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PRICES AND PRICE DISPERSION ON THE WEB: EVIDENCE FROM THE ONLINE BOOK INDUSTRY*

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Using data collected between August, 1999, and January, 2000, covering 399 books, we examine pricing by thirty-two online United States-based bookstores. At the aggregate level, we find that both advertising and competitive structure had the predicted effects. More competition led to lower prices and to lower price dispersion. Holding competitive structure constant, more widely advertised items also had lower prices. At the firm level, we observe considerable heterogeneity in behavior. Firms had differentiated (or attempted to differentiate) on dimensions such as brand, price, and selection.

I. INTRODUCTION

This paper analyzes the relationship between competitive structure, advertising, price and price dispersion in the Internet channel. Standard economics suggests that more competition will lead to lower prices. Search theory predicts that prices will be lower for more widely advertised or more commonly purchased items.[1] Given that search on the Internet is nearly costless, it may be that all items are now considered widely advertised. To the extent that we observe dispersion in this channel, search theory suggests a number of possible explanations, including differences in costs across firms, product differentiation, and different firm strategies based on different types of consumer behavior.

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[1] See Stigler [1961] and the empirical work that has followed on the effect of advertising, including Benham [1972], Cady [1976], Devine and Marion [1979], Feldman and Begun [1978, 1980], Glazer [1981], Kowka [1984], and more recently Milyo and Waldfogel [1999] and Sorenson [2000].

To investigate these questions, we use data on pricing in the online book industry from August, 1999 to January, 2000. Automated agents collected data for 399 books from thirty-two online bookstores over twenty-five weeks. The books included *New York Times* bestsellers, former *New York Times* bestsellers, computer bestsellers, former computer bestsellers, and random books. The stores included well-established Internet retailers such as Amazon, BarnesandNoble.com, and Borders.com as well as smaller Internet retailers such as Wordsworth and BCY Bookloft.

At the aggregate level, we find that both advertising and competitive structure had the predicted effects. More competition led to lower prices and price dispersion, and holding competitive structure constant, more widely advertised items had lower prices. At the firm level, we observe considerable heterogeneity in behavior. Firms had differentiated (or attempted to differentiate) on dimensions such as brand, price, and depth of offerings in a particular area. A subset of stores typically offered high prices, using the Internet primarily as a means to advertise their physical stores, rather than to generate Internet sales. One puzzle is how some unbranded stores have survived given that their prices were typically within \$0.10 of Amazon's prices.

II. BACKGROUND

Although book selling over the Internet began in the 1980s, it started to attract national attention from the press in 1993 (Wilke [1993]). The first online stores, not surprisingly, primarily sold computer books. Incredible rates of growth in the number of people with access to the Internet and the spread of web browsers in the early 1990s made the book market increasingly attractive to retailers and consumers. The number of stores and the range of books available increased dramatically. In July, 1995, Amazon entered the market. The two largest physical chains—Barnes & Noble and Borders—began Internet sales in May, 1997, and May, 1998, respectively.

Several factors have shaped the structure of this industry. Each version of a book title has a unique identifier called an International Standard Book Number (ISBN). ISBNs are important for two reasons. First, the existence of these unique identifiers allowed wholesalers to computerize their catalogs in the late 1980s. Computerized catalogs led to more efficient order processing, benefiting the industry as a whole. The first Internet bookstores built their systems on top of these catalogs. Second, consumers can search by ISBN and be assured that they are getting exactly the same product. In some other commodity markets, firms can hinder comparison shopping by bundling a few items and issuing the bundle a new SKU (stock keeping unit) number. Bundles in the book world, in contrast,

would be identified by component ISBNs or would have to be issued a new ISBN by the issuing agency.

Market penetration of online bookstores was 5.4 percent in 1999, up from 1.9 percent in 1998 (Book Industry Study Group [2000]). This is significantly higher than overall retail penetration, which finally reached 1 percent in the fourth quarter of 2000 (United States Census [2001]). Consumers can choose among a large number of Internet bookstores. Yahoo alone lists more than one hundred online bookstores.

