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ABSTRACT

This paper reports on a consortial attempt to overcome the high costs of scholarly journals and to study the roots of the cost problem. A multi-discipline study of the impact of electronic publishing on the pricing of scholarly periodicals is discussed. A brief overview of the pricing issue comparing print and electronic publishing is followed by a summary of the access approach to cost containment technique. This is then followed by a preliminary report on an attempt at this technique by a consortium and on the associated econometric study. This 3-year study is collecting data on approximately 6,000 journal titles gathered from the combined subscription lists of the 13 Associated Colleges of the South (ACS) libraries. The study includes analysis directed at testing the viability of consortial access versus ownership as well as the potential long-term solution that would derive from emergence of a new core of electronic titles. A complete financial analysis of the impact of consortial, electronic access to a core collection of general purpose periodicals as well as an econometric analysis of the impact of electronic availability on pricing policy will issue from the study conducted under an Andrew W. Mellon Foundation grant. Contains 42 references. (AEF)

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Consortial Access Versus Ownership

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Introduction

This paper reports on a consortial attempt to overcome the high costs of scholarly journals and to study the roots of the cost problem. The advent of high-speed telecommunication networks linking scholarly research throughout the world offers opportunity for reducing the costs to libraries for scholarly communications. The literature on the problem of journal costs includes both proposals for new ways of communicating research results as well as many studies on journal pricing.

Prominent members of the library profession have written proposals on how to disengage from print publishers.[1,2] Others in the sciences have suggested that electronic publications soon will emerge and bring an end to print-based scholarship.[3,4] Another scientist proposes that libraries solve the problem by publishing journals themselves.[5] These proposals, however, tend not to accommodate the argument that loosely coupled systems cannot be easily restructured.[6] While access rather than ownership promises cost savings to libraries, the inflation problem requires further analysis of the factors that establish journal prices before it is solved.

Many efforts to explain the problem of high inflation occupy the literature of the library profession and other disciplines. The most exhaustive description of the problem to date, published by the Association of Research Libraries for the Andrew W. Mellon foundation, provides ample data, but no solution. [7] Examples of the problem appear frequently in the *Newsletter on Serials Pricing Issues*, which was developed expressly to focus discussion of the issue.[8] Searches for answers appear to have seriously started with the studies of Hamaker and Astle, who provided a partial explanation of the problem based on currency exchange rates that work against libraries in North America.[9,10,11] Analyses published by librarians and economists propose means to escape inflation, which include securing federal subsidies, complaining to publishers, raising photocopying charges and convincing institutional administrators to increase budgets.[12,13,14,15]

A significant number of pricing analyses in recent years attempt to isolate the variables which determine prices and the difference in prices between libraries and individuals. Studies typically examine price by looking at the statistical relevance of sundry variables, but especially publisher type.[16,17,18] They confirm the belief of librarians that certain publishers, notably in Western Europe, practice price discrimination.[19,20,21] They also show that periodical prices are driven by many factors, including cost of production, which is related to frequency of issue, number of pages, and presence of illustrations. Alternative revenue from advertising and exchange rate risk for foreign publishers also affect price.[22,23] Quality measures on the content, such as number of times a periodical is cited affects demand, which then impacts price. Economies of scale that are available to some journals with large circulation affects price also.[24] These articles also help explain price differentials between what individuals are charged versus what libraries pay.[25] Revenues lost to photocopying accounts for much of the difference between individual and library price.[26] Also, differences in the way electronic journals may be produced compared to print provides a point on which some cost savings could be based.

The costs of production and the speed of communication may be driving forces that determine whether or not new publications emerge in the electronic domain to replace print. However, this issue involves a broader set of considerations. In a framework shaped by government policy, the interaction of demand and supply, more than the costs of production or speed of delivery, determines the price of any given journal. Periodical prices remain quite low over time when magazine publishers sell advertising as the principal generator of revenue, because publishers compete for readers, whose numbers can be sold to advertisers, rather than for the reader's dollars. When for political, public relations or similar reasons, publication costs are borne by organizations, usually other than scholarly societies, periodical prices tend to be lower. Prices tend to inflate in markets with high demand, where publishers are involved in supporting the communication of scholarly output. The highest demands and prices are concentrated in the sciences where multiple users include practicing physicians, pharmaceutical firms, national laboratories and so forth. Scholarly publishing in the sciences where demand is high provides the focus for much of the study of pricing and efforts to control library costs.

Unfortunately for libraries, the demand from users for any given scholarly journal is usually inelastic. Libraries tend to retain subscriptions no matter how high the publisher raises the price, because the demand originates with non-paying users even though libraries pay the bills. In turn, user demands are driven by price increases charged to individual subscribers to scholarly journals. Therefore, it might be expected that as currently existing print publications are offered by publishers in an electronic form, they will retain both their price as well as inelastic demand. Commercial publishers, who are profit maximizers, will seek to retain or improve their profits when expanding into the electronic market. However, there are some properties associated with electronic journals that could relax the inelasticity of journal prices. Diminished need for the physical artifact character of journals combined with changes in the transactions process to acquire scholarly content in the electronic domain could offset the profit potential of traditional scholarly publishing.

This paper reports on a multi-discipline study of the impact of electronic publishing on the pricing of scholarly periodicals. A brief overview of the pricing issue comparing print and electronic publishing is followed by a summary of the access approach to cost containment technique. This is then followed by a preliminary report on an attempt at this technique by a consortium and on the associated econometric study.[27]

Overview of Pricing Relevant to Electronic Journals

The industry of scholarly print publishing falls into the category of monopolistic competition, which is characterized by the presence of many firms with differentiated products, and by no barriers to entry of new firms.[28,29] Commercial and societal publishers supply a set of heterogeneous products which are distinguished from each other by quality and by uniqueness of content. Variation in quality occurs not only within any given journal, since articles differ somewhat in quality, but also from title to title. Furthermore, each scholarly article is fundamentally unique and has no perfect substitutes. As a result of this product differentiation, scholarly publishers do not encounter perfectly elastic aggregate demand typically associated with competitive markets. Rather, each publisher perceives a negatively sloped individual demand curve. Therefore, at least partially, each supplier has the opportunity to control the price of its product, even though barriers to entry of new, competing periodical titles may be quite low. Given this opportunity, publishers have gradually raised their prices to libraries with some loss of sales, but with consequent increases in profits which overwhelm those losses. They

segment their market between individuals and libraries and charge higher prices to the latter in an effort to extract consumer surplus.

