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INTERNET EXCHANGES FOR USED BOOKS:
WELFARE IMPLICATIONS AND
POLICY ISSUES

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Abstract

The emergence of simultaneous online markets for used and new books has caused concern among industry groups such as the Author's Guild and the Book Publishers Association. These groups note that authors do not earn royalty payments from used book sales and as a result Internet markets for new and used goods may undermine the creative incentives for authors.

This proposition, while theoretically possible, remains untested and many potentially countervailing effects remain unexplored. For example, the availability of a resale market may or may not cannibalize the new good market. In other words, the elasticity of demand between new and used goods may be such that it may or may not adversely affect the new book prices and sale. In such scenario, the total book market may expand, leading to higher customer surplus without hurting the authors' royalties.

Ultimately, the actual impact of Internet used book sales on author and publisher welfare is an empirical question. In this research, we use economic theory and structural estimation to model the welfare implications of Internet used book exchanges for consumers, retailers, publishers, and authors. We calibrate our models using a unique dataset collected from Amazon.com's new and used marketplaces. Our data collection and analysis are ongoing. We will be able to present full results at the conference.

Keywords: Welfare, price competition, used books sales, electronic markets

Introduction

The Authors Guild sent an e-mail to its members encouraging them to remove links to Amazon.com from their own sites to protest the company's selling of used books, which pays nothing to writers or publishers. Aside from not getting any royalties on used books, writers and publishers complained that used books were being sold on Amazon as soon as the books were published. Despite requests that there be a set period of time between when a book is published and when used copies are available, Amazon has not changed its practice.

David D. Kirkpatrick, *New York Times*, April 10, 2002

The Internet allows for the creation of large-scale consumer-to-consumer exchanges for a variety of products including common consumer durable good such as books. The first sale doctrine (17 U.S.C. §109) allows for the resale of books in this way and used bookstores are common in physical settings. However, physical markets for used books have several notable disadvantages that limit their use by consumers and their viability for businesses. In a physical environment, new and used books are typically sold in separate brick-and-mortar stores, raising the search costs for individuals who are interested in comparing prices between these markets. Further, used book stores only draw customers from a small geographical area, reducing the liquidity of these markets. Finally, in a physical setting, used book stores must maintain physical control over their inventory, reducing the viability of this business model.

In contrast, on the Internet, search costs to compare prices for new and used books are much lower. Frequently used books are listed side-by-side with new books either by retailers (e.g., Amazon.com) or by shopping agents (e.g., BizRate.com). Similarly, Internet markets for used books draw buyers and sellers without geographical constraints. Finally, used book market makers, such as Amazon.com and eBay/Half.com, do not take possession of the used books, but rather act as brokers for the direct exchange of the product between consumers. In the case of Amazon.com, these brokered transactions offer nearly the same margins as new book transactions, mitigating cannibalization concerns for the retailer. Online book sales grew from essentially nothing in 1995 to more than $2 billion in 2000. Today such sales make up between 7.5 percent and 10 percent of total book sales in the U.S.[1]

What is notable is that, as with many new Internet markets, the introduction of such exchanges threatens to change the traditional distribution of welfare between consumers, retailers, publishers, and authors. In particular, groups such as the Author's Guild and the American Association of Publishers have argued that online exchanges for used books reduce the sale of new books, hurting both publisher revenues and author royalty payments. However, this proposition, while theoretically possible, remains untested and many potentially countervailing effects remain unexplored. For example, the availability of a resale market may stimulate demand for books and thereby increase the prices retailers are able to charge (Miller 1974). This is precisely what happened to prices for used textbooks following the large-scale introduction of campus used book exchanges. Alternately, there may be only weak demand linkages between the two markets such that the introduction of used book markets has little impact on new book purchases, but increases purchases from highly price sensitive customers who would not otherwise have participated in the market. In this vein, Ghose et al. (2003) show that under some conditions, publishers can increase profits in the presence of a used book market without increasing their prices.

Research Question

This research aims to analyze the likely economic impact of Internet markets for used books on total social welfare and the distribution of this welfare among consumers, retailers, publishers, and authors. Our paper focuses on economic models of resale markets, combined with estimation of key economic variables. Specifically, we develop a model of the impact of used book availability on new book sales and calibrate the parameters of this model with empirical estimates of critical structural parameters. Based on this calibration, we will assess the welfare impact of used good markets on market participants and propose public policy remedies if necessary.