Consumers interested in comparing the price of a particular ISBN across many stores can use comparison-shopping engines. Yahoo lists ten comparison-shopping engines that focus primarily on books, including BestBookBuys, DealTime, and AddAll. Consumers can also choose from multi-product, comparison-shopping engines, such as Yahoo Shopping, MySimon, and PriceScan, that allow for comparison of book prices. Most of the major comparison-shopping engines cover twenty or more U.S.-based online bookstores. Their search set includes major players as well as smaller online booksellers.

Finally, online bookstores face very similar wholesale prices for books. As a result of a recent lawsuit in the book industry, all players with even minimal volume now pay roughly equal wholesale prices for books. Industry sources indicate that very large stores (Amazon, Barnes & Noble and Borders) may receive additional discounts of up to 7 percent of list price for warehousing books, engaging in advertising campaigns and waiving the right to return unsold books. Thus, depending on the payments for these services, the largest stores may get slightly larger net discounts. All other stores face the same prices for books. (Conversation in November, 1999 with Y. S. Chi, COO, Ingram Book Group, Friedman [1999], Bookweb.org [1999], and other industry sources).[2]

[2] Other costs that stores face can be divided into infrastructure costs, nonmarginal book specific costs, and order fulfillment costs. We intentionally ignore marketing expenditures, since they are effectively discretionary. Infrastructure costs include maintaining warehouse space, most personnel, and hardware and software associated with the database, orders, and customer service. Nonmarginal book specific costs are one time setup costs related to the creation of the entry for the book in the database with a scanned photo of the cover, establishing linkages with the supplier database, and other efforts that support creation of the page, placement of the order, and order fulfillment.

Order fulfillment costs together with the wholesale price of the book determine the marginal cost of the book. Stores with significant numbers of orders either outsource order fulfillment or maintain large semi or fully automated warehouses. In discussions with companies, it does not appear that the marginal cost of order fulfillment differs much within or between the two options. Industry estimates of order fulfillment costs, which are traditionally reported as a percentage of the sale price, are 10–15%.

III. DATA

Data were collected using automated agents (spiders). Stores were included if they were covered in one of two major comparison-shopping engines: DealTime or PriceScan. These comparison-shopping engines did not cover the universe of all online stores, but the thirty-two stores in our sample cover the largest United States-based stores, including Amazon, BarnesandNoble.com, Borders.com, Buy.com, and Booksamillion.[3]

The sample includes five categories of books: *New York Times* bestsellers, former *New York Times* bestsellers, computer bestsellers, former computer bestsellers and a random sample of books in print. *New York Times* bestsellers were included, because they are widely carried, represent high aggregate sales, and are a focal point for discounts. We included all books appearing in the *New York Times* bestsellers lists for paperback fiction, paperback nonfiction, hardcover fiction and hardcover nonfiction for the weeks of August 8, October 3 and November 28, 1999.[4] When *New York Times* bestsellers went off of the list, we continued to track them as former bestsellers.

Computer books were included, because they were one of the first categories of books sold on the Internet and remain an important category. Also, purchasers of computer books may have been early adopters of comparison-shopping engines. Although the *New York Times* does not maintain a bestseller list for computer books, Amazon does. We chose Amazon's bestseller list because of Amazon's high volume of book sales and the generalist (as opposed to specialist) orientation of the site.[5] Thus, the 50 books on the computer bestseller list were likely to be purchased by large numbers of consumers and offered in a large number of stores. Like the *New York Times* bestsellers, a new panel was begun each week and that panel was followed on an ongoing basis.

Random books were included to provide a baseline against which to compare the prices and price dispersion of bestsellers and former bestsellers and to understand pricing for the millions of books not covered by the bestseller lists. The random sample was created by generating random strings of letters of random length and then checking the result against the online *Books in Print* database until approximately 200 in-print titles were found.[6] Altogether, we examined the prices of 399 books on a daily basis between August, 1999 and January, 2000.

[3] A complete list of the stores is provided in Table IV. Data were also collected from some individual stores to confirm the accuracy of the information from DealTime and PriceScan.

[4] The number is approximate, because there are often ties for the no. 15 spot.

[5] Use of any store's bestseller list raises unavoidable issues of endogeneity.

[6] Some, although technically in print, were not available in any bookstores. After eliminating these, the data set includes 181 random books.

