

# **Scholarly Electronic Journal Publishing: A Study Comparing Commercial and Nonprofit/University Publishers**

by

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## **Abstract**

Pricing is a critical aspect of economic and business models of scholarly electronic journals. This study, in accordance with conventional wisdom, has divided publishers into two broad groups—those in the for-profit sector (hereafter called commercial publishers) and those in the nonprofit sector (hereafter called nonprofit/university publishers)—and examines the differences between the two groups in terms of journal price. It focuses on ten publishers, five in each group, and 4,415 electronic journals published by them.

The Average Subscription Price (ASP) and the Average Subscription Price per Issue (ASPPI) of the various publishers and disciplines in 2003 were calculated. A comparison of the two publisher groups revealed that the number of journals published by the commercial publishers was higher than the journals published by the nonprofit/university publishers. Blackwell was found to be the least expensive (US \$455) among the five commercial publishers and Cambridge University Press had the lowest ASP (US \$279) among the five nonprofit/university publishers. MCB University Press was the most expensive publisher. Ranked ASP and ASPPI showed that, with the exclusion of MCB University Press, there was a remarkable difference between the commercial and nonprofit/university publishers studied. The Average Subscription Price of journals from the commercial publishers was 2.8 times higher than the ASP of journals from the nonprofit/university publishers, and the Average Subscription Price per Issue of commercial-owned journals was 1.8 times higher. These results confirm the findings of earlier studies in this regard. Physics and chemistry titles were the most costly disciplines in comparison with the other subject categories surveyed.

**Keywords:** Journal prices, Electronic journals, Scholarly journals, Commercial publishers, Non-profit publishers

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# **Scholarly Electronic Journal Publishing: A Study Comparing Commercial and Nonprofit/University Publishers**

## **Introduction**

Pricing is a critical aspect of economic and business models of scholarly electronic journals. Over the years different pricing models have been developed and tested. Libraries worldwide have for some time been faced with stagnant or decreasing budgets. Significant cutbacks in library budgets internationally have led to a crisis and prompted a re-evaluation of the publisher pricing models. A comparative study of for-profit ("commercial") and not-for-profit ("nonprofit/university") publishers of scholarly journals can give a better picture of pricing. This study focuses on scholarly electronic journals from the two publisher groups; the term *journals* in this paper refers to scholarly electronic journals.

## **Literature Review**

Scholarly journals have been published for more than three centuries. They have had a tradition of purpose and structure with little change. Despite the combined effects of price inflation and fluctuations of currency exchange that libraries weathered in the 1970s and 1980s, the basic construct of journals and subscriptions has remained stable; in fact, the journal has continued to flourish in a world of scholarly publishing that is increasingly global and conglomerate [1].

Scholarly journals today are being transformed from once almost exclusively paper-based publications to online publications accessible via the World Wide Web. While developments in information technology and the Internet have offered the hope of lower prices, many print publishers have argued that electronic publishing costs cannot be reduced by more than thirty percent—the percentage covering printing and mailing expenses [2]. Most of the remaining expense is the first-copy cost of preparing the manuscripts for publication. Bergstrom explains that first-copy costs are those required to produce the original copy of an issue and are therefore independent of the number of subscriptions. Among these costs are the cost of managing the editorial office (primarily wages and secretarial support for editors who handle, evaluate, and comment on the papers that authors submit) and the costs of copy-editing and typesetting. Marginal subscription costs, on the other hand, include the cost of printing and paper, shipping and postage, and the costs of subscription management [3].

Tenopir and King have provided a comprehensive overview of the economics of journal production. According to their estimates, the first-copy costs of an academic article are between \$2,000 and \$4,000. The bulk of these costs are labor costs, mostly clerical costs for managing submissions, review, editing, typesetting and setup costs [4].

Odlyzko in 1994 estimated that the cost of publishing an article in a research journal ranged from \$900 to \$8700. The median cost was \$4000. He pointed out that if

only 20 scholars read an article completely, the median cost per complete reading would be \$200. If articles were skimmed by 200 people, the cost per article would still be \$20. [5].