As publishers have lost sales of periodicals to individuals, scholars have increased their dependency on libraries, which in turn, have increased interlibrary borrowing to secure the articles needed by their users. The photocopies typically supplied via library collections represent some of the revenue potentially lost to publishers, but which is recaptured in the price differential. Although copyright protection and diligence of librarians replaces some lost revenue through copyright clearance fees, additional revenue might be captured by publishers if they could effectively offer their products in online, electronic databases where they could monitor all duplication. This potential may rest on the ability of publishers to retain control in the electronic domain of the values they have traditionally added to scholarship.

Scholars demand of journals-- as in the economic sense of acquiring -- both input in the form of documentation of the latest and most accurate knowledge and/or information on scholarly subjects as well as outlets for their contributions to this pool of scholarship. They pay the following costs to deliver their output through print publishing: sometimes page charges; labor in creative and editorial effort; and usually, they relinquish copyright in trade for acceptance of their scholarly efforts.

In exchange for their trade of copyright, scholars receive value in four areas. First, scholars secure value in communication, when every individual's contribution to knowledge is conveyed to others; thus impacting the reputation of the author's future output and educating the reader, which is input to the scholar's peers. Second, although not provided by publishers directly, archiving (traditionally, storage of print publication) provides value by preserving historically relevant scholarship and fixing it in time. This value arises essentially automatically as a consequence of storing physical artifacts in libraries. Third, great value accrues from filtering of contributions in given disciplines by separating them into levels of quality, which improves search costs allocation and establishes or enhances reputation. Fourth, segmenting of scholarship into discipline groupings is important in reducing input search costs to scholars, but at some expense to publishers who bear production costs. This exchange of copyright ownership for value could be dramatically affected with the emergence of electronic journals.

Electronic journals are emerging in two ways. Totally new titles are appearing exclusively in electronic form in order to take advantage of the speed and informality of the electronic environment. Alternatively, existing print titles are being transformed or augmented by electronic counterparts as publishers look to improve marketability. Some new journals have begun exclusively as electronic publications with mixed success. The directory published by the Association of Research Libraries listed approximately 27 new electronic journals in 1991. By 1995 that figure had risen to over 300, of which some 200 claim to be peer reviewed.[30] Since then hundreds more electronic journals have been added, but the bulk of these additions appear to be electronic counterparts of previously existing print journals.[31] Constraints may keep many of these from succeeding.

The infrastructure and inter-relationships of scholarly print publishing evolved over a long time. In order for a parallel structure to emerge in the electronic domain, electronic publishers have to add as much value to the process of scholarship as they do in print. Value must be added in archiving, filtering and segmenting, in addition to, communication. It is essential that electronic products establish a brand name that readily communicates their level of quality. Traditionally, the reputation of editors establishes brand name which rests on and must be

nurtured by years of consistent performance. While some new scholarly titles are emerging successfully, traditional publishing retains an edge in the electronic domain.

Two of the more successful electronic journals of interest to librarians have not performed as well as hoped. *PACS Review*, which is a widely distributed publication from the University of Houston on electronic catalogs, shows a trend in new submissions per year that is flat at best and more likely declining. Over the five year period 1990 to 1995, the number of articles in *PACS Review* declined from 16 to 5; the number of pages from 241 to 78. As well, the number of new authors declined. Further examination of the titles cited in the publication suggests a drop in interest, also. The first volume contained original articles on a variety of topics. By the third and fourth volumes, submissions were more like reprises of conference papers. In 1996, interest may have rebounded somewhat with several substantial contributions.

As another interesting example, the electronic publication called *EJournal,* proclaims itself an "electronic journal concerned with the implications of electronic networks and texts" but showed erratic publication output, from a high of several thousand lines and five articles in its second year to a low of one article with less than one thousand lines in the fifth year. This publication appears to also suffer from submission problems, especially since more than one issue has solicited articles from readers.[32] A similar story could be written for many of the other electronic attempts. Empirical work indicates that electronic publications are inconsequential to date and that no more than three electronic journals have had substantive impact on scholarship.[33]

The apparently mixed success of new titles derives from the endemic need to provide the values traditionally added by publishers. Establishing brand quality requires tremendous energy and commitment. There are some successful electronic titles sponsored by individuals who are fervent in their efforts to demonstrate that the scholarly community can control the process of communicating scholarship. However, it is obviously unrealistic to expect an instantaneous, successful emergence of a full-blown infrastructure in the electronic domain that overcomes the obstacles to providing the values required by scholars. The advantage of higher communication speed of electronics is insufficient to drive a transformation of scholarly communication quickly.

In contrast, it appears likely that a transformation from print to electronic publication will be achieved effectively by duplicating existing print journals in the electronic sphere. Publishers of established print journals face less imposing investments to add electronic counterparts to their product lines. Traditional print journals are being packaged into collections and successfully marketed to libraries in electronic form. For example, the *Adonis* [34] collection on CD-ROM contains over 600 long-standing journals in medicine, biology and related areas covering about seven years. Furthermore, Ebsco, University Microfilms (UMI), Information Access Company (IAC), Johns Hopkins University Press, OCLC and other companies are implementing similar products. OCLC now offers libraries access to the full-text of journal collections pulled together by UMI and Ebsco. Furthermore, Johns Hopkins is making all forty plus titles which that press publishes now available online through *Project MUSE.*

Publications already existing in print are at least two steps ahead of any new electronic title on the pathway to complete transformation. Costs and values associated with filtering, segmenting and archiving that must be considered in addition to communicating, appear to be overcome by existing journals that are migrating to electronic form.

During the past fifteen years, libraries have experienced a remarkable shift from acquiring

secondary sources in print to accessing them through a variety of electronic venues. Users of most academic libraries today find CD-ROM indexes, local online indexes and electronic gateways over the Internet to indexes on remote servers. Many librarians report that patrons seldom use print indexes any more. In effect, much of the secondary literature has already made the transformation from print to electronic. In this environment, cost per unit of information delivered has often declined dramatically, because user costs of seeking information in the form of labor have diminished, thereby raising the use rate of indexes.[35] Presumably, these efforts were cost effective because they reduced the time needed by library users locating information and because they have proven to be more powerful retrieval agents due to Boolean logic and diminished need for thesaurus control.

This phenomenon suggests that many scholarly periodicals will become available electronically as an automatic response to the economies available there. In fact, there are quite a few products emerging which offer electronic bundles of periodical titles on given disciplines or general interest. Some of these represent viable possibilities for shared access among a consortium of libraries, with consequent savings from cancellation of print subscriptions.

