RCUK), moved from allowing grant applications to include APCs in either direct or indirect costs to a block grant payment system to UK institutions enabling payment of APCs for the research they fund (RCUK, 2012). In most cases, UK institutions manage these block grants from RCUK and Wellcome centrally, often through the library (Finch, 2014). However, it varies whether any other APC payments (for articles and not derived from RCUK- or Wellcome-funded research) are also managed in this coordinated way.

With clear funding streams in place for the payment of APCs, along with funder policies promoting OA, it might reasonably be expected that there would be a rise in APC payments by institutions. If this was the case, the double dipping concern would, in turn, become more pressing. This article presents data from a number of UK institutions comprising APC payments, subscription costs, and administrative costs. In particular, it analyzes levels of APC payments made by institutions for different journals and publishers and sets these against subscription payments for different journal titles and packages. It also discusses initial estimates of additional administrative costs borne by universities. As such, it provides an early view of the total cost of publication in an environment in which article-processing charges are becoming increasingly accepted in the scholarly communication environment.

Research Context

Article-processing charges (also sometimes called "article publication charges" [Singleton, 2013]) have been established as a means of funding publication of OA research papers for more than a decade. Fully OA publishers, such as BioMed Central (BMC) and PLOS, have been using APCs as their primary business model since 2002 (Delamothe & Smith, 2004). Some hybrid subscription/OA options have also been available for almost as long: for example, Springer Open Choice was introduced in 2004 (Springer, 2014). However, since 2010, there has been a significant growth in journals adopting APCs as a business model. Björk and Solomon's (2014a, 2014b) important recent analysis identifies key developments, including subscription publishers expanding the number of journals offering hybrid options and also creating new fully OA journals, as well as the continued growth of OA journals from fully Gold publishers.

In their analysis of the market, including APC list prices, Björk and Solomon (2014a) have observed significant differences between APC levels charged by different "types" of journals. Though the average APC for "OA

DOI: 10.1002/asi

journal[s]—published by 'nonsubscription' publishers" was reported to be US$1,418, the average for "full-OA journal[s]—published by 'subscription' publishers" was $2,097, and "hybrid journal[s]—published by 'subscription' publishers" US$2,727. This significant price differential (US$1,309) between APCs offered by fully OA publishers and APCs in hybrid journals has created a situation in which the evidence suggests that price is discouraging uptake of the hybrid option in contrast to the growth of the market for fully OA journals (Björk & Solomon, 2014a, 2014b; Solomon & Björk, 2012).

Calculating APC levels based on list prices from publishers is, however, not necessarily straightforward for a number of reasons. APCs may vary between different titles published by the same publisher, meaning that calculations cannot simply be made at the publisher level. APCs for BMC journals, for example, range from US$1,450 (*Acta Neuropathologica Communications*) to US$2,650 (*BMC Medicine*) (BMC, 2014). Even for single titles, APC prices may vary. For instance, ACS now has a suite of options for the same titles involving various licenses allowing immediate or embargoed OA at different prices (ACS, 2013). The journal *Nucleic Acids Research*, published by Oxford University Press, is one of a number of journals charging a basic APC with additional page charges if the article exceeds a given page length (OUP, 2014). Furthermore, prepayment or membership schemes offered to institutions by a number of fully OA and hybrid publishers result in reductions to APCs paid by institutions, compared with list prices. These and similar factors together mean that the market is increasingly complex, making price comparisons difficult and limiting market transparency.

Much of the analysis of APC levels to date has focused on list prices (often only partially taking into account complexities identified above). There has been little analysis of what institutions are actually paying. Exceptions to this include institution-specific case studies, such as Pinfield and Middleton (2012), which included an analysis of centrally funded APC spend over time in the University of Nottingham. Some institutions have now released their APC payments data publicly (e.g., Ottawa [Hatherill, 2013]). In addition, funder-specific data have been made available by Wellcome showing actual expenditure on APCs it has funded (Kiley, 2014). There remains, however, a clear need to gather and analyze more evidence in this area, particularly on the relationship between APC and subscription spend.

This need is perhaps most apparent in the United Kingdom, given that policy developments there in recent years have accelerated the drive toward Gold OA more than is the case in most other countries (Caruso, Nicol, & Archambault, 2013). The influential Finch Report (Finch, 2012) placed primary emphasis on Gold OA (OA journal publishing), as opposed to "Green" OA (deposit in OA repositories). This emphasis was reflected in the RCUK OA policy (RCUK, 2012, 2013), initial proposals for which were published within days of Finch and brought RCUK into line with the Wellcome Trust approach of allocating block grants to institutions who receive their research grants. This approach has, however, been criticized as encouraging double dipping, a concern raised by, among others, the UK House of Commons Select Committee on Business, Innovation and Skills (House of Commons, 2013). The Select Committee also identified various other problems in the market, including a lack of transparency on subscriptions created by nondisclosure clauses in contracts.

Sensitive to these criticisms, RCUK and the Wellcome Trust, along with other funders such as Jisc, commissioned an analysis of the APC market that reported in March 2014 (Björk & Solomon, 2014a). This report offers several scenarios that might encourage the development of a functioning market for hybrid APCs. One important issue dealt with by Björk and Solomon (2014a) is that of the relationship between local and global responses to double dipping. Already referred to in the UK government's response to the Select Committee report, this has become an important issue in the current debate:

> "Government does not consider it appropriate for publishers to rely on retrospectively amortising their APC revenue to discount global subscription rates, as some now do. This may address 'double-dipping' in one sense, (no increase in total revenue to the publisher) but it does nothing to address the concerns of research intensive individual institutions, wherever they are located around the world. Such institutions paying APCs for Gold OA publication in particular journals should see some related and proportional discount in their total subscription fees, with the same publisher, to avoid them disproportionately funding the translation to Gold OA." (House of Commons, 2014)

This policy imperative, to enable individual institutions moving ahead with APC payments to receive discounts on their subscriptions at an *institutional* level, rather than just having a small share of global reductions, is an important context to Björk and Solomon's (2014a) report. It describes a number of options designed to address this particular concern and suggests possible ways in which research funders can work to improve the operation of the hybrid APC market at an institutional level as well as at a global level.

All of this points to the need for more information on the "total cost of publication"—a phrase used by former UK Science Minister David Willetts in his letter responding to the review of the implementation of the recommendations of the Finch Report (Willetts, 2014). In his letter, Willetts refers to the need to "develop sustainable funding models that establish a relationship between the payment of APCs (and the costs of administering them) and subscription fees for an institution," thus defining key components of the total cost of publication that form the basis of this study.

The fact that Willetts (2014) mentioned administration costs (albeit in parentheses) is interesting, given that this has not been a major feature of the debate on OA business

DOI: 10.1002/asi

models to date. It has, however, been mentioned in general terms in the library management literature for a number of years. Early caution was shown to libraries becoming involved in payment of APCs by a number of academic library practitioners, given that it was anticipated that this may have to be funded by the library budget (Schmidt, Sennyey, & Carstens, 2005). Some, however, saw libraries handling membership or prepayment schemes as a logical new role (Bailey, 2007). Here, the concerns were largely about the costs of APCs themselves falling on the existing library budget, and this clearly lay behind the reluctance of many library directors to set up central funds. However, the practice of the library administering block grants on behalf of institution addresses this to a large extent. With regard to staff resources, a number of practitioners have mentioned, in general terms, the possibility of converting serials acquisitions roles into those handling APC administration as a consequence of OA (Pinfield, 2010a), but this is rarely costed. Recently, in the United Kingdom, concerns have been expressed by practicing library managers in universities about the cost implications of administering APC payments (Harris, 2013). The question remains open as to whether this will involve additional ongoing cost to the library or whether resources can be diverted from other diminishing library functions (especially, in a transition model, if subscription administration costs decline). Some discussion has focused on the role of intermediaries in taking on APC administration on behalf of institutions similar to the well-established practice of subscription agents (RIN, 2012), although library activity has to date not been high enough to justify this for many institutions (Harris, 2013).