In their book *Towards Electronic Journals*, Tenopir and King analyzed the scholarly journal publishing industry and the influences upon it that affected subscription costs. They believed that many activities were common to both electronic and paper publishing. Electronic journals can, however, save in reproduction and distribution and some other costs such as journal covers. While electronic production and distribution costs may be much lower than the corresponding paper costs, production and distribution account for a somewhat small percentage of the total costs of low-circulation journals; a higher circulation is needed for savings to become substantial. The authors noted that prices of scientific journals (adjusted for inflation) had risen 260% between 1975 and 1995. The number of subscriptions, especially personal subscriptions, fell precipitously as subscription prices rose. The fixed cost portion of a journal's total costs increases as the number of subscribers decreases. Since nearly 60% of scientific journals have fewer than 2500 subscribers, fixed costs dominate the cost picture for most journals. The authors calculated that the total cost per average journal subscription ranges from \$70 for a journal with 10,000 subscribers, to \$775 for a journal with only 500 subscribers. They also calculated "cost per subscription," that is, the minimum price necessary to recover all costs associated with publishing a scholarly journal based on number of subscribers. Commercial publishers were at the top of these averages. They have the highest cost per subscriber (\$441) and average journal price (\$487) [6].

A study regarding differences between commercial and nonprofit publishers appeared in the literature two decades ago. In 1986, Henry Barschall looked at the costs of a small sample of physics journals (20 titles), as well as an even smaller number of philosophy and mathematics journals. Barschall employed a methodology previously used by the American Mathematical Society and others: comparison of costs per 1000 characters. His conclusion:

While one would expect journals published by not-for-profit publishers to be less expensive than those published by commercial publishers, the cost-per-character ratio of over 40 between the most expensive commercial [at \$0.31 per 1000] and the least expensive not-for-profit publication [at \$0.007] is larger than one might have expected. We found the variation to be similar for mathematics and physics journals [7].

Two years later, Barschall conducted another study using a much larger sample of over 200 physics journals. The results of this study confirmed the results of the earlier study [8].

Loughner published a study in 1999 of the library budget at the University of Georgia. He concluded from the data he had gathered that a larger and larger proportion of library budget was going to a small number of major publishers. The library spent 76% of its science journal budget for publications from the top ten publishers. This was up

from 54% in 1990. The list of the ten publishers that it spent the most money with in 1990, 1993, 1996, and 1999 included Elsevier, Springer, Wiley, Harcourt, Taylor & Francis, Blackwell, Kluwer, Plenum, Gordon Breach and Marcel Dekker [9].

In "Free Labor for Costly Journals?" Bergstrom reported on a price comparison of economics journals from nonprofit and commercial publishers. The results showed that the six most-cited economics journals listed in the *Social Science Citation Index* were all nonprofit journals and their library subscription prices averaged about \$180 per year. Only five of the twenty most-cited journals were owned by commercial publishers, and the average price of these five journals was about \$1660 per year. The average price per page (calculated by dividing year 2001 prices by the number of pages published in the year 2000) of the commercial journals was about six times as high and the average price per citation was about sixteen times as high as for the nonprofit journals. The differences in prices and cost-effectiveness between nonprofit and commercial journals were similar for less prestigious journals [3].

Pricing studies by librarians show that the pattern found in economics is common to many disciplines. Commercial journals are more expensive than journals published by professional societies, but the most-cited and influential journals are almost universally those published at lower cost by professional societies. For example, in 1988 Wilder found that about 50 percent of all citations in chemistry come from journals published by professional societies, but expenditure on these journals constitutes only about 25 percent of library subscription costs for chemistry journals [10].

Another price study published by Bergstrom and Bergstrom in 2004 revealed a startling difference between the prices university libraries must pay for academic journals from commercial publishers and the prices they pay for journals from professional societies and university presses. For example, in the fields of economics and ecology, the average institutional subscription price per page charged by commercial journals is about five times that charged by nonprofit journals. These price differences do not reflect differences in quality as measured by number of recorded citations to a journal. For commercial journals the average price per citation is about fifteen times that for nonprofit journals. Similar price differentials were found across a wide variety of scientific disciplines. These price differences had increased rapidly in fifteen years. The average real (adjusted for inflation) price per page for journals from commercial publishers had increased by 300% since 1985, while that of nonprofit economics journals had increased by 50 percent. [11].

A report on a study in *Publishers Weekly* stated, "While many university libraries face severe budget cuts, large commercial publishers in the academic journal market have enjoyed increasing profits. In 2002, for instance, revenue rose 26% and operating profit increased to 25% for Elsevier, the largest journal publisher in the science, technology, and medical field." [12].