Pricing of Electronic Journals

Some monopoly power of publishers could be lost if barriers to the entry of new journals are lower in the electronic domain than in the print domain. With full-text online, libraries may take advantage of the economies of sharing access, which electronic networks offer. Favorable economies come into play when a group of libraries contracts for shared access to a core collection. Sharing a given number of access ports allows economies of scale to take effect. Were one access port each provided to a consortium of fifteen libraries, the vendor would tie up a total of fifteen ports, but any given library in the group would have difficulty servicing a user population with one port. Whereas for example, by combining access, fifteen libraries together might get by with as few as ten ports collectively. The statistical likelihood is small that all ten ports would be needed collectively by the consortium at any single given moment. This saves the vendor some computer resources that can then lead to a discount for the consortium that nets out less cost to the libraries. For example, fifty members of the Oberlin Group of college libraries negotiated a contract for all the periodicals of the Johns Hopkins Press *Project Muse* for a fifty-percent discount from their electronic list price.

Although numerous models for marketing exist, such as bundling CD-ROM's into the subscription or giving discounts for advanced deposits toward article purchases, there are fundamentally only two ways that publishers can price their products in the electronic domain. Either they will offer their products on *subscription* to each title or group of titles for a flat fee, or they will price the content on an article-by-article *transaction* basis. Vendor collections of journals for one flat fee based on the size of the user population represents a variant on the subscription fee approach. Commercial publishers, who are profit maximizers, will choose the method with the higher potential to increase their profit. Transaction based pricing offers the possibility of capturing revenue lost to interlibrary lending. Also, demand for content could increase due to the ease of access afforded online. On the risk side, print subscription losses would occur where the cumulative expenditure for transactions from a given title is less than its subscription price.

One or both of two mechanisms potentially could flatten demand functions in the electronic domain. First, by making articles available individually to consumers, the separation

of items of specific interest to given scholars creates quality competition that increases the elasticity of demand, because quality varies from article to article. Presumably, like individual grocery items, the elasticity of demand for particular articles is more elastic than that of periodical titles. A trip to the grocery store involves buying groceries in general and buying specific groceries. Economists argue that the demand for tortillas is more elastic than for groceries in general because other bakery goods can be substituted. Whereas, there is no substitute for groceries in general except higher priced restaurant eating. Similarly, it may be argued that when faced with buying individual articles, price increases will dampen demand more quickly than would be the case for a bundle of articles which are of interest to a group of consumers.

Second, by offering articles in an environment where the consuming scholar is required to pay directly (or at least observe the cost to the library), the effect of separation of payer and demander common with library collections resulting in high inelasticity will be diminished. Combining payer and consumer will increase elasticity because scholars will no longer be faced with a zero price. Even if for some libraries the scholar is not constrained to pay directly for the article, increased awareness of price will have a dampening effect on inelasticity. However, publishers may find it possible to price individual articles at a level that cumulatively exceeds the price they are able to set for a journal title which bundles a group of articles together. That is, the sum of individual article fees paid by consumers may exceed the bundled subscription price formerly experienced by libraries forced to purchase a whole title to get individual articles in the print realm.

For a product like *Adonis*, which is a sizeable collection of periodicals in the narrow area of biomedicine, transaction based pricing works out in favor of the consumer versus the provider. This is because there will likely be only a small number of articles of interest to consumers from each periodical title. This makes purchasing one article at a time more attractive than buying a subscription, because less total expenditure will normally result. In the case of a product composed of a cross section of general purpose periodicals such as the UMI *Periodical Abstracts* full-text product, the opposite may be true. The probability is higher that a user population at a college may collectively be interested in every single article in general purpose journals. This makes subscription based pricing more favorable for libraries, because the cumulative cost of numerous transactions could easily exceed the subscription price. Publishers will seek to offer journals in accordance with whichever of these two scenarios results in the higher profit. Scientific publishers will tend to bundle their articles together and make products available as subscriptions to either individual journals or groups. Scholarly publishers with titles of general interest will be drawn toward article by article marketing.

An Elsevier effort to make 1,100 scientific titles available electronically will be priced on a title by title subscription basis and at prices higher than the print version when only the electronic version is purchased.[36] On the other hand, the general purpose titles included in UMI's *Periodical Abstracts* full-text, (as are the similar products of Ebsco and IAC), as an alternative interface to their periodicals, are available on a transaction basis by article. These two approaches seek to maximize profit in accordance with the nature of the products.

Currently, UMI, Ebsco, and IAC, who function as the aggregators, have negotiated arrangements that allow site licenses for unlimited purchasing. These companies are operating as vendors who make collections of general purpose titles available under arrangements that pay the publishers royalties for each copy of their articles printed by library users. UMI, IAC and Ebsco have established license arrangements with libraries for unlimited printing with license

fees based on expected printing activity. These arrangements offer some libraries a solution to the fundamental pricing problem of monopoly power by publishers.

New research could test whether publishers are able to retain monopoly power with electronic counterparts to their journals. Work using an alternative model has examined the possibility that publishers exercise monopoly power in setting prices. Theory predicts that in a competitive market, even when it is characterized as monopolistic competition, the price offered to individuals will tend to remain elastic. Faced with a change in price of the subscriptions purchased from his own pocket, a scholar will act discriminately. Raise the price to individuals and some will cancel their subscriptions in favor of access to a library. That is, the price of periodicals to individuals is a determinant of demand for library access. By substituting a measure of monopoly power in place of price, it has been shown that publishers have some ability to influence their earnings through price discrimination.[37]

In contrast, the price to libraries, which is often much higher than the price to individuals, is set at a level intended to extract consumer surplus. The difference in these prices provides a reasonable measure of the extent of that monopoly power, assuming that the individual subscription price is an acceptable proxy for the marginal cost of production.[38] Even if not perfect, some measure of monopoly power is represented by the difference in prices. Extending this line of research may show that monopoly power is independent of the medium.

In monopolistic competition, anything which differentiates a product may increase monopoly power. Firms that sell laundry detergent expend tremendous amounts of money on advertising. They do so to create the impression that their product is qualitatively distinguishable from others. It may be that electronic availability of specific titles will create an impression of superior quality that could lead to higher prices. However, the prices of journals across disciplines also may be driven by different factors. In general, prices are higher in the sciences and technical areas and lower in the humanities. This is understandable considering the market for science versus humanities. There is essentially no market for scholarly publications in the humanities outside of academe, whereas scientific publications are used heavily in corporate research by pharmaceutical firms and other industries highly dependent on research. As a result, monopoly power will likely be demonstrable in the sciences, but not in other general areas. This would reflect additional price discrimination in the electronic environment by publishers who are able to capture revenue lost to photocopying.