The research reported in this article covers the three key aspects of the total cost of publication for the current OA environment: APCs, subscriptions, and additional administrative costs. Specifically, the research had four main objectives:

1. Analyze details of APC payments currently being made by institutions
2. Compare these with subscription payments also being made by institutions
3. Estimate the additional administrative costs to institutions associated with managing payment of APCs
4. Establish a picture of the total cost of publication to institutions.

The study, which focuses on the United Kingdom, was carried out as a collaboration between the present authors and Jisc Collections. Jisc has responsibility for negotiating a number of major e-journal deals with publishers on behalf of UK higher education institutions and wanted to gather evidence of current activity to inform its work. The authors wished to analyze the data within the wider context of scholarly communication to understand how research publishing was evolving in a country where policy developments are accelerating the adoption of business models based on APCs. The collaboration aimed to make an early contribution to the evidence base associated with the total cost of publication that could potentially be used as a baseline for further work.

Method

The data analyzed here were gathered from 23 volunteer UK university libraries. Jisc employed consultants, Information Power Ltd (IPL), to gather the data on its behalf, who, following consultation with the authors about the data set to be requested from institutions, assembled the data during March and April 2014. These data were normalized and compiled by IPL before being made available to Jisc and the authors in May and June 2014. The data requested from institutions comprised:

- Records of all APC payments made by the institution
- All subscription costs for journals and packages for publishers to which APC payments had been made
- Estimates of additional administrative costs relating to APC payments.

Where possible, data submitted by these and other UK institutions have been made publicly available. This applies, in particular, to the APC data (e.g., Harrison & Lawson, 2014; Lawson, 2014a, 2014b). Data on subscription costs have not been released because of nondisclosure clauses in contracts.

For APC payments, institutions, where possible, provided details of journal title, publisher, year of publication, date the APC payment, and amount of the APC payment (in UK pounds [£]). For APC prepayment membership schemes, institutions were asked to state how much they had paid into any scheme in a given financial year and how much they had actually spent during that year. The extent to which institutions were able to provide data on *all* APC payments made by the institution, of course, varied. All of the participating institutions were managing APC payments at least for block grants (RCUK and Wellcome) centrally, but many were aware of at least some payments being made elsewhere within their institution. The extent to which this was happening was, however, stated by institutions to be very difficult to track, although the introduction of block grants to institutions and the alteration of funding arrangements precluding payment of APCs from direct or indirect grant income would suggest that direct payment of APCs would decline significantly.

For subscriptions, institutions provided data on costs of all titles or packages for which they had subscriptions by financial year for the publishers to which they had also paid APCs. The financial years covered by the data submitted by most institutions comprised 2012–2013 and 2013–2014, with a financial year running from August 1 to July 31. A greater degree of confidence can be attached to these data as representing institution-wide spend, owing to the fact that its management is commonly centralized. However,

DOI: 10.1002/asi

TABLE 1. Total number and cost of APCs per year, 2007–2014.

Year	APC nos. (no. of institutions making payments)	Total cost	Mean	Median	Minimum	Maximum
2007	31 (1)	£40,595	£1,310	£1,250	£235	£2,827
2008	67 (1)	£108,442	£1,619	£1,432	£456	£4,022
2009	99 (3)	£177,200	£1,790	£1,725	£246	£4,023
2010	380 (8)	£641,798	£1,689	£1,761	£115	£4,800
2011	469 (9)	£818,150	£1,744	£1,800	£175	£5,280
2012	570 (14)	£977,848	£1,716	£1,738	£183	£4,800
2013	2,445 (23)	£4,097,981	£1,676	£1,680	£82	£4,955
2014	1,081 (23)	£1,784,879	£1,651	£1,554	£107	£4,660
Total	**5,142**	**£8,646,892**	**£1,682**	**£1,674**	**£82**	**£5,280**

such data, in some cases subject to contractual nondisclosure clauses, were only submitted on the understanding that institutions would not be identifiable in any reporting. They are therefore presented here in anonymized form.

Finally, additional administrative costs were provided by participants in a variety of forms. Institutions were asked to submit data on one-off set-up costs for administering APC payments, ongoing costs (based on activity for their busiest 3 months to date) and to estimate costs were numbers of payments to double. It was expected that there would be considerable variability in how institutions were dealing with such costs, depending on levels of activity, existing structures, and so on, and this proved to be the case. However, in addition to the cost estimates, responses in this area provide an interesting qualitative commentary on institutions' thinking in relation to managing APCs that could be analyzed alongside the quantitative data. All figures for all of the data included the UK value-added tax of 20%.

Following receipt of the data set, the authors carried out further data processing activities, including, where possible, supplying missing data elements, such as publication date. In some cases, data were verified with the originator institution. Nevertheless, the data come with caveats. Institutions were given very short notice to submit responses, and the data collection process was designed to minimize effort. Participants were encouraged to provide what data they had already collected for internal purposes, rather than going to a great deal of additional work. This means that the data set for each institution, although submitted according to headings provided as part of the data collection exercise, will have some gaps and is unlikely to have been subjected to extensive double checking and will almost certainly have been originally compiled according to slightly different assumptions across different institutions. Nevertheless, the data provided can reasonably be assumed to be strongly indicative of the current situation and the analysis provides some valuable insights into ongoing developments. Moreover, the data-gathering exercise was itself designed to be a learning experience to inform similar future exercises. As a result, recommendations can be made regarding the major data elements that could usefully be included in future data-gathering initiatives. Detailed discussion of the data-gathering challenges and recommendations on data elements to be included in future data-gathering exercises have been produced by IPL (Woodward & Henderson, 2014).

Twenty-four different institutions initially contributed data. Data from one of them were, however, excluded from the analysis because only a very small number of APCs was involved (two in 2013 and two in 2014). The remaining 23 institutions were all research institutions: 12 members of the Russell Group (the largest 24 institutions in the United Kingdom), 10 "pre-1992" universities (established research universities, as opposed to post-1992 teaching-led institutions), and one "other" specialized research institution. Institutions were based in England, Scotland, and Wales.

The different cost components (APCs, subscriptions, and administration costs) were initially analyzed separately and then in combination with a view to calculating the TCP. Although sometimes called the "total cost of ownership" (TCO) (Woodward & Henderson, 2014), this analysis does not constitute a formal TCO calculation. TCO typically includes a wide range of direct and indirect costs over the lifetime of a product (Piscopo, Johnston, & Bellenger, 2008), whereas the TCP calculations here are comprised of the specific cost components already identified. However, it is these cost components and the relationship between them that are the focus of the current debate, and therefore it is hoped that the analysis provided can help to inform that debate by contributing to the developing evidence base. Analysis was carried out using Microsoft Excel and SPSS/PASW version 21. Values are given in UK pounds (£) and have been rounded to the nearest pound.