Edwards and Shulenburger looked at the history of nonprofit and commercial publishers in 2003. They noted that traditionally scholars at research institutions had

made their research available through what they termed a "gift exchange" arrangement, whereby scholars submitted articles to publishers and served on peer-review editorial boards with little or no expectation of personal financial gain, but with the implicit understanding that the publishers would provide the widest possible audience for their research. They stated, however, that "Beginning in the late 1960s and early '70s, this gift exchange began to break down. A few commercial publishers recognized that research generated at public expense and given freely for publication by the authors represented a commercially exploitable commodity" [13]. Prior to this breakdown, most journals were published by scholarly societies that charged enough for their journals to break even and fund society activities, but were essentially not-for-profit ventures. By contrast, the current academic journal market is dominated by a few very large multinational firms that have methodically bought up the top titles in various fields and steadily ratcheted up the prices for them. As Edwards and Shulenburger put it,

“The old model operated on the basis of gift exchange to ensure wide distribution of what was readily acknowledged—indeed trumpeted—as clearly a public good. The new model operates for profit; it essentially says, "If you want access, pay up and we'll set the prices.” [13]

As commercial publishers came to dominate academic publishing, North American research libraries faced an average annual increase of 8.5% in journal prices between 1986 and 2001 [13].

Pricing studies across subjects/disciplines were also reported in the literature. For example, Gene Kean has conducted annual pricing studies for eighteen years. In the 18th Annual Study of Journal Prices for Scientific and Medical Society Journals, published in 2005, he reports that for the 251 journals studied, which were predominantly scientific and medical representing many different subject fields, the average U.S. institutional subscription price was \$326.11. The average price per issue was \$43.83 and the average journal had 7.44 issues a volume year. The pricing trends differ by discipline. For example, chemistry and physics titles, with an average 2005 price of \$1,879.56, continue to be more expensive than other subject categories surveyed [14]. The American Library Association also publishes an annual U.S. periodicals price index, which is now available on its Web site [15].

## **Objective and Methodology of the Present Study**

The present study was carried out in order to see the differences between for-profit and nonprofit publishers in terms of electronic scholarly journals price.

The first step of the study was to select the publishers. In accordance with conventional wisdom, they were grouped into two broad categories—for-profit ("commercial") publishers and not-for-profit ("nonprofit/university") publishers. One hundred twenty-four commercial publishers and ninety nonprofit/university publishers were identified and ranked according to the number of electronic journals they published.

While the complete lists were used for initial studies, for this detailed study, the research was limited to ten publishers, the top five from each category. Elsevier, Taylor & Francis, Blackwell, Kluwer and Springer-Verlag formed the commercial publishers group; since that time, Kluwer and Springer-Verlag have merged. Oxford University Press, Cambridge University Press, MCB University Press (Emerald), IEEE, and the American Psychological Association formed the nonprofit/university publishers group. It was difficult to distinguish between commercial and nonprofit/university publishers; it must be noted therefore that academic presses were grouped with the nonprofit/university publishers for the purposes of the study. For example, MCB University Press was considered as a nonprofit/university publisher in the study, but the author is now convinced, following the analysis of the data, that despite its name, MCB University Press should not be classified as such. Because of this, the press was omitted from the calculations in Table 5 in this paper.

In addition to ten publishers, the study also focused on 4,415 electronic journals published by them. This actually amounts to 3,775 out of 5,027 electronic journals from the top fifteen commercial publishers and 640 out of 914 electronic journals from the top fifteen nonprofit/university publishers. This size of sample, 4,415 electronic journals, was adequate for generalization and interpretation.

In order to study and compare the various pricing models of the selected publishers, the annual institutional subscription prices in US dollars for the year of 2003 were collected. Although the selected publishers had different pricing models on their Web sites, all of them offered an institutional subscription price. In this study, other pricing models such as “bundle pricing”, “consortium deals”, “tiered pricing” and so forth have not been considered and only institutional subscription prices have been used. In very rare cases, journals were not available in electronic form, and so their prices were excluded from calculations.