Access Versus Ownership Strategy

Clearly, if commercial publishers continue to retain or enhance their monopoly power with electronic counterparts of their journals, the academic marketplace must adjust or react more effectively than it has in the past. Possibly, the reaction of universities could lead to erosion of previous success achieved with price discrimination if an appropriate strategy is followed. Instead of owning the periodicals needed by their patrons, some libraries have experimented with replacing subscriptions with document delivery services. Louisiana State University reports cancelling a major portion of their print journals.[39] They replaced these cancellations by offering faculty and students unlimited subsidized use of a document delivery service. The first year cost for all the articles delivered through this service was much less than the total cost to the library for the former subscriptions. Major savings for the library budget via this approach would appeal to library directors and university administrators as a fruitful solution. However, it will turn out to be short term at best.

Carried to its logical conclusion, this approach produces a world in which each journal is reduced to one subscription shared by all libraries. This is equivalent to every existing journal having migrated to single copies in online files accessible to all interested libraries. Some libraries will pay a license fee in advance to allow users unlimited printing access to the online title and some libraries will require users to pay for each article individually. This requires the entire fixed-cost-plus-profit components of publisher's revenue to be distributed over article prints only. Whereas, with print publications, the purchase of subscriptions of physical artifacts that included many articles not needed immediately, brought with it a bonus. The library acquired and retained many articles with future potential use. Transactions based purchasing sacrifices this bonus and increases the marginal cost of articles in the long run.

Put another way, the marginal cost of a journal article in the print domain was suppressed by the spread of expenditure over many items never read. In the electronic domain under transactions based pricing, users face a higher, more direct price and therefore are more likely to forego access. While the marginal benefit to the user may be equivalent, the higher marginal cost makes it less likely users will ask for any given article. The result may show up in diminished scholarly output or notably higher prices per article.

More likely in the long-term, should a majority of libraries take this approach, it carries a benefit for publishers. There has been no means available in the past for publishers to count the actual number of photocopies made in libraries and thus to set their price accordingly. The electronic domain could make all those hidden transactions readily apparent. As a result, publishers could effectively maintain their corporate control of prices, and do so with more accurate information with which to calculate license fees. Given this attempted solution, publishers would be able to regain and strengthen their monopoly position.

A more promising approach lies in consortial projects such as that conducted by the Associated Colleges of the South (ACS).[40] There are collections in full-text of over 1,000 existing journals with backfiles accompanying the *Periodical Abstracts* and *ABI/Inform* indexes of UMI. These are available directly online from the vendor or through OCLC. The ACS contracted an annual license for these two products for the thirteen schools represented. Similar to the cost for each ACS library, the cost to Trinity University is $11,000 per year in 1996-97 for the electronic periodicals in the UMI databases. Coincidently, Trinity University subscribes to the print version of 373 titles covered by these products. Trinity could cancel its subscriptions to the print counterparts of the journals provided, and save $24,900. Although Trinity's library will subsidize user printing for paper, toner, and so forth, at an expected cost of several thousand dollars per year, with 230 faculty and 2,400 students, it appears likely that favorable economies accrue from switching to these electronic products. Of course, these savings will be accompanied by a significant decrease in non-dollar user cost to patrons, so unmet demand will emerge to offset some of the savings. Moreover, there is a substantial bonus for Trinity users inherent in this arrangement.

There is a number of titles made available in the UMI product for which subscriptions would be desirable at Trinity, but which have not been purchased in the past, because of budget limitations. There are some of these from which users would have acquired articles through the normal channels of interlibrary loan. However, the interlibrary loan process imposes costs in the form of staff time and also user labor and is sufficiently cumbersome that many users avoid it for marginally relevant articles. However, if some of those marginal articles could be easily viewed on screen as a result of electronic access described in this example, some users would consider

the labor cost of acquiring them to have been sufficiently reduced to encourage printing the articles from the system. Therefore, the net number of article copies delivered to users will be significantly increased simultaneous with a substantial net decrease in the cost of subscriptions delivered to libraries.

Included in this equation are savings which accrue to the consortial libraries by sharing access to electronic subscriptions. Shared access will result in a specific number of print cancellations which will decrease publisher profit from subscriptions. Publishers offering their journals in the electronic domain will be confronted by a change in the economic infrastructure that will flatten the scholar's demand functions for their titles while simultaneously increasing the availability of articles to the direct consumers. By lowering the user's non-dollar cost of accessing individual articles, demand will increase for those items. Scholars, therefore, will be more likely to print an article from an electronic library than they would be to request it through interlibrary loan. However, depending on library policy, those scholars may be confronted with a pay per print fee, which will affect their demand function. If the publisher raises the price to scholars for an article, they are more liable to lose a sale. Users will be more cautious with their own money than with a library's. This is to say that in the electronic domain, where scholars may be paying directly for their consumption, demand functions will be more elastic. This will occur to some extent even when users do not pay for articles, but merely note the article price paid by their subsidizing library. Therefore price discrimination may be more difficult to apply and monopoly power will be temporarily lost.

The loss might be temporary, because this strategy is functionally the same as merging several libraries into one large library and providing transactions based access versus ownership. This super library could ultimately face similar price discrimination currently existing in the print domain. This will lead, in turn, to the same kind of inflation that has been suffered for many years.

Preliminary Analysis of Financial Impact

This paper reports on the early stages of a three-year study funded by the Andrew W. Mellon Foundation. This study is collecting data on approximately 6,000 journal titles gathered from the combined subscription lists of the thirteen ACS libraries. The study includes analysis directed at testing the viability of consortial access versus ownership as well as the potential long term solution that would derive from emergence of a new core of electronic titles. A complete financial analysis of the impact of consortial, electronic access to a core collection of general purpose periodicals as well as an econometric analysis of the impact of electronic availability on pricing policy will issue from the study conducted under this grant. Some interesting issues have emerged with preliminary results of the study.

Financial Analysis

The Palladian Alliance is a project of the Associated Colleges of the South funded by the Andrew W. Mellon Foundation. This consortium of thirteen liberal arts colleges -- not just libraries -- has a full time staff and organizational structure. The Palladian Alliance came about as result of discussions among the library directors who were concerned about the problem described in this paper. As the project emerged, it combined the goals of several entities, which are shown in Table 1 along with the specific objectives of the project.