Prior Literature

Our research is related to three streams of extant work. The first relates to literature on piracy, copyright enforcement, and the impact of piracy on a legitimate producer's welfare. While the sale of used goods is allowed under copyright law, the piracy literature provides many interesting parallels to our work. For example, Liebowitz (1982, 1985) shows that legitimate demand may increase with buyers' supply of copies to others and Gopal and Sanders (1997) have similar findings for sharing among peer users. Piracy may also increase legitimate demand by enabling the producer to credibly commit to not reduce its price in the future (Takeyama 1994). In other work, Chen and Ping (2003) consider how the government should set the fine for copying, tax, and subsidy on legitimate software purchases and perform a social welfare analysis (Harbaugh and Khemka 2001). Whereas most research has focused on end-user piracy, Banerjee (2003) considers enforcement against commercial piracy.

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[1]American Booksellers Association, Industry News, "Overall Book Sales Up Slightly for First Six Months of '01," November 1, 2001 (available online at **http://www.bookweb.org/home/news/btw/5182.html**; accessed April 15, 2003).

The second stream of relevant literature relates to estimating welfare effects from new goods. Brynjolffson et al. (2003) estimate the consumer surplus from obscure books on the Internet. Hausman and Leonard (2002) use both direct and indirect approaches to estimate the effect of a new good introduction. Goolsbee and Petrin (2001) estimated a discrete choice model of demand for television delivery services and find that the consumer welfare gain from the introduction of direct broadcast satellite TV was approximately $1 billion per year.

The third stream of relevant literature attempts more direct measures of price competition on the Internet and consumer price sensitivity on the Internet (e.g., Brynjolfsson and Smith 2000; Clay et al. 2001). Goolsbee (2000) finds a large cross-price elasticity of online retail and online computers with respect to physical retail prices. Ellison and Ellison (2001) find large elasticities for computer memory and motherboards from data on a private computer parts retailer. Goolsbee and Chevalier (2002) directly estimate the elasticities of demand facing both Amazon.com and BarnesandNobles.com. Their results show significant price sensitivity at both merchants but demand at BarnesandNobles.com is much more price-elastic than is demand at Amazon.com. The general consensus from this work seems to be that Internet markets are competitive in the sense that own-price and cross-price measures are highly elasticity.

Data

Our data set is compiled from publicly available information on new and used book prices and sales at Amazon.com. The data is gathered using automated java bots to access and parse HTML pages downloaded from the retailer. The data was collected once every day and covers the time period from September 1, 2002, to March 1, 2003. It includes over 3.6 million price observations for 250 individual book titles.

Our panel of books includes 50 books from each of five major categories—*New York Times* best sellers, former *New York Times* best sellers, Amazon Computer best sellers, best selling text books, and new and upcoming books. Current best sellers were included because of popularity, high sales, and their relevance for publisher price discrimination strategies (using phased releases of binding types). We randomly selected books appearing on the *New York Times* best sellers list for paperback fiction, paperback nonfiction, hardcover fiction, and hardcover nonfiction. Using the Lexis-Nexis database, we also included a sample of 50 *New York Times* bestsellers from 1999 to analyze the impact of time as well as existing volume on the availability and pricing of used books.

Former best sellers should have a larger base of copies in circulation than other titles, potentially increasing the number of used copies for sale. Computer bestsellers represent one of the most popular book categories sold online and are also subject to demand shocks based on the version updates over time and changes in technology.[2] Our computer bestsellers are selected at random from the bestselling list at Amazon.com. Textbooks, which are also included in our survey, have similar demand characteristics to computer books—both in terms of popularity and demand shocks. Our textbooks are selected at random from facultyonline.com bestsellers. Our final category is the new and upcoming books. This category allows us to examine the development of used book markets for recent releases that are not on the *New York Times* bestseller list.

For each of the books tracked (each book is uniquely identified by an ISBN number), we collect data on new book prices charged by Amazon.com and the new and used book prices among Amazon.com marketplace sellers.[3] Besides prices, for each offer listed, we collect the book's self-reported condition and the seller's marketplace rating (a star rating provide by prior customers). Since Amazon.com provides four different condition (or quality) levels of used books (like new, very good, good and acceptable), our data includes all used book offers on a given date for each condition. Clearly since including each used book offer in our regression is impractical, from the set of offers, we selected the minimum price for each of these four possible conditions of a given used book. This was done because the minimum price for a specific condition of an used book strictly dominates any other price offers at that condition. Thus, we derived four new variables constituting the minimum prices of used books. We also collected the release date of each book. This enables us to capture the time elapsed between the book release date and the date on which the data was gathered. We collected new book prices from Amazon.com's competitors, using the shopbot bestwebbuy.com. Bestwebbuy.com tracks all major competitors of Amazon.com and provides us with important competitive pricing information. Finally, we collect book characteristics such as publication date and list price.

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[2]In fact, version updates are a popular strategy for publishers to mitigate the impact of used book markets (Miller 1974).

[3]Amazon.com allows other merchants to sell new books through its marketplace.