The 2003 prices of the 4,415 journals were collected by visiting the publishers’ Web sites. The titles of the journals, the number of their issues per year, and their subject coverage were also recorded for further analysis. This data was used to compute the Average Subscription Price (ASP) and the Average Subscription Price per Issue (ASPPI) according to the following formulas:

$$\text{ASP} = \text{Total sum of the 2003 subscription prices for all journals from a specific publisher} \div \text{Total number of e-journals of the same publisher}$$

$$\text{ASPPI} = \text{Total sum of the 2003 subscription prices for all journals from a specific publisher} \div \text{Total number of issues of all e-journals for the same publisher in 2003}$$

The ASP is thus the average annual price of a journal from a given publisher. The number of issues per year is a factor that might account for the price of journal. The ASPPI is a value that gives some more information about price of a journal in one specific year. For this reason, the ASPPI is also has been chosen as a parameter for better pricing analysis here.

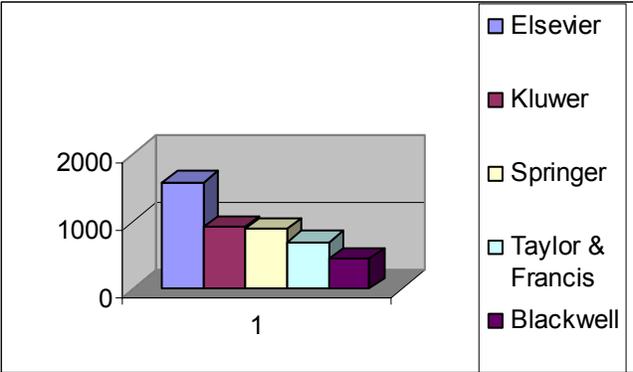
## Pricing Data Analysis

Table 1 gives the computed ASPs and ASPPIs for the ten publishers. The commercial and nonprofit/university publishers were also ranked according to their ASPs; Figures 1 and 2 present this ranking in graphical form.

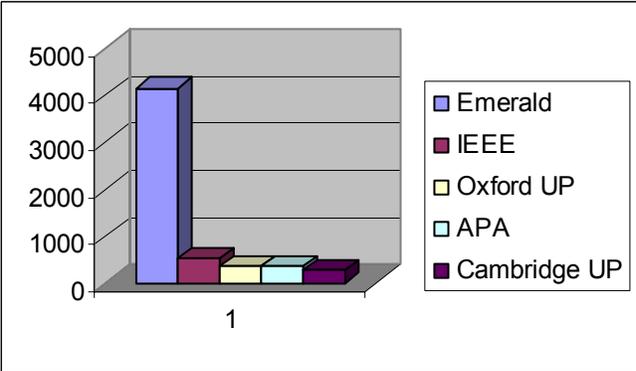
**Table 1: The ASPs and the ASPPIs for the Selected Publishers in 2003**

	<b>Publisher</b>	<b>Number of E-J</b>	<b>Number of Issues</b>	<b>Sub. Price (\$US)</b>	<b>ASP (\$US)</b>	<b>ASSPI (\$US)</b>
1	Elsevier (Including Academic Press)	1,349	18,015	2,142,879	1,589	119
2	Taylor & Francis Group	740	3,759	523,352	707	139
3	Kluwer Academic Publishers	673	4,491	623,404	926	139
4	Blackwell Publishing	577	3,490	262,394	455	75
5	Springer-Verlag	436	2,679	390,414	896	146
6	Oxford University Press	180	1,059	65,728	365	62
7	Cambridge University Press	157	690	43,801	279	64
8	MCB University Press (Emerald)	138	870	574,417	4,162	660
9	IEEE	120	853	63,434	529	74
10	American Psychological Association (APA)	45	234	16,004	356	68

**Figure 1: Commercial Publishers by ASP in 2003**



**Figure 2: Nonprofit/University Publishers by ASP in 2003**



One can see from Table 1 that of the commercial publishers in 2003, Elsevier was the most expensive, with an ASP of \$1,589. In terms of the ASPPI, though, Springer-Verlag was the most costly. Among the nonprofit/university publishers, excluding MCB University Press, IEEE had the highest ASP (\$529) and ASPPI (\$74) in 2003.

MCB University Press (Emerald) had a strangely high ASP among the nonprofit/university publishers. It should be noted that MCB University Press is an independent academic publisher established in 1967 by a group of academics from the Bradford Management Center in the United Kingdom. It is not affiliated with, nor does it receive any financial support from, any institution. In 2001 MCB University Press adopted the name Emerald as its new organizational identity. It seems that MCB University Press has changed its policy and become a commercial publisher; perhaps this is the reason for its high prices.