Andrew W. Mellon Foundation awarded a grant of $ 1.2 million in December 1995 to the ACS. During the first half of 1996, the librarians upgraded hardware, selected a vendor to provide a core collection of electronic full-text titles, and conducted appropriate training sessions. Public and Ariel workstations were installed in libraries by July 1996 and necessary improvements were made to the campus networks to provide access for using world-wide web technology. Training workshops were developed under contract with Amigos and SOLINET on technical aspects and were conducted in May 1996. During that same time, an analysis was conducted to isolate an appropriate full-text vendor.

After comparison of the merged print subscription list of all institutions with three products -- IAC's InfoTrac, Ebsco's EbscoHOST, and UMI's *Periodical Abstracts* and *ABI/Inform* -- the project team selected UMI with access thru OCLC. A contract with OCLC was signed in June for July 1, 1996 start-up of FirstSearch for the nine core databases: *WorldCat*, *FastDoc*, *ERIC*, *Medline*, *GPO Catalog*, *ArticleFirst*, *PapersFirst*, *ContentsFirst*, *ProceedingsFirst*; and for University Microfilm's two core indexes: *Periodical Abstracts* and *ABI/Inform* along with their associated full-text databases. This arrangement for the UMI products provides a general core collection with indexing for 2,600 titles of which approximately 910 also provide full-text of the contents.

Table 1. Goals and Objectives of the ACS Consortial Access Project.

Goals of the ACS Libraries:

- Improve the quality of access to current information
- Make the most efficient use of resources

Goals of the ACS Deans:

- Cost Containment

Goals of the Andrew W. Mellon Foundation:

- Relieve the economic pressure from periodical price inflation
- Evaluate the impact of electronic access on publisher pricing practices

Objectives of the Project:

- Improve the hardware available within the libraries for electronic access
- Provide online access to important undergraduate periodical indexes
- Provide online access to core undergraduate periodicals in full text
- Provide campus-wide access through readily available search tools -- eg., Internet browsers such as Netscape
- Determine the financial impact on the ACS libraries
- Test the pricing practices of publishers and their monopoly power

The UMI via OCLC FirstSearch subscription was chosen because it offered several

advantages including a reliable, proprietary backup to the Internet, additional valuable databases at little cost, and easy means to add other databases. The UMI databases offered the best combination of cost and match with existing holdings. Most of the libraries had none of these databases. A few had UMI, Ebscohost or InfoTrac products.

Students have had access to the core electronic titles since the Fall semester in 1996. As experience builds, it is apparent that the libraries do have some opportunity to cancel print subscriptions with financial advantages. The potential costs, savings and added value are revealed in Tables 2 through 4. Specific financial impact on a few of the institutions during the first year are shown in Table 5. It should be noted that the financial impact is based on preliminary data that has been extremely difficult to gather. Publisher and vendor invoices vary considerably between schools on both descriptive information and prices. Therefore, these results will be updated continually throughout the project.

The following tables are based on actual financial information for the consortium. It should be understood that these figures do not include periodical titles acquired directly from publishers or gift subscriptions. Throughout these tables, it should be kept in mind that the data for Morehouse does not include the entire collection available at Atlanta University Center; this information will be updated later to give a more accurate description of the effect of the project at Atlanta. Table 2 summarizes the project costs. These calculations will be corrected to reflect revised enrollment figures immediately prior to renewal for the 2nd and 3rd years. The project was designed to use grant funds exclusively the first year, then gradually shift to full support on the library accounts by the fourth year.

Table 2. Cost Sharing Between the Grant and the Institutions.

Institution	Enrollment	% of Total Enrollment	First Year	Second Year	Third Year
Mellon Grant			$184,295	$120,705	$45,000
Atlanta	13,174	38.70%		$26,873	$61,917
Birmingham	1,406	4.13%		$2,868	$6,608
Centenary	821	2.41%		$1,675	$3,859
Centre	968	2.84%		$1,975	$4,550
Furman	2,673	7.85%		$5,452	$12,563
Hendrix	978	2.87%		$1,995	$4,597
Millsaps	1,278	3.75%		$2,607	$6,007
Richmond	3,820	11.22%		$7,792	$17,954
Rhodes	1,407	4.13%		$2,870	$6,613
Rollins	2,632	7.73%		$5,369	$12,370
Sewanee	1,257	3.69%		$2,564	$5,908
Southwestern	1,199	3.52%		$2,446	$5,635
Trinity	2,430	7.14%		$4,957	$11,421
TOTALS	34,043		$184,295	$190,147	$205,000

The ACS libraries collectively subscribe to approximately 14,200 subscriptions through their vendors as shown in Table 3. Of these, 6,000 are unique titles; the rest are duplicates of these unique titles. Were the ACS libraries collectively merged into one collection, it would therefore be possible to cancel over 8,000 duplications and save over $1,133,000. Since this is not possible, the libraries have contracted for electronic access to nearly 1,000 full-text titles from UMI, where over 600 UMI titles match the print subscriptions held by the collective libraries. Cancelling all but one of the print duplications of the UMI titles could save the libraries about $130,000 or cancelling all the print counterparts to the electronic versions would save about $185,000 which is approximately equal to the licensing costs for one year per Table 2.

Table 3. Potential Savings from Substitution of Online Full-Text for Print Subscriptions.

	No. Titles	Costs/Savings
Cost Total for All ACS Print Subscriptions	14,187	$2,017,565
Number of Unique Titles	6,073	$883,880
Number of Duplicate Titles	8,114	$1,133,685
Cancelling of All But One Overlapping Duplicates	2,269	$130,306
Cancelling of All Overlapping Duplicates	2,870	$185,395

The project adds considerable value to the institutional resources as a bonus. There are many titles available through UMI that the schools had not previously taken. Table 4 lists the number of print subscriptions carried by each institution and indicates how many of those are available in the UMI databases electronically. Were the print counterparts of all these electronic journals to be cancelled, the fourth column shows the savings available to each school. "Added E-titles" shows the number of new journals made available to each institution through the grant.

Table 4. Savings Potential for Each Institution and Value Added by Electronic Subscriptions.