Summary statistics for the data set are presented in Table I. Reported prices are weekly minimums. Publishers' recommended prices, unit prices, and normalized prices (unit price divided by publishers recommended price) were lower for current and former *New York Times* bestsellers than for computer and random books. Current and former *New York Times* bestsellers also had lower margins.

Measures of price dispersion suggest that search was worthwhile. As a percentage of average price, current *New York Times* bestsellers exhibited both large standard deviations and large differences between the minimum

TABLE I
SUMMARY STATISTICS

	NYT Bestseller	Former NYT Bestseller	Computer Bestseller	Former Computer Bestseller	Random Book
Number of observations	25,681	28,342	26,870	16,661	63,879
Number of books	136	122	82	69	181
Average weeks on list	15.0	NA	15.6	NA	NA
Percent hardcover	52.9%	52.5%	18.3%	20.3%	66.9%
Percent fiction	56.6%	58.2%	0.0%	0.0%	24.3%
			Prices		
Publisher's recommended price	$17.28	$17.97	$43.08	$51.55	$37.92
Unit price	$11.83	$13.48	$33.57	$40.23	$34.39
Normalized price	0.69	0.76	0.78	0.79	0.86
Wholesale price	$8.25	$9.43	$21.84	$28.85	$24.66
Normalized wholesale price	0.50	0.52	0.49	0.50	0.60
Normalized margin	0.19	0.24	0.29	0.29	0.26
			Price Dispersion		
Standard deviation of unit price	$6.63	$7.31	$17.31	$31.09	$31.08
Difference between minimum and maximum price	$7.62	$6.06	$12.90	$14.12	$8.23
Standard deviation as % of average price	27.7%	17.8%	15.6%	14.0%	12.9%
Difference as % of average price	65.2%	42.8%	38.6%	35.7%	31.9%
Percent savings from not using Amazon	9.8%	24.7%	17.6%	21.2%	22.6%

Notes: The unit of observation is the minimum price of a specific ISBN at a given store in a given week. Publisher's recommended price is the suggested retail price listed in *Books in Print*. Unit price is the price offered by a retailer on either its website or a shopbot that lists prices for several bookstores. Wholesale price is based on standard terms to trade bookstores. Normalized price is unit price divided by the publisher's recommended price. Normalized wholesale price is the wholesale price divided by the publisher's recommended price. Normalized margin is unit price minus wholesale price divided by publisher's recommended price. Measures of price dispersion are calculated for specific IBSN's by week.

and the maximum price. The other categories exhibited smaller, although still substantial, price dispersion as a percentage of average price, and larger dispersion measured in absolute dollars.[7] The fact that we observe intratemporal and intracategory variation in prices suggests that firms may be using this variation as a selection device (Varian [1980]).

The last line of Table I presents a more applied measure of price dispersion. Many consumers routinely go to Amazon without checking prices at other stores. Thus, we computed savings that they could have realized by purchasing a book from the lowest cost vendor instead. The average savings as a percentage of Amazon's price ranged from a low of 10 percent for *New York Times* bestsellers to a high of 25 percent for former *New York Times* bestsellers.[8] In absolute dollars, the largest savings were on computer and random books because of their high unit prices.

IV. PRICES

Table II explores the effects of market structure on pricing behavior. Columns 2 and 3 present the regression of the normalized price for the big three bookstores and the fringe bookstores on indicators of the presence of other firms selling the same book in the same week. For a big three firm, the presence of another firm of the same type (i.e., another member of the big three) lowered price by 6.5 percent; the presence of both of the other two big three firms lowered price by another 0.5 percent to 7.0 percent overall. Similarly for a fringe bookstore the presence of another firm of the same type (i.e., another member of the fringe) lowered price by 7.8 percent; the presence of all fringe firms (on average 15 stores) lowered price by another 3.9 percent to 11.7 percent overall. For big three firms, the entry of one firm of the other type (i.e., a fringe firm) lowered price by 5.5 percent. The entry of all fringe firms lowered price by 4.9 percent to 10.4 percent overall. For the fringe firms, the entry of the one firm of the other type (i.e., a big three bookstore) lowered price by 5.3 percent. The entry of all three of the big three bookstores lowered price by 0.7 percent to 6.0 percent overall. Looking at the control variables, the big three had

[7] The increase in standard deviation with price is in line with the findings of Pratt, Wise, and Zeckhauser [1979] for the physical channel and more recently Smith [2001] in the online channel. The increase is somewhat surprising, however, given that search models predict that customers will engage in more search for higher priced items and so price dispersion will be lower.

