The open access movement may be the most prominent aspect of the profound ongoing evolution of scholarly communication, but it is far from the only one. Electronics is loosening the straitjacket of print, but only slowly. Technologies take time to become widely adopted, and sociological change even longer. Most journals are already available electronically, for example, but they remain largely facsimiles of their print cousins, and pre-publication evaluation procedures are much as before. Where change will be fastest is perhaps in the world of online access and pricing, where the economics will drive diverse and often controversial strategies.

Open access journals raise an endless series of broad economic questions, with for the moment few definitive answers. The "author pays" model, for example, comes in two flavours. In one, authors are charged a submission fee only if their article is published. In the other -- tuned closer to covering the costs of rejected papers -- authors pay a fee to submit an article, no matter whether it is subsequently published or rejected. Which is fairer?

And is it fair to shift costs of publishing from libraries to the authors themselves? Are the authors the main beneficiaries of publications, or their readers? Should part of the public grants used to pay for research be used to cover the costs of publishing the findings of that research? Should authors with large grant budgets pay more than those with smaller ones? And is it fair to have research institutions pay for publications that will be read extensively at non-research schools?

A series of similar questions also arise with conventional subscription journals as they experiment with new online pricing models. But the options for paying for open access journals are more diverse, and therefore raise more questions.

Open access journals also pose other economic questions. One is how their business model will be able to build sufficient capital to invest in new journals for the years before these break even, or to project future costs such as long-term stable archiving, when they lack a subscriber base to fund it, as the business model often relies on one-off author payments.

The open access movement itself is growing rapidly but is still embryonic, and its precise evolution is impossible to predict. Will the 'gold' flavour, open access journals, dominate, or the 'green' flavour, archiving of eprints by authors and/or their institutions?

Overall, one should expect authors to increasingly embrace open access. Papers that are freely available online appear to be cited more frequently than those that are behind subscription firewalls [1]. As more studies become available confirming this finding (and all preliminary results obtained so far do), it would be a strong incentive for authors to either publish in open access journals or post their eprints on openly accessible archives. Such selfish motives will likely be more important in driving authors to open access than altruistic ones such as reduced library costs, or making one's work available in less-developed countries.

Open access will likely accelerate many evolutionary trends in scholarly communication, and boost usage of online material. The easy accessibility
of open access articles should also be an important advantage in competing for reader attention. But such changes will be gradual. Sudden, disruptive changes are likely only when powerful 'change agents' [2] intervene, for example were university presidents to drastically cut paid subscriptions.

Many of the host of economic questions raised by open access will be discussed elsewhere in this debate. Here, I will focus on just one: how the economics of pricing are likely to determine how much you, or your institution, will end up paying for access to electronic journals, be they open access or traditional subscription ones.

Electronics will lead to diverse pricing models

The key difference between electronic and print publishing is that the former has very low marginal costs. Once the 'first copy' is prepared, distributing it is relatively inexpensive. Just how high 'first copy' costs are is currently a hot topic, as are the costs of archiving, and converting material to new formats. But these costs are nonetheless largely independent of the volume of usage.

The options for spreading costs of electronic publishing among users are more diverse than with print, and can often seem arbitrary as a result. A key economic concept to better understanding costs and pricing is price discrimination theory, the practice of charging some users more than others for the same goods or service. Price discrimination has long aroused strong opposition in commerce, mainly because it raises concerns about fairness, and its use in electronic publishing is no exception.

Economists are familiar with the basic rationale for price discrimination. Consider a simple example. Suppose the publisher of a proposed new journal has two potential libraries as subscribers, where one is willing to pay a maximum of $700 annually and the other $1,000, whereas the publisher needs at least $1,500 to cover costs, and perhaps make a profit.

If a publisher is obliged to charge the same price to both libraries, it will not be able to create the journal as the above scenario makes it impossible to obtain $1,500 in revenues annually. If the price does not exceed $700, both libraries will subscribe, but revenues will be $1,400 at most. If it exceeds $700, the first library will not subscribe, and the most the publisher can get is the $1,000 from the second.

But if the publisher charges the first library $650 per year, and the second one $950 per year, conventional economics says everyone benefits. Each library obtains the journal for a lower price than it valued it at, and the publisher will get enough money to pay for creating it. This argument applies with equal force whether the publisher is commercial or non-profit.

Price discrimination in this model does not just reallocate resources from purchasers to sellers (although it can do that), but results in new economic activity. That is why governments often encourage differential pricing, although they also often act to constrain it. (For a more thorough discussion, see [3].)

The academic community is already familiar with extensive differential charging. Even before the Internet, the practice of charging libraries more than individuals for print subscriptions was widespread. Student discounts for society memberships and conference registrations are also common. Many publishers, non-profit as well as commercial, also offer discounts, or free subscriptions, to readers in less-developed countries. Electronic publishing is driving a proliferation of such practices. Publishers employ diverse charging schemes, depending on factors such as an institution's position in the Carnegie Classification <http://www.carnegiefoundation.org/Classification/>, the number of faculty in a given area, or the number of papers published by an institution's researchers. The trend is towards charging according to the value of a publication to an institution.

This is not something specific to scholarly communication. Many argue that it will be the most prominent and contentious feature of e-commerce [4]. But it is more explicit in the case of learned journals, because publishers are often becoming more open about explaining what they are
Price discrimination applies not only to the traditional subscription model, but also open access, "author pays," models. BioMed Central, an open access publisher, for example, states on its institutional membership web page that fees for institutional memberships renewed in 2004 vary between $1,612 and $8,060, depending on "the graduate and postgraduate students, researchers and faculty members in the relevant departments, i.e. biology and medicine" [5].

And in a twist to this flat-fee approach, it recently announced that for renewals in 2005, fees will be determined by multiplying $525 'by the number of articles published in BioMed Central journals during the previous 12 months'. In the traditional system that prevailed a few decades ago, there was a uniform institutional price for each print subscription (apart from small variations to cover, for example, international postage rates). Today, the search is on for the optimal way to recover costs or, in the case of commercial publishers, to maximize profits.

The reason price discrimination is, and will continue to be contentious, is that it arouses strong opposition, even from people who obviously benefit from this practice. Most opposition is based on concerns about fairness that appears to motivate not just people, but even some monkeys. In one experiment [6], capuchin monkeys refused to engage in trades advantageous to them if they saw other monkeys obtaining higher rewards than they were offered. Fairness is very much in the eye of the beholder. Suspicion about the fairness of pricing policies is also accentuated by the often opaque practices of sellers, such as the standard confidentiality clauses in publisher contracts, intended to hide the extent of differential pricing.

We can therefore expect an endless series of debates and disputes, with negotiating and legal skills in great demand among scholars, publishers, librarians, administrators and other stakeholders. But price discrimination is one concept which will be fundamental to understanding many of these disputes, and why you or your institution are paying more or less, for reading or publishing in journals, than are your neighbours.