Results

APCs

Total number of APCs per year. Overall, there were a total of 5,142 APC payments recorded by the 23 institutions between 2007 and 2014 (with the 2014 data covering the period between January 1 and March 20), as illustrated in

DOI: 10.1002/asi

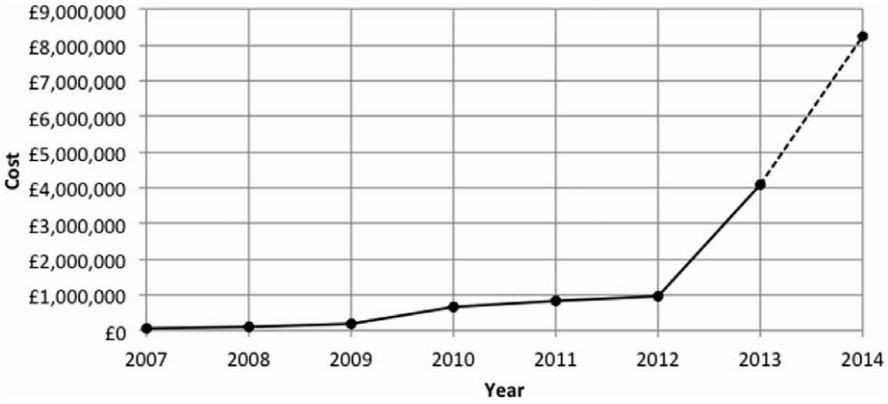

FIG. 1. Growth of APC payments 2007–2014, including projected expenditure to the end of 2014.

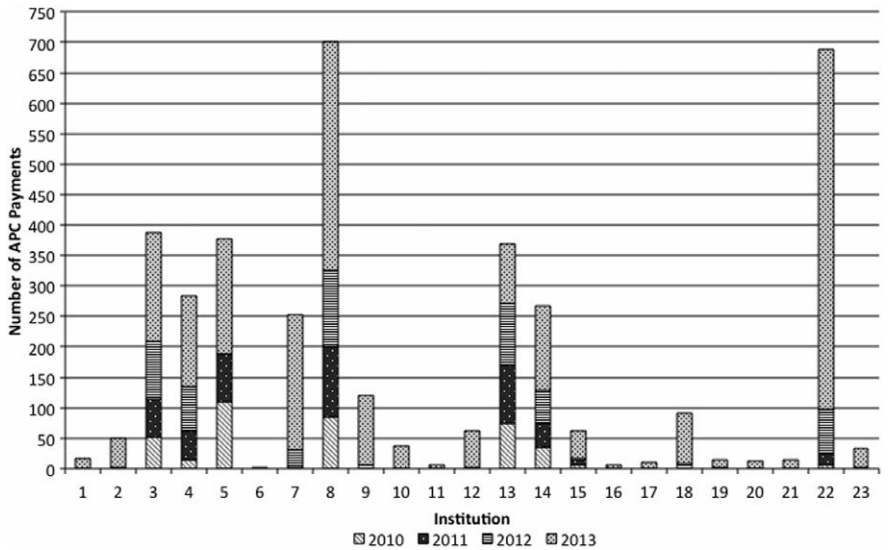

FIG. 2. Numbers of APC payments made, 2010–2013.

Table 1. There was a rise from only 31 recorded central payments made by just one university in 2007 to 2,445 made by 23 institutions in 2013. The majority of institutions only began to make central APC payments from 2012 onward. The value of payments over the whole period totaled more than £8.6 million, with the mean APC payment over the period £1,682 and median £1,674. For most of the period, mean APC levels remained relatively stable, falling from their peak of £1,744 in 2011 to £1,651 in 2014. However, there was considerable variation in the APCs paid over the period, with the minimum APC payment being £82 and the maximum being £5,280.

The total spent on APCs in the 23 institutions over the period rose rapidly, particularly from 2012 onward. Figure 1 illustrates the growth and includes a projection for 2014 expenditure to the end of the year. Because data for 2014 were gathered between March 16 and 20, they represented expenditure from less than one quarter of the year, and Figure 1 includes projected expenditure for 2014 extrapolating from the available 2014 data (covering 79 days with the spend rate of £22,593 per day) and assuming expenditure at a similar rate for the remainder of the year. It shows a continued rise in APC payments and is likely to be a conservative estimate.

APC payments per institution. There was considerable variation in the number of APC payments made by the participating institutions over the period. Figure 2 illustrates the number of payments made by each of the participating institutions for each year between 2010 and 2013. Only small numbers of central payments were made before that by a minority of the institutions. Institution 8 made the highest number of payments (702) between 2010 and 2013 with payments spread across all 4 years, but with a marked rise in 2013. Institution 22 paid 688 APCs over the period, but most (590) in 2013. In contrast, institution 6 made one payment in the period, with the remainder of its payments made in 2014. Institutions 11 and 16 only paid five APCs

DOI: 10.1002/asi

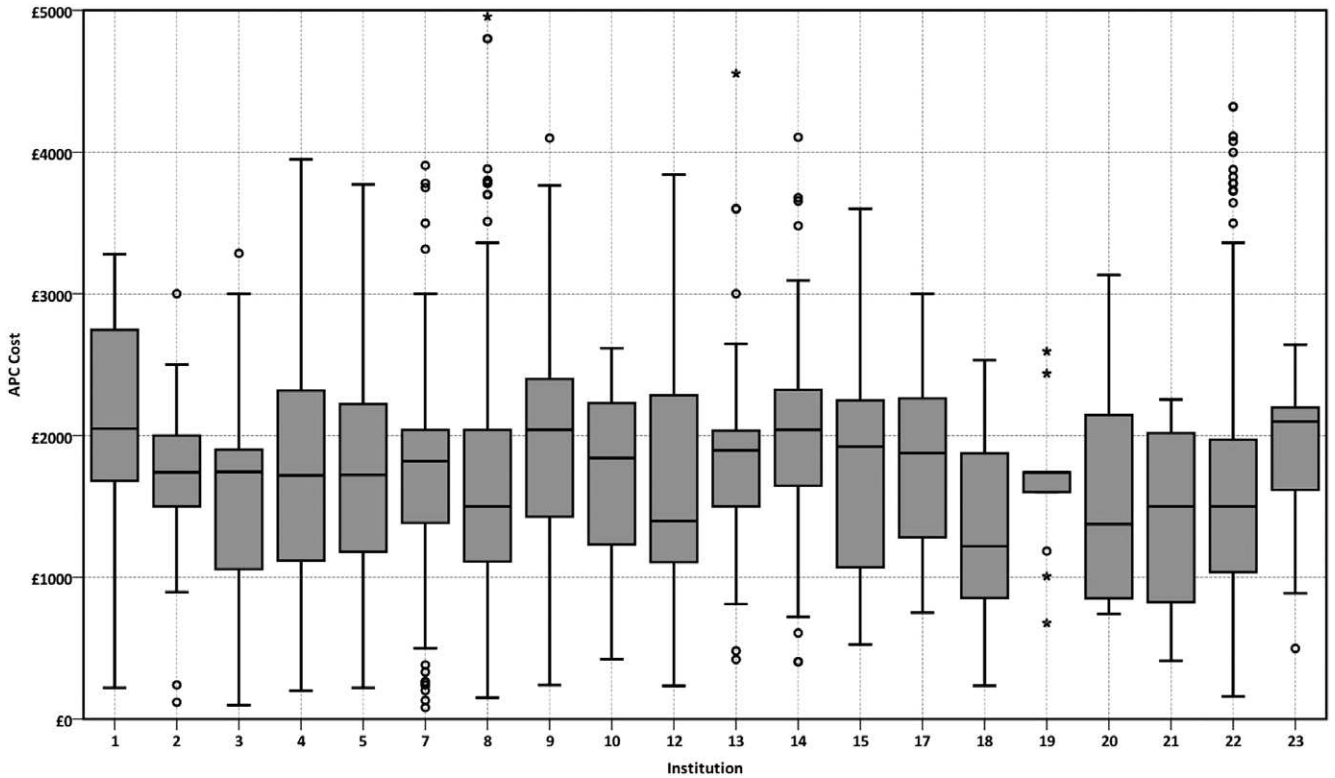

FIG. 3. APC payments per institution, 2013.

each up to the end of 2013. During that year, the mean number of payments made across all institutions was 106 and the median 49.