In our data, there are a significant number of observations for both scenarios, when there are many used books on offer and when no used book is on offer, for a given ISBN on a given date. Hence, we create a dummy variable for each used book condition such that 1 denotes that a used book of a given condition for a given ISBN was offered on a given day, while 0 indicates the absence of a specific used book offer on that day, for that condition. Summary statistics for our data are provided in Table 1.

Table 1. Summary Statistics

Variable	Mean	Std Deviation	Min	Max
Amazon Rank	49863	142168.7	1	1137976
Amazon Price	25.16	28.16	0	209.99
Average Used price	9.93	14.48	0	209.96
Average Book Condition	2.59	1.12	1	5
Seller Rating	4.13	1.58	0	5
Count of Used Books	8.08	16.56	1	223

Methodology

To analyze the impact of used books on new book prices, we first develop a simple economic model of the relationship between new and used markets on the Internet and analytical expressions for the resultant publisher, retailer, and consumer welfare. One can develop a pure theoretical model to calculate the price, sales, and welfare functions and analyze the impact of various parameters on welfare and prices (see Bulow 1982; Ghose et al. 2003; Miller 1974). For the purposes of policy analysis, however, a significant limitation of a purely analytic approach is that analytic models are rarely able to generate unambiguous findings. Rather their findings are conditioned on the demand parameters for the market. A significant contribution of our work is to a build a theoretical model and empirically estimate key demand parameters (i.e., own and cross price elasticity) for the market and use these parameters to analyze welfare implications.

Until recently it was difficult to calculate the price elasticity for books sold on the Internet, because while the price on individual items could be readily observed, the quantity sold remained unobserved. Two recent papers solve this problem by providing a way to map the observable Amazon.com sales rank to the corresponding number of books sold. The first paper (Goolsbee and Chevalier 2002) uses an easily executed online experiment. The authors first obtain a book with a known (and relatively stable) number of weekly sales. They then purchase several copies of the book in rapid succession from Amazon.com and track the Amazon.com sales rank before and shortly after their purchase. They then calculate the slope of a Pareto distribution (e.g., $Quantity = \beta_1 \cdot Rank^{\beta_2}$) based on these two points (initial quantity and rank and final quantity and rank). Brynjolfsson et al. (2003) use a similar technique. They obtained data from an undisclosed book publisher mapping the Amazon.com sales rank to the number of copies the publisher sold to Amazon.com. The data include 321 books with sales ranks ranging from 238 to 961,367. They fit this data to the same Pareto curve specification as Goolsbee and Chevalier. As noted in Brynjolfsson et al. (2003), these different methodological approaches yield remarkably similar empirical estimates.

Brief Overview of the Model

Our first goal is to calculate how publisher (or author) welfare changes with the emergence of a used good market. To be able to answer this question, we develop the following model:

Publisher Welfare $PW = kQ_nP_n$ (where Qn is new book quantity, Pn is the new book price, and k is the commission on each sale). With the establishment of used book market, we seek to empirically estimate the welfare loss or gain. Denote Pu as the used book price normalized by its quality and seller's rating. How does the availability of such books change publisher welfare? We know that change in the welfare is

$$\frac{\partial PW}{\partial P_u} = k\left[\frac{\partial Q_n}{\partial P_u} P_n + \frac{\partial P_n}{\partial P_u} Q_n\right]$$ (1)

Since we already observe Qn and Pn, if we can estimate the respective elasticities, then we can measure the change in publisher welfare. To estimate these parameters, we set up our model as follows. The sales of a new book can be written as

$$Q_n = \alpha_0 + \alpha_1 P_n + \alpha_2 P_u + \alpha_3 Quality_u + \alpha_4 Ratings_u + \alpha_5 Timeofrele\,ase_u + \varepsilon_u \qquad (2)$$

where α_1 and α_2 represent own and cross price elasticities, α_3 and α_4 represent the coefficients for the condition of the used book and the rating of the used book seller, and α_5 is the coefficient of the time elapsed between the book release date and the date on which the data was gathered.

Economic theory suggests that there is endogeneity in the parameters of both P_n and P_u. In other words, estimating equation (2) alone will lead to incorrect estimate of α_2 leading to an incorrect conclusion from equation (1). Since new good price observed at Amazon.com is a function of used book prices, the competitors' new book prices, conditions of the used book, and the rating of the seller, we have to explicitly impose this structure. Similarly, the used book prices will be set by the seller after taking into account the new book price and the book's condition as well as the seller's own rating. Hence

$$P_n = \beta_0 + \beta_1 P_u + \beta_2 P_c + \beta_3 Quality_u + \beta_4 Rating + \varepsilon_{np} \qquad (3)$$

$$P_u = \xi_0 + \xi_1 P_n + \xi_2 Quality_u + \xi_3 Rating + \varepsilon_{up} \qquad (4)$$