Table 1 also shows that Blackwell was the least expensive of the five commercial publishers and that Cambridge University Press had the lowest ASP (\$279) of the five nonprofit/university publishers. If one disregards the MCB University Press figures, the remaining ASPs and ASPPIs demonstrate a remarkable difference in the pricing structures of the commercial versus the nonprofit/university publishers.

### **Price Analysis by Subject**

In order to examine the pricing differences across subjects/disciplines, the journals of the ten publishers were divided into their subject areas. Then the Average Subscription Price (ASP) and the Average Subscription Price per Issue (ASPPI) of various disciplines were calculated.

Since individual publishers had their own subject categorizations, in order to standardize the categorization, the Australian Standard Research Classification (ASRC) was chosen for use in this study. This classification was established by Monash University Library in Australia. All 4,415 electronic journals of the ten selected publishers were classified according to the ASRC standard. Table 2 is a subject breakdown of the electronic journals from each of the publishers. As mentioned earlier, a few journals that had no electronic counterparts were excluded, and so the figures in the table reflect only the electronic journals for every publisher and every subject for the year 2003.

As seen in Table 2, of the various disciplines in 2003, the Medical Sciences had the highest number of commercially produced journals; only one nonprofit/university publisher, Oxford University Press, published more journals in the Medical Sciences (43) than in any other subject area. Table 2 once again demonstrates Elsevier's dominance in the number of journals. Taylor & Francis, Kluwer and Blackwell, among the commercial publishers, and Oxford University Press and Cambridge University Press, among the nonprofit/university publishers, seem to cover almost all of the disciplines.

**Table 2: The Number of E-Journals of the Studied Publishers in Subject Categories**

ASRC Subjects	Number of E-Journals of Commercial Publishers					Number of E-Journals of Nonprofit/University Publishers				
	Elsevier	Taylor	Kluwer	Black	Spring	OUP	CUP	MCBU	IEEE	APA
Science-General	-	-	-	-	-	-	-	-	-	-
Social Sc.-General <sup>1</sup>	54	42	13	11	-	7	5	-	-	-
Math. Sc.	62	15	27	11	38	14	11	-	-	-
Physical Sc.	79	14	35	2	11	-	4	-	-	-
Chemical Sciences	47	21	51	8	16	-	-	-	-	-
Earth Sc.	69	12	30	31	17	1	6	-	-	-
Biological Sciences	158	14	61	29	69	7	10	-	-	-
Information, Computing <sup>2</sup>	74	19	62	6	35	5	6	-	45	-
Engineering, Technology	185	45	65	4	33	6	3	19	75	-
Agriculture	126	42	55	41	19	8	9	-	-	-
Architecture	-	8	-	3	-	-	1	4	-	-
Medical Sciences	354	114	76	164	152	43	12	-	-	12
Education	-	91	42	18	-	-	-	7	-	-
Economics	23	26	28	47	27	12	9	-	-	-
Commerce <sup>3</sup>	79	28	36	49	5	1	-	91	-	-
Political Sc.	-	20	-	36	-	14	15	-	-	-
Studies in Human Soc.	-	107	7	16	-	-	7	-	-	-
Behavioral Sciences	35	43	36	24	6	4	5	-	-	33
Law, Justice	-	10	16	9	8	17	5	-	-	-
Journalism <sup>4</sup>	4	-	-	-	-	2	-	17	-	-
The Arts	-	12	-	3	-	6	10	-	-	-
Language	-	13	6	14	-	14	19	-	-	-
History	-	24	6	20	-	6	10	-	-	-
Philosophy	-	20	21	31	-	13	10	-	-	-

<sup>1</sup>Also includes the Humanities and Arts. <sup>2</sup>Also includes Communication Sciences

<sup>3</sup>Also includes Management, Tourism and Services. <sup>4</sup>Also includes Librarianship and Curatorial Studies

The ASPs and ASPPIs for the year 2003 were then computed for each of the subject areas and publishers; the results are found in Tables 3 and 4. As Table 3 shows, the Elsevier's ASP in almost all the scientific subject fields was over one thousand US dollars. Of the sciences, the Physical and Chemical Sciences had highest ASPs in 2003. The Physical Sciences ASP for Elsevier was \$3,376; for Taylor & Francis, \$2,604; for

Kluwer, \$1,904; for Blackwell, \$1,913; and for Springer, \$2,629. Taylor & Francis was the highest in the Chemical Sciences with an ASP of \$3,365. Generally, the second costliest subject area among the five commercial publishers was Chemical Sciences.

