

Will open access compete away monopoly
profits in journal publishing?

Theodore C. Bergstrom
Department of Economics
University of California, Santa Barbara

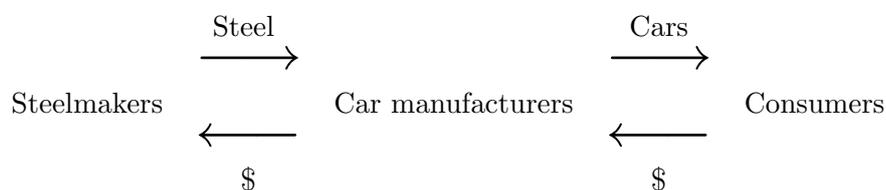
Carl T. Bergstrom
Department of Biology
University of Washington

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Publishers of scholarly journals currently obtain most of their revenue from subscription fees charged to libraries and individual users. We call this the “reader-pays” pricing model. An alternative pricing method has recently emerged, in which publishers collect their revenue by charging significant publication fees to authors, and then supply their content over the internet, at no cost to readers. We call this the “author-pays” pricing model. Open access, author-pays publishing is relatively new and has only become feasible because of the recent development of the internet, which reduces the marginal cost of extending access to almost zero.

For reader-pays publishing, there is abundant data on price and quality of journals. For the nascent author-pays model, not much historical information is available and the academic world has not yet had time to fully adapt to the technological capabilities of the internet. In order to make some predictions about the eventual shape of the academic publishing market, it is useful to think about the economic fundamentals of this industry and their likely effects.

We begin by noticing an unusual feature of the market for scientific publications. In most commodity markets, payments and resources flow in opposite directions. For example, the flows in the automobile market could be diagrammed as follows:



In the academic journal market, the direction of cash flows is different.

The middlemen, publishers, receive payments from consumers (readers) *and also from* suppliers (authors). Most journals charge subscription fees to readers. Many also charge page fees to authors and most maintain an implicit requirement that those who publish are obliged to donate refereeing services. Very few scholarly journals pay their authors for content. For journals, the flow diagram is like this:



Publishers thus have two potential sources of revenue. Of course their ability to collect revenue from either source are limited by competitive forces. Publishers compete in the input market for submission of high quality articles and in the output market for library subscriptions. While the input suppliers for the car industry would never voluntarily offer their product for free, scientists are eager to expose their work to the public. In academic institutions, a scholar’s tenure, promotion, salary, and reputation depend critically on publishing in prestigious journals and having her work widely cited. Thus authors are willing to supply their papers for free, or even pay to have them published in the most prestigious journal that will accept them.

To understand the academic publishing market, it is useful to examine the competitive characteristics of the two markets in which publishers compete, that for readers and that for authors. Within the class of reader-pays publishing, journals fall into roughly two institutional types. Those of one type are owned and controlled by “non-profit” professional societies

or university presses. Those of the other type are owned and controlled by a profit-motivated commercial publisher. As the table below indicates, libraries typically must pay 4 to 6 times as much per page for journals owned by commercial publishers as for journals owned by non-profit societies. These differences in price do not reflect differences in the quality of the journals. In fact the commercial journals are on average less cited than the non-profits and the average cost per citation of commercial journals ranges from 5 to 15 times as high as that of their non-profit counterparts [1].

	Cost per page (\$ US)		Cost per citation (\$ US)		Year
	For-profit	Non-profit	For-profit	Non-profit	
Ecology	1.01	0.19	0.73	0.05	2000
Economics	0.83	0.17	2.33	0.15	2000
Atmosph. Sci.	0.95	0.15	0.88	0.07	1999
Mathematics	0.70	0.27	1.32	0.28	2000
Neuroscience	0.89	0.10	0.23	0.04	1997
Physics	0.63	0.19	0.38	0.05	1997

How can such dramatic differences persist? If one automobile manufacturer charged 6 times as much as its competitors for a car of lower quality, almost nobody would buy its product. Those who want only one car would buy the better, cheaper car. Those who want two cars would buy two of the cheaper ones rather than one cheap one and one expensive, inferior one.