Substituting (3) into (4) leads to

$$P_n = \beta_0 + \beta_1(\xi_0 + \xi_1 P_n + \xi_2 Rating + \xi_3 Quality_u + \varepsilon_{up}) + \beta_2 P_c + \beta_3 Quality_u + \beta_4 Rating + \varepsilon_{np} \qquad (5)$$

Rearranging this, we get

$$P_n = \frac{1}{1 - \beta_1\xi_1}\left[(\beta_0 + \beta_1\xi_0) + \beta_2 P_c + (\beta_1\xi_3 + \beta_3)Quality_u + (\beta_1\xi_2 + \beta_4)Rating + (\beta_1\varepsilon_{up} + \varepsilon_{np})\right] \qquad (6)$$

$$P_u = \frac{1}{1 - \beta_1\xi_1}\left[(\xi_0 + \beta_0\xi_1) + \xi_1\beta_2 P_c + (\xi_1\varepsilon_{np} + \varepsilon_{up})\right] + (\xi_2 + \frac{\xi_1(\beta_1\xi_3 + \beta_3)}{1 - \beta_1\xi_1})Quality_u + (\xi_3 + \frac{\xi_1(\beta_1\xi_2 + \beta_4)}{1 - \beta_1\xi_1})Rating \qquad (7)$$

Finally, we can substitute both (6) and (7) into (2) and get a new equation in Q_n such that

$$Q_n = \alpha_0 + \frac{\alpha_1(\beta_0 + \beta_1\xi_0) + \alpha_2(\xi_0 + \beta_0\xi_1)}{1 - \beta_1\xi_1} + (\alpha_3 + \alpha_2\xi_2 + \frac{\alpha_1(\beta_1\xi_3 + \beta_3) + \alpha_2\xi_1(\beta_1\xi_3 + \beta_3)}{1 - \beta_1\xi_1})Quality_u +$$
$$(\alpha_4 + \alpha_2\xi_3 + \frac{\alpha_1(\beta_1\xi_2 + \beta_4) + \alpha_2\xi_1(\beta_1\xi_2 + \beta_4)}{1 - \beta_1\xi_1})Rating + \beta_2\frac{\alpha_1 + \alpha_2\xi_1}{1 - \beta_1\xi_1}P_c + \alpha_5 Timeofrelease + \varepsilon_u + \frac{\alpha_1(\beta_1\varepsilon_{up} + \varepsilon_{np}) + \alpha_2(\xi_1\varepsilon_{np} + \varepsilon_{up})}{1 - \beta_1\xi_1}$$

With our structural model, we are left with a fully identified system of 15 equations and 15 unknowns, all of which can be estimated. We are particularly interested in the estimates for α_2 and β_1 which can be substituted in (1) to measure the change in publisher welfare.

Note that (2), (3), and (4) are linear in nature. We plan to use the theoretical model to derive the exact relationship between new and used good prices and sale. Once we have the exact expression, we can rewrite (2), (3), and (4) and calculate α_2 and β_1. Thus, a major contribution of our paper is to be able to not only derive theoretical relationships between prices, sales, and welfare, but also to empirically estimate these functions using our data set. Therefore, we also offer a rich methodology to answer an important and interesting policy question.

Finally, we plan to estimate the consumer welfare. To achieve consumer welfare measurements, we plan to follow Hausman and Leonard's (2002) derivation to break the total effect on consumer surplus of the introduction of a new product into two parts:

the variety effect and price effect. The total effect on consumer surplus is the difference in the consumer's expenditure function before and after the introduction, measured at the level of post-introduction utility:

$$CV = [e\,(p_{c1}\,,\,p^*,\,u_1\,)\text{-}\,(p_{c1}\,,\,p,\,u_1)] + [e\,(p_{c0}\,,\,p^*,\,u) - e(p_{c1}\,,\,p^*,\,u)] \tag{8}$$

where p_{c0} is the vector of pre-introduction prices of competing products, p^* is the virtual price of the new product (the price that sets demand to zero), p_{c1} is the vector of post-introduction prices, and u is the post-introduction utility. We are currently working on a different demand formulation to apply equation (7) in practice.

Discussion and Future Directions

The introduction of Internet markets for new and used books has rekindled—and heightened—the debate regarding the impact of used book sales on authors and publishers. Publishers and authors have argued that used book sales reduce authors' royalties and constrain publisher revenue. However, these assertions remain untested. Specifically, these assertions do not consider the possibility that the availability of used book resale markets will increase market prices for new books or that the much of the used book market will consist of consumers who would have otherwise not been willing to make a purchase. Our research represents initial work to rigorously address some of these questions. Our data analysis is ongoing and we aim to present empirical estimates of the relevant parameters at the conference.

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