There was also considerable variation in the APC prices paid by the different institutions providing data. Figure 3 illustrates, in a box plot, the range of APC payments in 2013 across the institutions and includes all institutions that had made 10 or more payments in the year (and therefore excludes institutions 6, 11, and 16). Of the remaining 20 institutions, there was a total of 2,434 payments in 2013. The bold line in each box in Figure 3 represents the median (second quartile) APC value for each institution. The bottom and top of each box represents the first and third quartiles, respectively; the distance between these represents the interquartile range, with small circles (○) representing outliers and asterisks (*) extreme values. The figure therefore illustrates the wide range of APC charges paid by institutions during 2013 for institutions. As might be expected, there is a clear band of values within which APCs cluster. Nevertheless, even within that, there is some variation, with median values ranging from £1,220 to £2,100.

Funding sources for APCs. Across all years, approximately 77% of the APC payment records (3,964 of the 5,142) identify a funding source. Of these, the Wellcome Trust accounts for 2,264 (57%), RCUK 1,387 (35%), and other external funders 43 (1%). The high number of Wellcome-funded APCs is partly a reflection of the fact that the Wellcome Trust provided block grants for institutions for the whole period covered by this research, whereas RCUK only introduced block grants from 2012 onward. Two hundred of the records cited more than one funder, in which case the first funder has been included in the figures cited above. It is unlikely at this stage that any single APC was divided between several funders, although the issue of the payment of APCs for jointly funded research is likely to receive attention in the future. In their discussion of the then new Wellcome OA policy, Walport and Kiley (2006, p. 439), reported, "more than 80% of papers that acknowledged our support also acknowledge the support of one or more other funders." Pinfield's (2013) study of medical research charities showed that more than 43% of research funded by one of eight major charities cited at least one other of the eight as a cofunder, although, in most cases, funding from a single source would have been used to pay for the APC. In addition to the externally funded APCs, a number of institutions funded APCs through internal funding ($n = 270$; 7%).

Ten of the institutions had complete records of funders for APC payments for 2013. These are illustrated in Figure 4. Of these, four report internal, as well as external, funding for APCs. This is most apparent for institution 8, for which 41% of its payments were internally funded. The remainder only funded APCs centrally, where there was an external source of funding available, in most cases a

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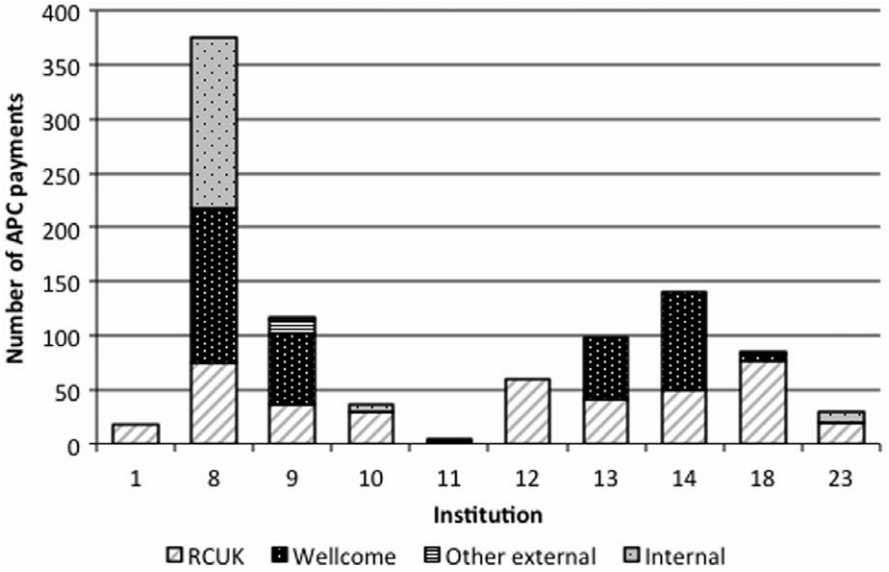

FIG. 4. Funding sources for APC payments, 2013.

TABLE 2. Comparison of APCs charged by types of journals providing OA.

Year	OA journals—published by nonsubscription publishers (mean)	Full-OA journals—published by subscription publishers (mean)	Hybrid journals—published by subscription publishers (mean)
2010	£1,141	£1,154	£1,842
2011	£1,281	£1,148	£1,905
2012	£1,227	£1,121	£1,873
2013	£1,106	£1,152	£1,857
2014	£1,068	£1,216	£1,799
5-year mean	**£1,136**	**£1,164**	**£1,849**

combination of Wellcome Trust and RCUK funding. In two cases (institutions 1 and 12), APCs were only funded from RCUK block grants.

Types of journals providing OA. The three "types" of journals allowing OA publication identified by Björk and Solomon (2014a) provide an important view of the current market, showing noticeable APC price differentials across the types based on list prices. Table 2 illustrates these categories of journals for the current data set of APC prices paid by the sample institutions from 2010 to 2014, with the overall mean value representing the mean value for all the data over the 5-year period. There are clear differences between the categories, with hybrid journals being markedly more expensive than the other two types. This appears to confirm Björk and Solomon's finding that APC costs for hybrid OA journals are significantly more expensive and provides further evidence for their argument that the hybrid market may not be operating effectively in terms of price sensitivity. This is further illustrated in Table 3, which draws a direct comparison between the current data set and the price differentials identified by Björk and Solomon (2014a). To enable comparison, the mean APC values for 2010–2014 have been converted into U.S. dollar prices (at a conversion rate of 1:1.7). It is noticeable that in two cases—OA journals published by nonsubscription publishers and hybrid journals—UK customers have paid considerably more than the dollar values identified by Björk and Solomon, although conversion and taxation rates are, of course, factors that could influence these results. In one case—for OA journals published by subscription publishers—they have paid slightly less.

Although the price differentials identified by Björk and Solomon among the hybrid and two types of OA journals are apparent, the differential between the two fully OA categories—OA journals published by nonsubscription publishers and OA journals published by subscription publishers—is negligible in the UK data. Based on the comparison with the data from Björk and Solomon, it appears to be in the first category (OA journals—published by nonsubscription publishers) where the difference lies—this figure is substantially higher in the UK data (US$1,931), compared with that of Björk and Solomon (US$1,418). The price levels for the second category (full-OA journals—published

DOI: 10.1002/asi

TABLE 3. Comparison of data for journal types.