Institution	No. Print Subs'ns	Overlap w/ UMI	Cancellation Savings	Added E-titles	Total Subs'ns
Birmingham	658	198	$13,583	712	1,370
Centenary	535	184	$10,831	726	1,261
Centre	790	194	$11,501	716	1,506
Furman	2,008	279	$17,632	631	2,639
Hendrix	573	180	$9,980	730	1,303
Millsaps	740	193	$12,425	717	1,457
Morehouse	49	41	$2,494	869	918
Rhodes	318	81	$4,248	829	1,147
Richmond	1,976	368	$25,315	542	2,518
Rollins	1,314	261	$19,078	649	1,963
Sewanee	1,607	214	$14,073	696	2,303
Southwestern	1,406	304	$19,333	606	2,012
Trinity	2,213	373	$24,903	537	2,750
TOTAL	14,187	2,870	$185,396	8,960	23,147

Table 5 details the financial impact on several ACS institutions. Comparing this table with Table 2 reveals that in the cases of Trinity, Millsaps, and Rollins, even without Mellon support, the consortial provision of the OCLC/UMI databases could be paid for by cancelling existing redundant indexes. In Trinity's case, two indexes previously purchased as CD-ROM's or direct links to another online source were cancelled for savings of over $5,000 in the first year. Trinity cancelled a CD-ROM subscription to a site license of *ABI/Inform* , which saved expenditures totaling over $6,000 per year and an online general purpose index that previously cost over $12,000. The Trinity share to the Palladian Alliance project would have been just over $13,000 per year for the first three years. Similarly, Millsaps cancelled one indexes and 74 periodical titles that overlapped the UMI content. Their first year savings were over $5,700.

Table 5. First Year Financial Impact on Selected ACS Schools.

* = Incomplete data, but no cancelations made.

	Birming'm	Centre	Hendrix	Millsaps	Rhodes *	Trinity
Periodical Subscriptions						
Total 1996	656	719	600	677	957	2686
Total 1997	660	723	604	633	512	2621
Cancellations						
Total for 1997	2	1	0	85	0	42
Overlap of UMI	0	0	0	74	0	0
Indexes	1	0	1	0	0	9
Savings						
Periodicals	$24	$120	$0	$9,274	$0	$20,049
Overlap of UMI	$0	$0	$0	$5,104	$0	$0
Print Indexes	$4,650	$0	$604	$0	$0	$7,806
Electronic Indexes	$0	$0	$0	$0	$0	$18,491
Savings Due to Project	$4,650	$0	$604	$5,104	$0	$26,297
Subsidized Cost of Project	$9,476	$6,524	$6,591	$8,613	$9,483	$16,378
NET SAVINGS	($4,826)	($6,524)	($5,987)	($3,509)	($9,483)	$9,919

The interesting outcomes of the project at this point include a couple of new pieces of important information. First, cancelling individual subscriptions to indexes provides a viable means to relieve campus budgets at least in a short run with consortial pricing. In Trinity's case, were it necessary to pay our full share of the cost, there were more than sufficient savings from cancelling indexes alone to pay for the project. The net savings over the project lifespan total nearly $18,000 for Trinity just considering trade-offs with indexes alone.

Second, on the down side, cancelling journals and replacing them with an aggragator's collection of electronic subscriptions may not be very reliable. It is apparent that the aggragators suffer from the vagaries of publishers. Over just the short time of the first few months of the project, UMI dropped and added a number of titles in both full-text databases. This means that instead of full runs of each title, there are often partial runs. Furthermore, in some cases, the publisher provides only significant articles, not the full journal. Therefore, the substitution of UMI provides the libraries with essentially a collection of articles, not a collection of electronic subscription substitutes. This diminishes reliability and discourages libraries from being able to secure really significant cost savings.

It should be noted however, that several of the libraries independently subscribed to the electronic access to Johns Hopkins *Project Muse*. In contrast to an aggregated collection, this project provides full-image access to every page of the print counterparts and guarantees access indefinitely to any year subscription once paid for. This means that reliability of the product is substantially improved and it provides reasonable incentives to the libraries to substitute access for collecting. While it may be acceptable to substitute access to a large file of general purpose articles for undergraduate students, *Project Muse* holds out better promise compared to the

initial project for scholarly journal collections.

Third, the impact of online full-text content may or may not have an impact on interlibrary loan activity. Table 6 summarizes the searching and article delivery statistics for the first six months of the project compared to the total interlibrary borrowing as well as non-return photocopies ordered through the campus interlibrary loan offices. The change in interlibrary loan statistics for the first six months of the project compared to the previous year show that in some cases interlibrary borrowing increased and in other cases it decreased. Several variables in addition to the availability of full-text seem to affect use of interlibrary loan services. For instance, some of the institutions had full-text databases available before the project started. Some made more successful efforts to promote the project services than others. It seems likely that improved access to citations from online indexes made users more aware of items that could be borrowed. That effect probably offset an expected decrease in interlibrary loans that the availability of full-text makes predictable. Regardless, statistics on this issue yield inconclusive results early in the project.

Table 6. UMI Articles Delivered to Users Compared to Change in Interlibrary Loans from 1995 to 1996.

School	Enroll- ment	Total Searches	Searches per Student	Articles Delivered	Articles Delivered per Student
Atlanta	13,174		0.00		0.00
Birmingham	1,406	5,597	3.98	660	0.47
Centenary	821	789	0.96	0	0.00
Centre	968	5,541	5.72	1,583	1.64
Furman	2,673	8,065	3.02	373	0.14
Hendrix	978	1,392	1.42	498	0.51
Millsaps	1,278	11,175	8.74	4,523	3.54
Rhodes	3,820	1,744	0.46	384	0.10
Richmond	1,407	45,639	32.44	10,477	7.45
Rollins	2,632	8,862	3.37	3,052	1.16
Southwstrn	1,257	19,999	15.91	5,623	4.47
Sewanee	1,199	18,117	15.11	590	0.49
Trinity	2,430	66,218	27.25	25,835	10.63

	Non-returns 95	Non-returns 96	Change in Non Returns	Total Borrows 95	Total Borrows 96	Change in Total Borrowing
Atlanta						
Birmingham	662	668	0.91%	928	380	-59.05%
Centenary	583	441	-24.36%	911	1,137	24.81%
Centre	409	351	-14.18%	872	758	-13.07%
Furman	246	246	0.00%	833	923	10.80%
Hendrix	146	192	31.51%	251	353	40.64%
Millsaps	568	352	-38.03%	710	887	24.93%
Rhodes	255	198	-22.35%	601	471	-21.63%
Richmond	1,034	1,044	0.97%	1,892	1,831	-3.22%
Rollins	394	365	-7.36%	656	652	-0.61%
Southwstrn	412	308	-25.24%	695	571	-17.84%
Sewanee	626	434	-30.67%	1,083	1,038	-4.16%
Trinity	706	711	0.71%	1,172	1,257	7.25%

Econometric Analysis

At this point, a meaningful econometric analysis is many months away. It is intended that a model based on Lerner's definition of monopoly power will be used to examine pricing as journals shift into the electronic sphere. The model calls for regressing the price of individual titles on a variety of independent variables, such as number of pages, advertising content, circulation, publisher type, and including a dummy for whether a journal is available electronically or not. Data is being collected on over 2,000 of the subscriptions held by Trinity for the calendar years 1995- 1997. Difficulties with financial data coupled with the time-consuming nature of data gathering have delayed progress on the econometric analysis.