**Table 3: The Subject ASPs of the Ten Studied Publishers**

ASRC Subjects	ASP of Commercial Publishers					ASP of Nonprofit/Univ. Publishers				
	Elsevier	Taylor	Kluwer	Black	Spring	OUP	CUP	MCBU	IEEE	APA
Science-General	-	-	-	-	-	-	-	-	-	-
Social Sc.-General <sup>1</sup>	542	400	515	260	-	251	167	-	-	-
Math. Sc.	1875	1906	1427	333	720	417	428	-	-	-
Physical Sc.	3376	2604	1904	1913	2629	-	586	-	-	-
Chemical Sciences	3097	3365	1850	849	1351	-	-	-	-	-
Earth Sc.	1692	892	1090	448	735	965	281	-	-	-
Biological Sciences	2005	715	1301	988	1592	763	373	-	-	-
Information, Computing <sup>2</sup>	1316	457	664	490	462	401	329	-	567	-
Engineering, Technology	1939	1272	1171	714	1000	289	854	3656	506	-
Agriculture	1355	788	997	722	1023	454	488	-	-	-
Architecture	-	456	-	299	-	-	189	3386	-	-
Medical Sciences	1174	683	636	528	693	612	561	-	-	279
Education	-	570	367	327	-	-	-	6301	-	-
Economics	764	490	392	278	367	249	192	-	-	-
Commerce <sup>3</sup>	845	514	483	374	259	190	-	4589	-	-
Political Sc.	-	293	-	290	-	193	161	-	-	-
Studies in Human Soc.	-	401	518	261	-	-	168	-	-	-
Behavioral Sciences	678	422	469	375	359	326	305	-	-	384
Law, Justice	-	335	361	349	365	214	140	-	-	-
Journalism <sup>4</sup>	280	-	-	-	-	174	-	1749	-	-
The Arts	-	267	-	232	-	151	114	-	-	-
Language	-	260	487	241	-	214	147	-	-	-
History	-	312	325	216	-	180	163	-	-	-
Philosophy	-	314	460	237	-	154	154	-	-	-

<sup>1</sup>Also includes the Humanities and Arts. <sup>2</sup>Also includes Communication Sciences

<sup>3</sup>Also includes Management, Tourism and Services. <sup>4</sup>Also includes Librarianship and Curatorial Studies

**Table 4: The Subject ASPPIs of the Ten Studied Publishers**

ASRC Subjects	ASPPI of Commercial Publishers					ASPPI of Nonprofit/University Publishers				
	Elsevier	Taylor	Kluwer	Black	Spring	OUP	CUP	MCBU	IEEE	APA
Science-General	-	-	-	-	-	-	-	-	-	-
Social Sc.-General <sup>1</sup>	103	102	89	62	-	52	56	-	-	-
Math. Sc.	124	234	170	75	182	69	89	-	-	-
Physical Sc.	116	334	170	91	590	-	106	-	-	-
Chemical Sciences	154	337	230	80	186	-	-	-	-	-
Earth Sc.	93	137	159	84	130	80	67	-	-	-
Biological Sciences	145	125	164	96	257	61	72	-	-	-
Information, Computing <sup>2</sup>	117	92	115	113	97	59	66	-	79	-
Engineering, Technology	138	157	155	102	165	29	78	632	72	-
Agriculture	104	141	121	110	187	66	72	-	-	-
Architecture	-	94	-	75	-	-	47	451	-	-
Medical Sciences	103	109	113	67	91	69	74	-	-	67
Education	-	142	70	76	-	-	-	959	-	-
Economics	129	121	92	65	85	69	54	-	-	-
Commerce <sup>3</sup>	110	110	97	83	76	48	-	720	-	-
Political Sc.	-	83	-	57	-	57	46	-	-	-
Studies in Human Soc.	-	103	73	63	-	-	45	-	-	-
Behavioral Sciences	100	93	105	67	57	62	61	-	-	69
Law, Justice	-	93	78	87	70	64	44	-	-	-
Journalism <sup>4</sup>	62	-	-	-	-	44	-	286	-	-
The Arts	-	78	-	63	-	45	39	-	-	-
Language	-	80	108	59	-	58	48	-	-	-
History	-	90	85	59	-	54	53	-	-	-
Philosophy	-	98	87	62	-	50	45	-	-	-

<sup>1</sup>Also includes the Humanities and Arts. <sup>2</sup>Also includes Communication Sciences

<sup>3</sup>Also includes Management, Tourism and Services. <sup>4</sup>Also includes Librarianship and Curatorial Studies

The most costly subject area for Oxford University Press, one of the nonprofit/university publishers, was Earth Sciences, with an ASP of \$965. Cambridge University Press's highest ASP was in the Physical Sciences area. The highest ASP of all the subjects and publishers belonged to MCB University Press for its Education journals (\$6,301).