Type	UK results, 2010–2014 mean (£)	UK results (in US$*)	Björk and Solomon (2014a) (US$)
OA journals—published by nonsubscription publishers	£1,136	$1,931	$1,418
Full-OA journals—published by subscription publishers	£1,164	$1,979	$2,097
Hybrid journals—published by subscription publishers	£1,849	$3,143	$2,727

Note. *Conversion rate: £1 = $1.7.

TABLE 4. Top 10 publishers based on number of APC payments.

Publisher	Fully OA journals	Hybrid journals	Number of APC payments (%)
Elsevier	12	1,019	1,031 (20.1)
Wiley	17	763	780 (15.2)
PLOS	575	—	575 (11.2)
Oxford University Press	78	292	370 (7.2)
BMC	231	—	231 (4.5)
Nature Publishing Group	120	110	230 (4.5)
Springer	—	224	224 (4.4)
BMJ	51	149	200 (3.9)
Taylor & Francis	—	139	139 (2.7)
American Chemical Society	—	130	130 (2.5)
Other	113	1,119	1,232 (24)
Total	**1,197**	**3,945**	**5,142 (100)**

TABLE 5. Top 10 publishers based on APC mean cost.

Publisher	APC mean (no. of payments)
American Association for Cancer Research	£4,660 (1)
Royal College of Psychiatrists	£2,786 (15)
International Glaciological Society	£2,760 (1)
American Society of Pediatrics	£2,646 (1)
American Society for Nutrition	£2,572 (9)
Informa Healthcare	£2,465 (7)
American Psychological Association	£2,452 (16)
JoVE	£2,446 (15)
European Respiratory Society	£2,410 (6)
ICE Publishing	£2,400 (1)

by subscription publishers) appear to be more comparable (US$1,979 in the UK data and US$2,097 in Björk and Solomon). One possible explanatory hypothesis for the difference in the OA journals published by nonsubscription publishers is that, whereas Björk and Solomon's price is an average of a broad range of OA journals' list prices, the UK data is a reflection of actual publishing behavior in research institutions, which is more heavily concentrated on established OA publishers that tend to have prices at the higher end of those of fully OA publishers. This hypothesis would benefit from further testing, but does seem to be supported by evidence below on OA publishers (showing a preponderance of APCs paid to established OA publishers). This is likely to be the case particularly if publications are concentrated in the life and health sciences disciplines, which external evidence suggests is probable (Gargouri, Larivière, Gingras, Carr, & Harnad, 2012; Kurata, Morioka, Yokoi, & Matsubayashi, 2013), given that such titles in those areas tend to charge above average APCs.

Publisher "league tables." Table 4 illustrates the top 10 publishers in terms of the total number of payments of APCs received over the period 2007–2014. The number of APCs paid for fully OA titles and hybrid titles is disaggregated, and percentages of the overall number of payments are also given. Between them, these top 10 publishers received 76% of the numbers of payments made. The remaining 24% of "other" publishers comprises a total of 127 different publishing houses. This illustrates that established commercial publishers, such as Elsevier and Wiley, which dominate the subscription market, are now also capturing a substantial part of the OA APC market, with 20.1% and 15.2% of all payments, respectively, heavily weighted in favor of hybrid journals. However, the fully OA publishers, PLOS (11.2%) and BMC (4.5%) are also both in the top five. PLOS and BMC have, in fact, captured much of the fully OA market, with their nearest fully OA publisher competitors having markedly lower numbers: MDPI 22, Copernicus 19, and Hindawi 19.

APC costs were subject to considerable variation across publishers. Table 5 shows the top 10 publishers based on APC mean cost as paid by institutions. In all cases, there are only small numbers of payments involved. However, it is worth noting that this table is dominated by Learned Society publishers, particularly those from the medical and health sciences. This may reflect an attempt to minimize risk shown by a number of smaller Learned and Professional Society publishers in relation to OA, by setting relatively high APCs. It also may reflect a higher upper threshold of APC level being tolerated in the medical and health sciences area, in which there is greater acceptance of Gold OA funded by APCs.

APCs also varied *within* single publishers. Table 6 shows the considerable variations in the APC levels charged by single publishers (showing the top 10 publishers in terms of number APC payments received in 2013). APCs ranged from £82 to £4,955, both of which were charged by Elsevier journals. Elsevier was also the only publisher in this list to charge an APC greater than £4,000. In some cases, the variations in these data occur between different journal titles produced by the same publisher, with different APC levels being set for different titles. In some cases, however, the data

DOI: 10.1002/asi

TABLE 6. Range of APCs charged by the top 10 publishers in terms of numbers of APC payments received for 2013.

Publisher	Mean	Minimum	Maximum	Range
American Chemical Society	£1,339	£610	£3,200	£2,590
BMC	£1,358	£437	£2,010	£1,573
BMJ	£1,767	£574	£3,600	£3,026
Elsevier	£2,060	£82	£4,955	£4,873
Nature Publishing Group	£1,646	£220	£3,780	£3,560
Oxford University Press	£1,892	£260	£3,000	£2,740
PLOS	£1,104	£151	£2,280	£2,129
Springer	£1,923	£262	£2,880	£2,618
Taylor & Francis	£1,963	£927	£2,950	£2,023
Wiley	£1,868	£439	£3,600	£3,161

show variation within single titles. As well as the obvious explanation of this being a result of price rises over time, explanations of variation within a single title include the use of prepayment packages (which result in discounts on APCs) and currency fluctuations, both of which, over time, are likely to lead to small variations. Figure 5 illustrates the same data, showing the variation of median APC values between publishers as well as the range of different APC prices. Three publishers had a median APC of £2,000 or more: Oxford University Press (£2,040), Springer (£2,002), and Elsevier (£2,000). In contrast, four of the publishers had median prices of £1,500 or below: PLOS (£1,013), followed by Nature (£1,068), ACS (£1,061), and BMC (£1,350).

Subscription and Administration Costs

As might be expected, there was considerable variation in the level of subscriptions costs paid by the different institutions. The data submitted only include subscriptions paid to those publishers to which APCs were also paid, and so the data cannot be used to compare overall subscription costs. These are available from other data sources (e.g., LISU, 2014). However, it is interesting to note variations in package costs charged to different institutions by single publishers, given that these do significantly impact on the TCP. Variations normally occur with the precise makeup of the pricing models adopted by the publisher, which may take account of factors such as the size of the subscribing institution, usage levels, and historic print spend. Elsevier Science Direct in 2013–2014, for example, varied in cost between £244,260 and £1,541,793 among the different institutions submitting data.

Data were also provided on estimated administration costs, both one-off set-up costs and ongoing costs, which varied considerably. Set-up costs varied from just a few hundred pounds to cover staff training to nearly £25,000 to include a new member of staff. It is clear that respondents were at different stages of development and making quite different assumptions about how to calculate administrative costs. Similarly, ongoing costs, based on the busiest 3 months experienced to date by institutions, varied significantly from as little as £797 to as much as £23,915. These, of course, varied according to numbers of APCs processed, but there was otherwise no clear pattern in the data resulting, for example, in a consistent cost per APC paid. Of those institutions providing sufficient data allowing such calculations, figures of administrative cost per APC varied from £66 to £665. Such variability makes building administrative costs into TCP calculations at this stage very difficult.