It would be desirable to conduct an analysis on time series data to observe the consequences in journal price changes as a shift is made to electronic products. This would provide a forecast of how publishers react. Lacking the opportunity at the outset to examine prices over time, a straightforward model applying OLS regression on cross section data similar to the analyses reported by others, will form the basis of the analysis. Earlier models have typically regressed price on a number of variables to distinguish the statistical relevance of publisher type in determining price. By modifying the earlier models this analysis seeks to determine whether monopoly power may be eroded in the electronic market. The methodology applied uses two specifications for an ordinary least squares regression model. The first, regresses price on the characteristics of a set of journal titles held by the ACS libraries. This dataset is considerably larger than those utilized in previous studies. Therefore, we propose to confirm the earlier works that concentrate on economic journals across a larger set of disciplines. This specification includes the variables established earlier: frequency of publication, circulation, pages per year, and several dummy variables to control for whether the journals contain advertising and to control for country of publication. Four dummy variables are included for type of publisher with the residual being commercial. A second specification regressing the difference in price for libraries compared to individuals will be regressed on the same set of variables with an additional dummy added to show whether given journals are available electronically or not.[41]

The ACS libraries collectively subscribe to approximately 14,000 titles. Where they duplicate, an electronic set has been substituted for shared access. We anticipate that at the margin, the impact on publishers of ACS cancelling subscriptions to the print counterparts of this set would be minimal. However, the national availability of the electronic versions will precipitate cancellations among many institutions in favor of electronic access. Prices will be adjusted accordingly. Since most publishers will offer some products in print only and others within the described electronic set, we expect the prices of the electronic version will reflect an erosion of monopoly power. Thus the cross section data will capture the affect of electronic availability on monopoly power.

Since the dataset is comprised of several thousand periodical titles representing general and more popular items, several concerns experienced by other investigators will be mitigated. The only study found in the literature so far that examines publishers from the standpoint of the exercise of monopoly power investigated price discrimination.[42] This project intends to extend that analysis in two ways. First, we will use a much broader database. Most of the previous work has been done on limited datasets of less than 100 titles narrowly focused in a single academic discipline. Second, we will extend the analysis by assuming the existence of price discrimination given the difference in price to individuals versus libraries for most scholarly journals. With controls in the model for previous discoveries regarding price discrimination, we will attempt to test the null hypothesis that monopoly power will not decrease in the electronic domain.

In the dataset available, we were unable to distinguish the specific price of each journal for the electronic replacement, because UMI priced the entire set for a flat fee. This pricing scheme may reflect an attempt by publishers to capture revenue lost to interlibrary lending. However, it may also reflect publisher expectations that article demand will increase when user non-dollar costs decrease. Therefore, monopoly power will be reflected back on to the subscription price of print versions. As a result we will use the price of print copies as a proxy for the specific electronic price of each title.

An alternative result could emerge. In monopolistic competition, anything which differentiates a product may increase its monopoly power. For example, firms that sell laundry detergent expend tremendous amounts of money on advertising to create the impression that their product is qualitatively distinguishable from others. It may be that electronic availability of specific titles will create an impression of superior quality.

The general model of the first specification is written:

$$yj = \alpha + \beta 1IPRICEj + \beta 2CIRCj + \beta 3FREQj + \beta 4PAGESj + \beta 5AGEj + \beta 6QUALITYj + \beta 7PEERREVj + \beta 8CCCREGj + \beta 9ADVj + \beta 10ASSOCj + \beta 11GOVERNj + \beta 12FOUNDTNj + \beta 13UNIVPRj + \beta 14EUROPEj + \beta 15GBRITAINj + \beta 16OTHERj + \beta 17ELECTRNj + \varepsilon j$$

where, y equals the library price (LPRICE) for journal $j = 1, 2, 3, \ldots n$. The definitions of independent variables appear in Table 6 along with the expected signs on and calculations of the parameters $\beta 1$ through $\beta 17$ to be estimated by traditional single regression techniques.

The general model of the second specification is written:

$$yij = \alpha i + \beta 1iRISKj + \beta 2iCIRCj + \beta 3iFREQj + \beta 4iPAGESj + \beta 5iAGEj + \beta 6iQUALITYj + \beta 7iPEERREVj + \beta 8iCCCREGj + \beta 9iADVj + \beta 10iASSOCj + \beta 11iGOVERNj + \beta 12iFOUNDTNj + \beta 13iUNIVPRj + \beta 14iEUROPEj + \beta 15iGBRITAINj + \beta 16iOTHERj + \beta 17iELECTRNj + \varepsilon ij \ (1\text{-}i)$$

where, y equals two different forms of monopoly power (MPOWER1; MPOWER2) defined as measure $i = 1$ and 2 for journal $j = 1, 2, 3, \ldots n$. The definitions of independent variables appear in Table 6 along with the expected signs on and calculations of the parameters $\beta 1$ through $\beta 17$ to be estimated by traditional single regression techniques.

It should be understood that the variables listed in Table 6 are suggested at this point based on previous studies which have demonstrated that they are appropriate. Testing with the regression model is required in order to determine those ultimately useful to this study. Additional variables will be introduced should experiments suggest them. A very brief rationale for the expected sign and the importance of the variables is in order. If the difference in price between what publishers charge libraries versus individuals represents price discrimination, then a variable for the individual price (IPRICE) will be a significant predictor of price to institutions (LPRICE). As the individual experiences a rise in price, substitution of access to the library will take place. That is, higher individual prices will shift users toward the library thus raising demand for library subscriptions which will pull institutional prices higher. The sign on this variable is expected to be positive.

One group of variables deals with the issue of price discrimination based on the monopoly power that can be exercised by foreign publishers. Publishers in Great Britain (GBRITAIN), western Europe (EUROPE), and other countries outside the United States (OTHER) may have enough market power to influence price. Therefore these variables will carry a positive sign if there is a sizeable market influence exerted. Some of these publishers will also be concerned with currency exchange risks (RISK), which they will adjust for in prices. However, since they offer discounts through vendors for libraries who prepay subscriptions, this variable will carry a negative sign if the price to individuals captures most of the financial burden of risk adjustment.