Looking at the ASPs of specific publishers in Table 3, one sees that in the case of Elsevier, Physical Sciences journals were 6.2 times and Chemical Sciences journals were 5.7 times more expensive than the general Social Sciences, Humanities, and Arts journals. Kluwer's Physical Sciences journals were 3.7 times more expensive than its general Social Sciences, Humanities and Arts journals. In the case of Taylor & Francis, Chemical Sciences journals were 8.4 times more expensive than the general Social Sciences, Humanities, and Arts journals. Among the nonprofit/university publishers a somewhat similar pattern seems to be true. For example, Cambridge University Press's Physical Sciences journals were 3.5 times more expensive than its general Social Sciences, Humanities and Arts journals. It can be concluded that, for individual publishers, general Social Sciences, Humanities and Arts journals were considerably less costly than those in the Physical and Chemical Sciences.

As mentioned earlier, the Average Subscription Price (ASP) seems to be a somewhat crude measurement, and the Average Subscription Price per Issue (ASPPI) seems to be more refined. The ASPPI may more closely reflect the actual cost of the journals in a specific discipline.

Table 4 shows no significant difference among Elsevier's ASPPIs for the various subjects except Journalism, Librarianship, and Curatorial Studies. Its highest ASPPI (\$154) was in the Chemical Sciences. Taylor & Francis's and Kluwer's Chemical Sciences ASPPIs were also their highest (\$337 and \$230, respectively). Chemical Sciences was thus the most expensive discipline for the three publishers. Blackwell's highest ASPPI (\$113) was in the Information, Computing and Communication Sciences area, while Springer's was in the Physical Sciences (\$590).

Oxford University Press's highest ASPPI (\$80) was in the Earth Sciences. Cambridge University Press's highest (\$106) was in the Physical Sciences. Once again, MCB University Press's Education journals proved to be the most expensive of all subjects across the various publishers, having an ASPPI of \$959. The American Psychological Association and IEEE showed no appreciable variation in their respective ASPPIs.

Viewed from the perspective of the ASPPI, the price difference between the general Social Sciences, Humanities and Arts journals and Physical/Chemical Sciences journals was not as high for individual publishers. For example, Elsevier's Chemical Sciences journals cost 1.5 times more. For Taylor & Francis and Kluwer, the cost was 3.3 and 2.6 times as much, respectively.

The ASPPIs of the five commercial publishers show that journals in the science, technology, and medicine (STM) disciplines were more expensive than those in the social sciences and humanities. This pattern seems to be true for the nonprofit/university publishers as well. Among the STM journals, Physical and Chemical Sciences journals were more expensive than other commercially produced journals. It is difficult to make a generalization for the nonprofit/university publishers regarding Physical and Chemical Sciences journals because only Cambridge University Press published journals in either of the two disciplines.

## **Discussion**

Both the ASP and the ASPPI for MCB University Press (Emerald) journals in 2003 were found to be the highest among the ten publishers (see Table 1). Most of its journals—91 out of 139, or 65.5%—dealt with Commerce and Management. This could perhaps be one of the reasons for the press's high subscription rates. Another reason for the high ASP and ASPPI may be the fact that MCB University Press is located in the United Kingdom, and so the exchange rate between the US dollar and the British pound must be taken into consideration. As observed in a Cornell University study in 1998, “The heavy commercial charges for library subscriptions come largely from European publishers with the greatest influence coming from those in Germany, the Netherlands and the United Kingdom. It is also clear that a portion of the costs result from cost of living increases and the low value of the U. S. dollar in these countries” [16]. In the present research also, the ASP and the ASPPI of the commercial publishers, all located in European countries, have been found to be quite expensive.