Costs tended to be distributed across a number of staff at different levels and including obvious activities, such as administration of payments themselves. However, in most cases, a large proportion of the costs quoted related to communication issues, including liaison with publishers and funding bodies, and also provision of advice to authors. One participant commented about the current situation: "It is the uncertainty of authors and the queries they generate that take up the vast majority of time." Some of the costs given clearly related to the management of OA in the institution in general as well as APC administration in particular. This was perhaps one of the most important reasons for variations in the level of costs quoted.

Most institutions reported that if APC activity were to grow substantially, they would require additional staffing. Some anticipated diverting existing staff from other activities, with others bidding for new money from their institution. One respondent commented that it was unlikely that any additional resource would be considered by the university in anticipation of an increase in workload and could only therefore be made when a higher workload could actually be demonstrated. A number did, however, expect to achieve economies of scale and other efficiencies, especially as business processes were streamlined. Several responders mentioned the role of aggregators in helping to achieve such efficiencies, although reported experience of early aggregator pilots was mixed.

Modeling the TCP

Based on the available data, modeling of the TCP was carried out. It was decided to compare APC data covering 2013 with subscription data from the 2013–2014 financial year. This was seen as justifiable, given that, although the 2013–2014 financial year covers August 2013 to July 2014, in fact most subscription allocations are made, in practice, at the beginning of the financial year, and much of the institutional annual budget will be transferred to third-party subscription agents in the first month of the financial year. It was also decided that building in administrative costs was, at this stage, unachievable because of the variability in reported costs.

The total cost of publication was calculated for publishers to which the represented institutions had paid both subscriptions *and* APCs during the relevant year. TCP calculations were made for both all APCs for each publisher and also APCs for only hybrid journals (i.e., excluding fully OA journals published by the subscription publishers). In most cases, the impact on the overall TCP of excluding fully

DOI: 10.1002/asi

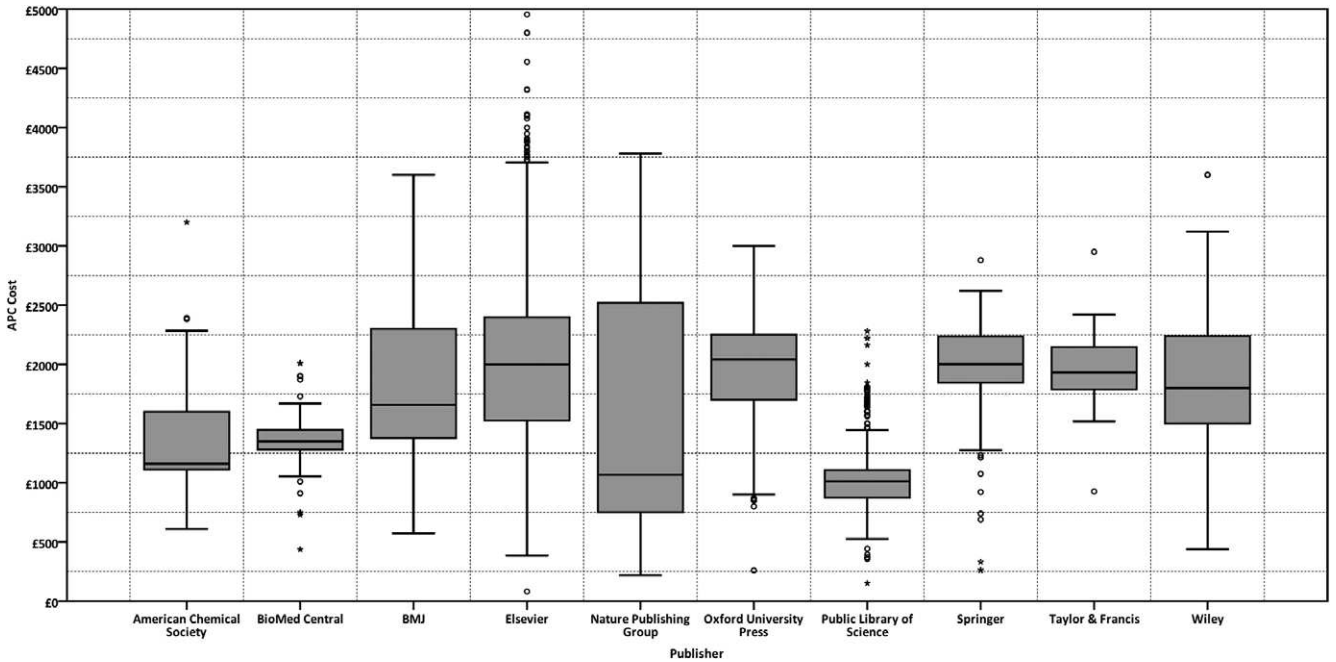

FIG. 5. Range of APCs charged by the top 10 publishers in terms of numbers of APC payments received for 2013.

TABLE 7. Total cost of publication, 2013 (excluding administrative costs) for institutions.

Institution	Total subscription costs (%)		Total APC costs (%)		Total cost
1	£578,708	(94)	£34,186	(6)	£612,894
2	£1,053,260	(93)	£73,777	(7)	£1,127,037
3	£2,274,060	(90)	£242,601	(10)	£2,516,661
4	£1,756,783	(89)	£206,404	(11)	£1,963,187
5	£2,816,456	(91)	£275,148	(9)	£3,091,604
7	£2,025,761	(86)	£332,363	(14)	£2,358,124
8	£2,781,917	(85)	£473,557	(15)	£3,255,474
9	£1,815,342	(91)	£189,200	(9)	£2,004,542
10	£934,655	(95)	£54,165	(5)	£988,820
11	£1,403,884	(99)	£10,209	(1)	£1,414,093
12	£1,821,589	(96)	£68,078	(4)	£1,889,667
13	£264,492	(61)	£170,246	(39)	£434,738
14	£2,194,903	(90)	£239,940	(10)	£2,434,843
15	£865,998	(93)	£63,678	(7)	£929,676
16	£139,168	(95)	£6,691	(5)	£145,859
17	£44,875	(72)	£17,603	(28)	£62,478
19	£887,186	(97)	£23,421	(3)	£910,607
21	£829,924	(98)	£18,444	(2)	£848,368
22	£3,271,535	(81)	£763,602	(19)	£4,035,137
23	£1,631,646	(97)	£49,366	(3)	£1,681,012
Total	**£29,392,142**	**(90)**	**£3,312,679**	**(10)**	**£32,704,821**

OA journals was relatively small, although, in some cases, there was a discernible difference (of up to 3%) in the proportion of APCs within the overall TCP. However, the exclusion of fully OA journals published by subscription publishers was thought to be fairer given that these journals are *replacing* subscription income with APC income, rather than adding to it.