Journal articles differ in that they are not substitutes for each other in the same way as cars are. Rather, they are complements. Scientists are not satisfied with seeing only the top articles in their field. They want access to articles of the second and third rank as well. Thus for a library, a second copy of a top academic journal is not a good substitute for a journal of the second rank. Because of this lack of substitutability, commercial publishers

of established second-rank journals have substantial monopoly power and are able to sell their product at prices that are much higher than their average costs and several times higher than the price of higher quality, non-profit journals.

By contrast, the market for authors' inputs appears to be much more competitive. If journals supported themselves by author fees, it is not likely that one open-access journal could charge author fees several times higher than those charged by another of similar quality. An author, deciding where to publish, is likely to consider different journals of similar quality as close substitutes. Unlike a reader, who would much prefer access to two journals rather than to two copies of one, an author with two papers has no strong reason to prefer publishing once in each journal rather than twice in the cheaper one.

If the entire market were to switch from reader-pays to author-pays, competing journals would be closer substitutes in the view of authors than they are in the view of subscribers. As publishers shift from selling complements to selling substitutes, the greater competition would be likely to force commercial publishers to reduce their profit margins dramatically. But, at least for the near future, it is unlikely that all journals would switch to the author-pays model. Instead, author-pays, open-access journals will compete directly with reader-pays journals, some published by non-profit and some by for-profit publishers. We expect that in this heterogeneous market, profit-seeking publishers will be reluctant to employ the author-pays model because the close substitutability of alternative outlets will result in greater competition and lower profits. For similar reasons, professional societies that support other

activities by profits on their publications are less likely to adopt the author-pays open-access model.

Will open access be able to compete successfully? This depends largely on whether authors (or universities and granting agencies acting on their behalf) will be willing to pay substantial author fees to support open access to their work. Doing so may not require altruistic behavior on an author's part. Recent studies have found open access articles to be cited two or three times as often as similar articles without open access [2, 3]. Citations translate into both prestige and money; two recent econometric studies of economists' salaries [4, 5] estimated that, controlling for age and number of articles published, that on average, doubling one's number of citations increases one's salary by 7 to 14 percent.

The additional readership will not come from large, research-oriented U.S. universities, which subscribe to essentially all of the moderately-priced society journals and to a large fraction of the high-priced commercial journals. Instead it will come from researchers and teachers at small institutions, third world institutions, and from scholars and intellectuals who are not employed at academic institutions or other major research establishments. It is difficult to guess how much authors will be willing to pay for wider distribution of their work to this audience.

A powerful technological reality looms over this entire discussion. With electronic access, the marginal cost of allowing an extra person to read a scholarly work approaches zero. When publishers — even non-profit operations interested in maximizing circulation — rely on subscriptions to generate revenue, distribution is inefficient because potential readers are excluded

though it would cost nothing to allow them access. Author-pays, open access publishing is one way of realizing the enormous potential gains that the internet offers. Whether some form of open access emerges as the dominant form of academic publishing is likely to depend on how much scholars care about broad distribution of their writings.

Bibliography

- [1] C. T. Bergstrom and T. C. Bergstrom. The costs and benefits of library site licenses to academic journals. *Proceedings of the National Academy of Sciences USA*, 101:897–902, 2004.
- [2] S. Lawrence. Free online availability substantially increases a paper’s impact. *Nature webdebates*, May 2001. Available on-line at <http://www.nature.com/nature/debates/e-access/Articles/lawrence.html>.
- [3] T. J. Walker. Open access by the article: an idea whose time has come? *Nature web focus*, April 15 2004. Available on-line at <http://www.nature.com/nature/focus/accessdebate/13.html>.
- [4] Onur Baser and Elda Pena. The return of publications for academic faculty. *Economics Bulletin*, 1(1):1–13, 2003.
- [5] William J. Moore, Robert J. Newman, and Geoffrey K. Turnbull. Do academic salaries decline with seniority. *Journal of Labor Economics*, 16(2):352–66, April 1998.