In order to compare the price differentials between the commercial and nonprofit/university publishers, the ASP and the ASPPI data have been summarized in Table 5. It should be noted that MCB University Press was excluded from this comparison as its pricing was totally at variance with that of the other nonprofit/university publishers. Because of this, the comparison was made between the top four commercial publishers (Elsevier, Taylor & Francis, Kluwer, and Blackwell) and the remaining four nonprofit/university publishers (Oxford University Press, Cambridge University Press, IEEE, and the American Psychological Association). The results show that the ASP of the commercial publishers was 2.8 times higher than that of the nonprofit/university publishers. In addition, the ASPPI of the commercial publishers was 1.8 times higher than that of the nonprofit/university publishers. These results once again confirm the findings of earlier studies of journal pricing issues such as Wilder’s study in 1998. According to Wilder, the commercial journals are far more expensive than the journals published by the professional societies [10]. The findings of the present study verify that in 2003 this was still the case.

**Table 5: Comparison of the Commercial and Nonprofit/University Publishers**

<b>Type of Publisher</b>	<b>Number of E-J</b>	<b>Number of Issues</b>	<b>Subscription Price (\$US)</b>	<b>ASP (\$US)</b>	<b>ASPPI (\$US)</b>
Commercial Publishers (N=4)	3,339	29,755	3,552,029	1,064	119
Nonprofit/University Publishers (N=4)	502	2,836	188,967	377	67

A comparison of the two groups—commercial and nonprofit/university publishers—reveals that the number of journals published by the commercial publishers was higher than the number of journals published by the nonprofit/university publishers (See Table 2). As a matter of fact, the smallest commercial publisher in the present study (Springer) published twice as many journals as Oxford University Press, the largest nonprofit/university publisher.

The subject classification of the journals indicate that all five commercial publishers focused on disciplines in science, technology and medicine, while two well-established nonprofit/university publishers (Oxford University Press and Cambridge University Press) focused more on journals in the social sciences and the humanities. One possible reason the commercial publishers may have focused less on the social sciences and the humanities could be a small market for such journals.

Oxford University Press did not publish any journal in the Physical and Chemical Sciences, and Cambridge University Press published only four journals in the Physical Sciences. Both of these publishers publish a substantial number of journals in the Medical Sciences. The Medical Sciences constitute a single subject classification in the ASRC classification, but it is very broad, including various subjects. This is one possible reason for the high number of journals in the Medical Sciences from almost all the publishers.

IEEE, the American Psychological Association, and MCB University Press (Emerald), three other nonprofit/university publishers considered in this research, published scholarly electronic journals in very few subjects. IEEE is a professional society focusing on electrical and electronic engineering. The American Psychological Association is another professional society with an obvious specialization. MCB University Press focused on subjects such as Commerce and Management, Engineering, Journalism, Education, and Architecture.

Elsevier, the world's largest publisher of scholarly journals, focused more on science, technology, and medicine but also published journals in such areas as Economics; Commerce and Management; Behavior Science; and Journalism,

Librarianship and Curatorial Studies. Springer, another commercial publisher, published more STM journals but published some in such areas as Economics, Commerce and Management, Behavioral Sciences and Law. The three other commercial publishers published journals in almost all disciplines, STM as well as others.

Among the various social sciences, the commercial publishers were most interested in Economics, and Commerce and Management. Each of the five commercial publishers produced more journals in the Medical Sciences than in any other single subject. The same was also true of Oxford University Press.

In terms of the ASP, Table 3 shows that the Physics, Chemistry and Biological Sciences were the most expensive disciplines for the commercial publishers studied. These results agree the 2005 data by Kean [14].

For the nonprofit/university publishers, the subject price analysis showed that Earth Sciences was the most expensive category in the case of Oxford University Press, and Engineering and Technology was the most expensive category in the case of Cambridge University Press.

## **8. Conclusion**

The present study verified that, in 2003, commercially published journals were indeed more expensive than the nonprofit/university journals. The Average Subscription Price (ASP) of commercially published journals was 2.8 times higher than that of journals from the nonprofit/university publishers, and the Average Subscription Price per Issue (ASPPI) was 1.8 times higher. Physics, Chemistry and Biological Sciences titles were the most costly disciplines in terms of journal price among the commercial publishers in comparison with the other subject categories studied.

Why are the prices for commercially published journals as high as they are? Are they driven by the need—or desire—for profit? Are publication costs the reason instead? Unless researchers can actually examine the specific publication costs of the commercial publishers studied, we will never truly know how much profit their publications generate.

The present study was a comprehensive price study based on 2003 data. A similar, annual study would surely give a better picture of scholarly electronic journal prices. The author therefore hopes that other researchers in library and information science will further investigate this matter.

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