Table 7 shows the results of the TCP modeling for subscriptions and hybrid-journal APCs for the 20 institutions for which there were complete data (all institutions apart from 6, 18, and 20). For those 20 institutions in 2013, the TCP (excluding administration costs) was £32,704,821. Subscriptions totaled £29,392,142 (i.e., 90% of the TCP), and APCs for hybrid journals totaled £3,312,679 (i.e., 10% of the TCP). There was, however, considerable variation among the different institutions, both in terms of absolute costs and overall percentages. This is perhaps a reflection of different existing structures of collection procurement,

DOI: 10.1002/asi

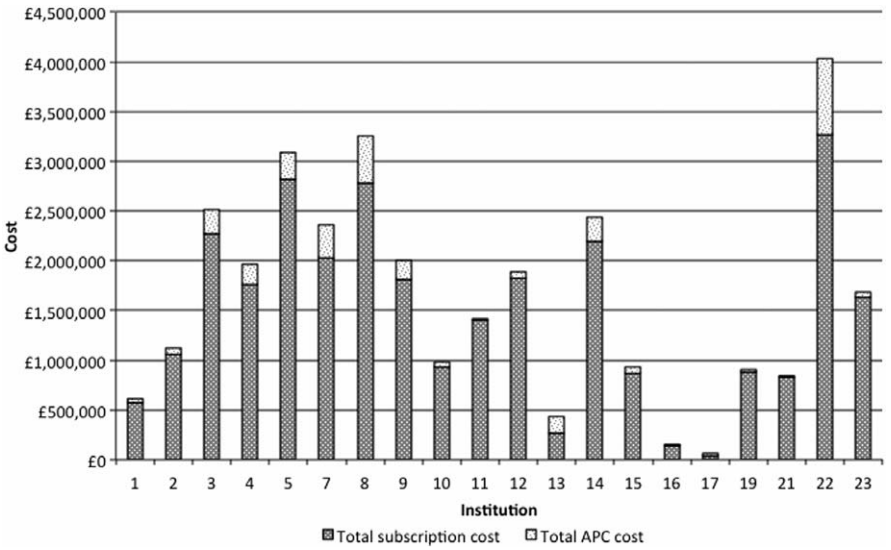

FIG. 6. Total cost of publication, 2013 (excluding administrative costs) for institutions.

TABLE 8. Total cost of publications, 2013 (excluding administrative costs) for different publishers.

Publisher	Total subscription (%)		Total APCs (%)		Total
Elsevier	£14,259,959	(94)	£937,531	(6)	£15,197,490
Wiley	£5,541,996	(89)	£684,593	(11)	£6,226,589
Springer	£3,171,977	(94)	£190,332	(6)	£3,362,309
Taylor & Francis	£1,168,350	(90)	£133,511	(10)	£1,301,862
Nature Publishing Group	£940,496	(85)	£160,864	(15)	£1,101,360
Oxford University Press	£660,463	(69)	£294,924	(31)	£955,386
Total	**£25,743,242**	**(91)**	**£2,401,755**	**(9%)**	**£28,144,996**

different rates of change between institutions, and different emphases in approach. On the first of these, the normal pattern of expenditure is for large subscription costs, often including "big deal" packages, constituting more than 85% of the TCP and APC costs of less than 15%. One institution (22) follows a similar pattern, but with an exceptionally high proportion of expenditure on APCs (19%). Institutions 4, 7, and 8 have 11%, 14%, and 15% APCs, respectively, with the remainder of the institutions following the above-described pattern, with 10% or below. However, two institutions (13 and 17) depart from the pattern. In both cases, they have much lower subscription expenditure on big deals, meaning that APC expenditure constitutes a greater proportion of the TCP. The data are also illustrated in Figure 6.

If fully OA journals published by these publishers are not removed from the TCP calculation, the TCP in 2013 was £33,355,982 (plus administrative costs). This comprised subscriptions of £29,392,142 (88%) and APCs of £3,963,840 (12%).

The total cost of publication experienced by institutions for different publishers is represented in Table 8 (excluding administrative costs). It shows the top six publishers according to subscription income received from the 20 institutions in 2013 (selected from the top 10 publishers by subscription income who also had over £100,000 income from APCs). This demonstrates that, in all cases, publishers now have a considerable income stream from APC payments. The larger publishers (Elsevier, Wiley, Springer, and Taylor & Francis) made proportionately less from APCs than the other publishers (11% or less). Nevertheless, this still represents a considerable proportion of the total income received from the institutions. The two other publishers, Nature and OUP, made a greater proportion of their income from APCs (15% and 30%, respectively). This is perhaps a consequence of the fact that fewer institutions subscribed to their packages, having title-by-title subscriptions rather than purchasing a big deal, meaning that as APCs have grown, they have formed a larger proportion of the overall TCP for these publishers. If fully OA titles are included in the TCP calculation, the APC percentage changes for these two publishers from 15% to 20% for Nature (which now has a relatively large portfolio of fully OA titles) and 31 to 33% for OUP, whereas for the other publishers the percentage change is less than 1%.

Across all publishers, the data clearly demonstrate that the financial relationship between universities and publishers now consists of considerably more than the

DOI: 10.1002/asi

purchase of (access to) content. OA APC payments are now an important part of this relationship and are adding to the TCP markedly.

Discussion

The marked rise in APC payments paid in a centrally coordinated way by institutions included in this study from 2012 onward may be explained in a number of ways. Gold OA had been gaining traction in the United Kingdom (as in other countries) for a decade, particularly in certain disciplinary areas (such as medical and health sciences). Growing acceptance of Gold OA has developed along with increasing availability of OA options from journal publishers, particularly since 2010. These points are evident from previous studies of the APC market (e.g., Björk, 2012; Laakso et al., 2011) and institutional case studies (e.g., Pinfield & Middleton, 2012); they act as contextual explanatory factors for the data. However, the primary explanation for this rapid rise in APC payments is the introduction of the series of related policy developments and funding arrangements in the United Kingdom in 2012. RCUK's introduction of block grants (RCUK, 2012) as the primary vehicle for implementing its OA "mandate" (RCUK, 2013) was perhaps the most important of these. It was also accompanied by clear statements of compliance expectations with rising targets for compliance set over a 5-year period (a minimum of 45% compliance being required in 2013–2014, rising to 53% in 2014–2015, with further rises thereafter). At the same time, the Wellcome Trust, which already had a system of block grants in place, "strengthened" its compliance monitoring and announced a number of noncompliance sanctions to grant holders (Wellcome Trust, 2012). Pinfield et al. (2014) have identified a number of criteria for such policies to be successful:

> "If they are to be effective, mandates clearly need to be worded in a robust way and complemented by meaningful incentives and sanctions as well as accompanied by compliance monitoring."

All of these major elements of effective mandates appear to have been put into place as part of the 2012 developments in the United Kingdom. Crucially, they were accompanied by clearly identifiable funding streams in the form of block grants now generally managed at the institutional level.

However, this study clearly shows that there is still considerable variation in APC prices paid by institutions, indicating that the market has yet to fully mature. There is still considerable uncertainty about pricing models, customer behaviors, and business processes. In particular, this study includes evidence to support the findings of Björk and Solomon (Björk, 2012; Björk & Solomon, 2014a) that the hybrid market is not functioning optimally with APCs in hybrid journals being set considerably higher than those of other journals.

Regardless of the immaturity of the APC market, the evidence presented in this article demonstrates that the total cost of publication for institutions now consists of considerable levels of APC payments (and administrative costs), *in addition* to subscription costs. In 2013, APCs were, on average, an additional 11% on top of subscription costs for the institutions included in this research. Moreover, it is likely that APCs will continue to rise for the foreseeable future in terms of absolute numbers, total cost, and proportion of the overall TCP (even taking into account subscription price rises). This is demonstrated in the 2014 projections included in this study, in which early levels of activity indicate a continued substantial rise in APCs for the year. Furthermore, conditions in institutions, including improved systems for managing payments (including technologies, processes, and support services) plus rising awareness among authors, are likely to combine with funder compliance requirements to further drive rising levels of activity.