[8] Choices of search engine customers indicate that they are willing to pay 5.0 percent more to purchase the same book from Amazon rather than from the low price vendor and 3.1 percent more to purchase the same book from Barnes & Noble or Borders (Brynjolffson and Smith [2001]).

substantially larger average discounts than fringe bookstores on both current and former bestsellers. The value of the constant indicates that the two types of stores had very similar monopoly prices on random, paperback nonfiction books.

The marginal effect of competitors across the two types of bookstores was similar in magnitude, suggesting that the competitive fringe effectively disciplined the big three. This result may have been caused by the aggressive pricing policies of a small number of stores that carry 90 percent or more of the books in the sample. In markets where a relatively small number of stores sell a book, it was these stores that repeatedly put competitive pressure on the big three.

V. PRICE DISPERSION

The price regressions suggest that there was substantial dispersion between and possibly within big three and fringe bookstores and across categories of books.[9] There is a question of what type of dispersion focus on: between stores (interstore), within stores over time (intertemporal), or within stores across categories (intracategory). Table III suggests that interstore dispersion is most important. Intertemporal standard deviation was low, implying that stores do not change prices very often. Intracategory standard deviation was fairly consistent across the bestseller categories, although somewhat higher for random books, an inherently more heterogeneous category.

Table II explores the relationship between market structure and price dispersion. Columns 5 and 6 present the regression of standard deviation of normalized price for the big three fringe bookstores on indicators of the presence of other firms selling the same book in the same week. For the big three bookstores, going from two to all three of the same type (the big three stores) increased the standard deviation of the big three's prices by 1.2 percent. For the fringe bookstores, going from two to all additional fringe firms that carry the book increased the standard deviation of fringe prices by 4.5 percent. For the big three bookstores, adding one fringe bookstore increased the standard deviation of the big three's prices by 4.6 percent. The marginal effect of adding more fringe bookstores on the standard deviation of the big three's prices was negative, with the overall effect falling to 2.8 percent for two fringe firms and 0 percent for all fringe firms. For the fringe bookstores, adding one of the big three did not have a significant effect on the standard deviation of the fringe's prices,

[9] In what follows, we will focus on unweighted price dispersion, that is, price dispersion that has not been weighted by quantity sold. This implicitly gives equal weight to every store's price. If we weighted price dispersion by quantity sold, price dispersion would be low due to the dominance of the big three and the similarity in their prices.

TABLE II
NORMALIZED PRICE AND STANDARD DEVIATION REGRESSIONS FOR BIG THREE AND FRINGE BOOKSTORES

	Independent Variable					
	Normalized Price			Standard Deviation of Normalized Price		
Dependent Variable	Entire Sample	Big Three Bookstores	Fringe Bookstores	Entire Sample	Big Three Bookstores	Fringe Bookstores
Constant	0.880***	1.082***	1.064***	0.106***	0.058**	0.056***
	(0.009)	(0.047)	(0.044)	(0.002)	(0.023)	(0.014)
Effects of Competitors						
One additional firm of same type		−0.065**	−0.078**			
		(0.028)	(0.039)			
All additional firms of same type		−0.070**	−0.117***		0.012	0.045***
		(0.031)	(0.037)		(0.008)	(0.011)
One firm of other type		−0.055*	−0.053**		0.047*	0.002
		(0.028)	(0.023)		(0.026)	(0.012)
Two firms of other type		−0.049*	−0.062**		0.027	0.021*
		(0.029)	(0.025)		(0.027)	(0.012)
All firms of other type		−0.104***	−0.060**		−0.016	0.006
		(0.031)	(0.023)		(0.025)	(0.011)
Control Variables						
NYT bestseller	−0.188***	−0.362***	−0.131***	0.081***	−0.033***	0.071***
	(0.005)	(0.008)	(0.007)	(0.001)	(0.003)	(0.001)
Former NYT bestseller	−0.137***	−0.156***	−0.108***	0.013***	−0.003	0.016***
	(0.007)	(0.014)	(0.008)	(0.002)	(0.005)	(0.002)
Computer bestseller	−0.103***	−0.137***	−0.073***	0.025***	−0.006	0.025***
	(0.004)	(0.009)	(0.005)	(0.001)	(0.004)	(0.001)
Former computer bestseller	−0.120***	−0.126***	−0.097***	0.005***	−0.014***	0.007**
	(0.005)	(0.012)	(0.007)	(0.002)	(0.005)	(0.002)