It is expected that commercial publishers price discriminate more than their non-profit counterparts. Therefore, in comparison to the commercial residual, associations (ASSOC), government agencies (GOVERN), university presses (UNIVPRESS) and foundations (FOUND) will capture generally lower prices of these non-profit publishers. The signs on all these are expected to be negative.

All the publishers will experience production costs, which can be exposed through variables that control for frequency (FREQ), total pages printed per year (PAGES), peer review (PEERREV) processing/communication expenses and copyright clearance registration expenses (CCCREG), and the presence of graphics, maps, and illustrations (ILLUS), all of which will positively affect price to the extent they are passed along through price discrimination. Circulation (CIRC) will capture the effects of economies of scale, which those publications distributed in larger quantities will experience. Thus this variable is expected to be negative. Similarly, the inclusion of advertising (ADV) will provide additional revenue to that of sales, so this variable is expected to be negative since journals that include ads will have less incentive to extract revenue through sales. New entries into the publishing arena are expected to experience costs for advertising to increase awareness of their products, which will be partially passed on to consumers. Therefore, age (AGE) which is the difference between the current date and the date the journal started will be a negative predictor of price and monopoly power.

Previous studies have developed measures of quality based on rankings of publications compared to each other within a given discipline. Most of these comparisons work from information available from the Institute for Scientific Information. Data acquired from this source showing the impact factor, immediacy index, half-life, total cites, and cites per year will be summarized in one variable to capture quality (QUALITY) of journals. This variable is expected to be positive with regard to both price and monopoly power.

The prices of journals across disciplines may be driven by different factors. In general, prices are higher in the sciences and technical areas and lower in the humanities. This is understandable when we consider the market for science versus humanities outside the academe, whereas scientific publications are used heavily in corporate research by pharmaceutical firms and other industries highly dependent on research. As a result two additional dummies are included in the model to segment the specification along the discipline lines. HUMAN and SOCSCI will control for differences in price among the humanities and social sciences as compared to the residual category of science. These variables are expected to be negative and strong predictors of price.

Table 7. List of Variables.

Dependent variable

LPRICE	The price for library subscriptions.
MPOWER1	Monopoly power as represented by LPRICE minus IPRICE.
MPOWER2	Monopoly power as represented by the index: (LPRICE - IPRICE) / LPRICE

Independent variables	
IPRICE	Price for for individuals. (+, number)
GBRITAIN	1 if the journal published in Great Britain, 0 otherwise. (-, dummy variable)
EUROPE	1 if the journal published in Europe, 0 otherwise. (-, dummy variable)
OTHER	1 if the journal published outside US, Canada, Europe or Great Britain, 0 otherwise.(-, dummy variable)
RISK	Standard deviation of the monthly free market exchange rate between the currency of the home country of a foreign publisher to the U.S. dollar.
ASSOC	1 if the journal is published an association, 0 otherwise. (-, dummy variable)
GOVERN	1 if the journal published by a govt agency, 0 otherwise. (-, dummy variable)
FOUNDTN	1 if the journal published by a foundation, 0 otherwise. (-, dummy variable)
UNIVPR	1 if the journal published by a university press, 0 otherwise. (-, dummy
FREQ	The number of issues per year. (+, number)
PAGES	Number of pages printed per year. (+, number)
PEERREV	1 if article submissions are peer reviewed, 0 otherwise. (+, dummy variable)
CCCREG	1 if journal is registered with the CCC, 0 otherwise. (+, dummy variable)
ILLUS	1 if the journal contains graphics or illustrations, 0 otherwise. (+, dummy)
CIRC	The reported number of subscriptions to the journal. (-, number)
ADV	1 if there is commercial advertising in journal, 0 otherwise. (-, dummy variable)
AGE	Current year minus the date the journal first published. (-, number)
QUALITY	Sum of the Institute for Scientific Information citation measures. (+, number).
HUMAN	1 if the journal is in the humanties, 0 otherwise. (-, dummy variable)
SOCSCI	1 if the journal is in the social sciences, 0 otherwise. (-, dummy variable)
ELECTRONIC	1 if available in electronic form, 0 otherwise. (+, dummy variable)

Finally, a dummy variable is included to determine whether availability of each journal electronically (ELECTRONIC) has a positive impact on ability to price discriminate. Since we have predicted that monopoly power will erode in the electronic arena, ELECTRONIC should be statistically significant and a negative predictor of monopoly power. However, to the extent that availability of a journal electronically distinguishes it from print counterparts, there is some expectation that this variable could be positive. This would capture additional price discrimination by publishers who are able to capture lost revenue in the electronic environment.

The data set will be assembled by enhancing the data on subscriptions gathered during the planning project. Most of the additional dataset elements including prices will be acquired from examination of the journals and invoices received by the libraries. Impact and related factors will be acquired from the Institute for Scientific Information. Circulation will be proxied from the number of subscriptions supplied in print by two major journal vendors, FAXON and Ebsco. An alternative measure of circulation will be compiled from a serials bibliography. The rest of the variables were obtained by examination of the print subscriptions retained by the libraries or from a serials bibliography.

Conclusion

There may be other ways to attack the problem of price inflation of scholarly periodicals. Some hope arises from the production cost differences between print and electronic periodicals. The marginal cost of each added print copy diminishes steadily from the second to the nth copy, whereas for electronic publications, the marginal cost of the second and subsequent copies is approximately zero. Although distribution is not quite zero for each additional copy, since computer resources can be strained by volume of access, the marginal cost is so close to zero that technical solutions to the problem of unauthorized redistribution for free of pirated copies might provide an incentive for publishers in the electronic domain to distribute equitably the cost of the first copy across all consumers. If the total cost of production of the electronic publications is lower than it would be for printed publication, some publishers may share the savings with consumers. However, there is no certainty that they will, because profit maximizers will continue to be profit maximizers. Therefore, it is appropriate to look for a decoupled solution lying in the hands of consumers.

In the meantime, the outcomes of this research project will include a test of the benefits of consortial access versus ownership. In addition, earlier work on price discrimination will be extended with this cross-discipline study to determine whether electronic telecommunications offers hope of relief from monopoly power of publishers.

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For additional information about the conference, or The Andrew W. Mellon Foundation's scholarly communication initiatives, please contact Richard Ekman. For additional information about ARL or this web site contact Patricia Brennan, ARL Program Officer at (202) 296-2296.

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