The picture across all the institutions covered by this study is not, however, a completely even one. Institutions are starting from different places and moving at different rates. Moreover, the precise direction of travel is, in some cases, different, with institutions adopting somewhat different approaches to compliance with funder policies, for example. Whereas some institutions have a stated preference for the Gold OA route, others are still prioritizing Green (deposit in OA repositories), and this is impacting on the extent to which they actively promote and support APC payments. In addition, some institutions have adopted a policy of funding APCs regardless (or even in the absence) of an external funder, whereas others are only currently funding APCs for Wellcome- or RCUK-funded research outputs. These factors are likely to be reflected in somewhat different TCP figures for different institutions in the foreseeable future.

Notwithstanding the differences between the specific approaches adopted by institutions, double dipping is, with the rise in APC payments, becoming an increasingly apparent concern. With APCs already at an average 10% of TCP (excluding administrative costs), and likely to rise, there is an important issue with regard to the management of institutional budgets. The argument that block grants from funders and central management of APC payments in institutions tend to encourage double dipping, by reducing price sensitivity among authors and creating clearly identifiable funds that publishers can tap into, is part of this issue. The research presented here illustrates the need for institutions to play a proactive role in the market through their negotiations with publishers (including at the consortial level) to ensure it operates in an optimal way for the research community in terms of the TCP. The work of Björk and Solomon (2014a, 2014b) has made a significant contribution to this discussion, focusing on how pricing models may be negotiated to benefit particular institutions moving ahead with Gold OA rather than being subsumed in global price setting (including various approaches to institution-level "offsetting"). Such approaches need to be further pursued to incentivize OA initiatives in particular countries or institutions.

DOI: 10.1002/asi

However, a fundamental question lies behind these issues: Is the current situation a transitional one that will result ultimately in a predominantly OA environment, or will a hybrid model be the norm for the foreseeable future? The Finch Report (Finch, 2012, p. 7) envisioned a move in the United Kingdom toward "support for publication in open access or hybrid journals, funded by APCs, as the main vehicle for the publication of research, especially when it is publicly funded." It is clear that policy in the United Kingdom has been shaped with this destination in mind. However, the future of OA is, of course, an international issue. Although it is reasonable to assume that other institutions in the United Kingdom are experiencing similar trends to those identified in this study, that may not necessarily be the case outside the United Kingdom. Given that the United Kingdom produces less than 7% of global research outputs (Universities UK, 2013) and scholarly publishing is a global business, it is necessary to address this fundamental question from an international perspective. Research funders and institutions outside the United Kingdom may be adopting somewhat different approaches to OA implementation (or none at all). The UK experience, nevertheless, is important in that it has taken the country further ahead in policy-led Gold OA implementation than most countries, highlighting lessons that can be learned internationally from such an experience. This article makes an early contribution to the process of capturing and analyzing those experiences. There is clearly a need to continue to monitor developments and subject them to rigorous scrutiny in order to inform future developments both in the United Kingdom and beyond.

An important part of this future work needs to focus on the creation of a robust evidence base. The lack of transparency, both in the mature subscription market and the developing APC market, needs to be addressed by gathering data that are comparable over time across institutions and, where possible, across countries. With regard to APCs, this study has, in particular, highlighted the need for further work collecting APC data to allow analysis to take place. Specifically, it is recommended that the following data items should be collected on a regular basis:

- Name of institution
- Date of APC payment: giving the full date so that analysis can be carried out across different time periods (e.g., calendar years and fiscal years)
- Amount of APC payment (including and excluding purchase tax): in the local currency and payment currency
- Funding source for the APC: including internal as well is external funding
- Whether the APC payment is part of a prepayment scheme
- Publisher
- Journal title
- ISSN
- First author
- Article title
- DOI
- Publication year

These data items may be augmented by the specific requirements of institutions, consortia, or funding agencies that are likely to have particular areas of interest in addition to these generic requirements. It is likely, for example, that institutions may wish to include items such as date of application (as well as date of payment) as well as faculty or departmental affiliation of the author(s). Similarly, it is likely that agencies funding APCs may request inclusion of grant number and license terms. For both internal management and external reporting purposes, institutions also need to investigate seriously how they can monitor and record APC payments being made *throughout* the institution, not just through centrally managed funds. To date, there is still little certainty about the levels of payments being made on a one-off basis by authors, although with changes in funding arrangements in the United Kingdom this is assumed to be declining.

In addition to the APC data, further work is required with regard to both subscription and administration costs. For the former, greater clarity is needed on the extent to which subscription data can be openly shared. In the United Kingdom, there is a reluctance to share subscription data for fear of breaking confidentiality clauses in contracts. This is the case in other countries. However, the legal status of such clauses in relation, for example, to freedom-of-information requests requires further clarification. For administration costs, greater agreement is needed on how to calculate new costs sustained by APC administration and the extent to which these represent *additional* cost to the library (which, in most institutions, is carrying out the work), as opposed to a *reallocation* of existing resource as the library role in the scholarly communication chain changes. There are several ongoing initiatives in this area, such as the European Efficiency Standards for Article Charges project (ESAC, 2014), which are likely to yield useful data.

Conclusion

For the 23 institutions included in this study, APCs (in addition to subscriptions) are now a considerable proportion of the TCP. APC payments from central university budgets have risen sharply since 2012 and are likely to continue to rise for the foreseeable future. This has, in large part, been caused by policy and funding changes in the United Kingdom, which accelerated the adoption of Gold OA funded by APCs. Although the mean cost of APCs paid by institutions has remained relatively stable since 2008, with the overall mean being approximately £1,682, there has been considerable variation in APC prices over the period, with prices ranging from £82 to £5,280. Even within single publishers, there was considerable variation in APC prices. Of the APC payments made, there was a consistent noticeable price difference between fully OA journals and hybrid journals, the latter charging considerably higher prices. Nevertheless, commercial publishers producing mostly hybrid journals have captured a large proportion of the APC market, with only two fully OA publishers appearing in the top 10 of

DOI: 10.1002/asi

those receiving payments from the participating institutions. Typically, APC payments made were funded from block grants from research funders (particularly the Wellcome Trust and RCUK), but some institutions were also providing additional internal funding where block grants were not provided.

In addition to APC payments, institutions reported making subscriptions payments of varying sizes and experiencing rising administrative costs. Whereas the first of these is relatively well understood, the second needs further work to enable meaningful assessment. Institutions are currently finding it difficult to do this with estimated costs showing very large variations and inconsistencies. This is a reflection of the still underdeveloped nature of the organizational structures and business processes associated with APC payment in most institutions.

Modeling of the TCP with the data from this study shows that, on average, APCs account for 10% and subscriptions 90% of the TCP (excluding administration costs). There was, however, variation across different institutions with different rates of change and different emphases in approaches. The proportion of their income from subscriptions and APCs for different publishers also showed marked variation.

These results provide an early perspective on the developing OA and hybrid OA market as experienced by institutions. The work carried out helps to highlight the need for the research community to continue to monitor and scrutinize the market both in the United Kingdom and elsewhere in order to understand (and shape) its ongoing development.

Acknowledgments

Thanks to Lorraine Estelle, Sarah Fahmy, Helen Henderson, Bill Hubbard, and Stuart Lawson for comments on drafts of this article. The opinions expressed remain those of the authors.

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