Hardcover	−0.015***	−0.028***	−0.022***	0.005***	−0.005	0.007***
	(0.004)	(0.008)	(0.005)	(0.001)	(0.003)	(0.001)
Fiction	−0.070***	−0.084***	−0.054***	0.005***	0.016***	0.007***
	(0.004)	(0.008)	(0.005)	(0.001)	(0.004)	(0.001)
Week	0.001***	0.001	0.000*	−0.000	−0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fixed effects	Yes	No	No	No	No	No
Number of observations	161,433	28,199	133,234	16,893	8,156	8,358
R^2	0.410	0.581	0.158	0.303	0.066	0.290

Notes: Standard errors are in parentheses. The unit of observation for the first three columns is the minimum normalized price of a specific ISBN at a given store in a given week. Normalized unit price is unit price divided by the publisher's recommended price. To allow for the correlation of error terms between observations of the same book sold in the same store but in different weeks, price regressions are estimated using robust estimates of variance with data grouped by unique ISBN store combinations. Standard deviation regressions are estimated using robust estimates of variance with data grouped by ISBN. For normalized price regressions, observations have been weighted by the inverse of the number of stores offering a price for an ISBN in a specific week to avoid overweighting ISBN's in the least concentrated markets. The big three bookstores are Amazon, Barnes and Noble, and Borders. The fringe bookstores include the other 29 stores in the data set. A market is defined as the number of bookstores that post prices for a specific ISBN during a specific week. For a big three bookstore, the baseline is a market with 1 big three bookstore and 0 fringe bookstores selling a specific book. For a big three bookstore, holding the number of fringe bookstores constant, one additional firm of same type is the effect of going from 1 to 2 big three bookstores, and all additional firms of same type is the effect of going from 1 to 3 big three bookstores. Also for a big three bookstore, holding the number of big three bookstores constant, one firm of other type is the effect of going from 0 to 1 fringe bookstores; two firms of other type is the effect of going from 0 to 2 fringe bookstores; and all firms of other type is the effect of going from 0 to N fringe bookstores, where N is the number of stores that carry the book. The interpretation is reversed for fringe bookstores. * = coefficient is significant at the 10 percent level, ** = coefficient is significant at the 5 percent level, *** = coefficient is significant at the 1 percent level. Analysis of the standard deviation of normalized price begins requires a minimum of two firms of the same type (the baseline firm and the first of same type competitor) to calculate standard deviation.

although adding two of the big three increased standard deviation by 2.1 percent, and adding the three of the big three had a negative marginal effect with the overall effect being zero. So for both types of stores, at some point, more competition seems to have led to lower standard deviation.[10]

Holding competitive structure constant, there were notable differences between the two types of stores. The big three had very similar prices overall, with widely advertised books, as predicted, having the lowest standard deviation of price. In contrast, fringe bookstores offered very different prices. In particular, some stores set the price of all books (including bestsellers) at full price or nearly full price, but presumably sold very few copies. This increased standard deviation more for categories with low average prices such as *New York Times* bestsellers than for categories with higher average prices. As a result, widely advertised books had the highest standard deviation of price.

VI. FIRM LEVEL STRATEGIES

The observed price dispersion appears to be driven, in part, by differences in firm level strategies. Table IV showed that selection varied systematically by store, and Table V shows that prices vary systematically by store as well. To control for differences in selection, prices in Table V were calculated by regressing normalized price by category on indicator variables for each store using book fixed effects.

Based on differences in selection and price, we sorted the stores into six types. The six types are: (i) the big three bookstores, (ii) other full-line stores that offer low prices on *New York Times* bestsellers, (iii) full-line stores that offer average prices on *New York Times* bestsellers, (iv) full-line stores that charge close to full price for most books, (v) stores with limited selection and very low prices, and (vi) specialty bookstores. The first two types of stores are very similar in that they offer wide selection and low prices on *New York Times* bestsellers.[11] The second type, however, has lower name recognition and branding. The third type also offers wide selection but offers less competitive prices on current and former *New York Times* bestsellers. The fourth type is usually a physical store that sells books at full price. The fifth type is a specialty store that specializes in remaindered books. The sixth type of store specializes in one or more

[10] The increase and then decrease in standard deviation is consistent with Stahl [1989].

[11] It is interesting to note that Barnes & Noble and Borders were offering 50 percent off of *New York Times* bestsellers in their online channel and at the same time were offering only 40 percent off of *New York Times* hardcovers and 30 percent off of *New York Times* paperbacks. This runs counter to the thesis proposed by Png *et al.* [2000] that online stores should offer smaller discounts on bestsellers than offline stores because buyer switching costs are lower.

TABLE III
STANDARD DEVIATION OF NORMALIZED PRICE BY STORE, TIME, AND CATEGORY OF BOOK AS A FRACTION OF AVERAGE NORMALIZED PRICE

	Interstore Standard Deviation	Intertemporal Standard Deviation	Intracategory Standard Deviation
New York Times bestseller	0.277	0.025	0.101
	(0.030)	(0.065)	(0.073)
Former NYT bestseller	0.178	0.045	0.117
	(0.044)	(0.073)	(0.035)
Computer bestseller	0.156	0.026	0.093
	(0.055)	(0.045)	(0.063)
Former computer bestseller	0.140	0.019	0.113
	(0.025)	(0.037)	(0.031)
Random books	0.129	0.027	0.159
	(0.067)	(0.053)	(0.084)

Notes: Interstore standard deviation is the standard deviation of normalized price across stores for a given ISBN in a given week then averaged across all observations. Intertemporal standard deviation is the standard deviation of normalized price across time for a given ISBN in a given store then averaged across all observations. Intracategory standard deviation is the standard deviation of normalized price within a book category (e.g. computer bestsellers) for a given store in a given week then averaged across all observations. Average normalized prices are computed for the same groupings used to define interstore, intertemporal, and intracategory standard deviation. Standard deviations are given in parentheses.

categories of books. Examples include Brian's Books and Bookpool that specialize in computer books, Christianbooks that specializes in Christian books, and Cherry Valley that specializes in children's books.

Because of Amazon's dominant status in the online book industry, its prices tend to act as a focal point. Table VI compares each store's prices with Amazon's prices to determine the frequency with which that store's prices are more than 1 percent above, more than 1 percent below, or within 1 percent of Amazon's price.[12] Overall, although 43 percent of prices in the sample were below Amazon's prices, only 36 percent were more than 1 percent below Amazon's prices and only 20 percent were more than $0.10 below Amazon's prices. Clearly some firms were choosing marginally to undercut Amazon's price. This strategy ensures better placement if prospective customers search for prices either manually or using comparison-shopping engines.

Tables V and VI indicate that firms were following a number of distinct strategies. Some of these strategies appear to have been viable, because firms offered significantly lower prices than the big three or specialized in a particular category. Other strategies are more puzzling, because stores offered similar selection to the big three but higher or only marginally lower prices. In the remainder of this section, we examine individual firm strategies in detail.

[12] Thanks to Mike Smith for suggesting this measure to us.

TABLE IV
PERCENTAGE AVAILABILITY OF BOOKS BY BOOKSTORE AND CATEGORY OF BOOK

	Percentage				
Store	NYT Bestseller	Former NYT Bestseller	Computer Bestseller	Former Computer Bestseller	Random Book
1000's of Discount Books	0	0	0	0	1
1Bookstreet	99	98	97	96	73
A1 Books	99	97	95	98	75
Allbooks4less	6	1	0	0	2
Alldirect	41	38	25	26	29
Alphacraze	90	89	89	94	64
Amazon	99	98	98	98	84
BarnesandNoble.com	100	100	100	100	86
BCY Book Loft	90	90	74	57	39
Bookbuyer's Outlet	58	40	62	38	52
Bookcloseouts	5	1	1	0	0
Bookpool	0	0	87	91	10
Books.com*	38	21	43	23	43
Books4mom	1	1	0	0	0
Booksamillion	92	93	93	96	75
Booksnow	54	44	61	44	55
Borders.com	99	98	98	98	87
Brian's Books	0	0	34	15	7
Buy.com	98	94	94	97	75
Cherryvalleybooks	8	2	0	0	4
Christianbook	2	2	0	0	1
Classbook	36	23	60	44	51
Codys books	92	80	93	91	34
Computerlibrary	76	73	82	65	33
Fatbrain	90	97	97	99	79
Hamiltonbook	11	14	0	2	8
Kingbooks	99	96	95	97	76
Page1book	41	38	24	24	30
Powells	98	98	95	93	45
Shopping.com	93	88	93	87	74
Varsitybooks	63	55	59	66	58
Wordsworth	53	58	54	50	44

Notes: Percentage availability is the number of sample ISBN's with prices reported by a bookstore in a week divided by the total potential number of sample ISBN's for the same week, averaged across all the weeks in the sample. Books.com was purchased by BarnesandNoble.com in the fall of 1999, so it reports prices only part way through the sample period.

The wide selection stores that offer low *New York Times* prices offered prices that were the same as or often lower than Amazon's prices. This type is probably part of the competitive fringe that was disciplining the big three. Booksamillion.com is a familiar name because of its physical stores. Buy.com and Bookbuyers Outlet are both parts of larger internet-only stores that specialize in selling a variety of merchandise including books, music, videos, computer hardware, and computer software at low prices.

TABLE V
AVERAGE NORMALIZED PRICE BY STORE

Store	Average Normalized Price				
	NYT Bestseller	Former NYT Bestseller	Computer Bestseller	Former Computer Bestseller	Random Book
			Dominant Online Bookstores (Big Three)		
Amazon	0.50	0.72	0.73	0.78	0.87
BarnesandNoble.com	0.50	0.70	0.79	0.80	0.85
Borders.com	0.50	0.69	0.77	0.79	0.83
			Wide Selection, Low NYT Prices		
Bookbuyer's Outlet	0.50	0.72	0.71	0.76	0.86
Booksamillion	0.51	0.63	0.76	0.77	0.83
Buy.com	0.47	0.61	0.71	0.71	0.76
Shopping.com	0.54	0.66	0.72	0.74	0.82
			Wide Selection, Average NYT Prices		
1Bookstreet	0.68	0.82	0.87	0.89	0.94
A1 Books	0.71	0.71	0.71	0.74	0.81
Alphacraze	0.64	0.68	0.67	0.69	0.78
BCY Book Loft	0.73	0.72	0.76	0.77	0.81
Books.com	0.67	0.72	0.78	0.79	0.85
Fatbrain	0.67	0.71	0.74	0.76	0.85
Kingbooks	0.74	0.74	0.73	0.74	0.84
Varsitybooks	0.74	0.75	0.70	0.72	0.80
			Wide Selection, Close to Full Prices		
Booksnow	0.89	0.89	0.88	0.86	0.92
Classbook	0.97	0.97	0.97	0.93	0.90
Codys books	1.00	1.01	0.97	0.97	1.07
Computerlibrary	1.00	0.99	0.96	0.99	1.07
Powells	0.92	0.90	0.91	0.92	0.93
Wordsworth	0.82	0.85	0.89	0.90	0.95
			Limited Selection, Low Prices		
1000's of Discount Books					0.63
Allbooks4less	0.43	0.55			0.43
Bookcloseouts	0.47	0.42	0.47		
			Limited Selection, Average to Full Prices		
Alldirect	0.62	0.64	0.61	0.64	0.75
Bookpool			0.63	0.64	0.71
Books4mom	0.63	0.64			0.76
Brian's Books			0.81	0.82	0.82
Cherryvalleybooks	0.89	0.92			0.89
Christianbook	0.73	0.74			0.74
Hamiltonbook	0.66	0.69		0.75	0.63
Page1book	0.99	1.00	0.97	0.96	0.99

Notes: Average prices are the regression coefficients from the regression of normalized prices on store dummies with book fixed-effects.

In early 1999, Buy.com adopted a model that involved selling at wholesale and make revenue through advertising. Recent Securities and Exchange Commission filings indicate that Buy.com has moved away from this

TABLE VI
INDIVIDUAL PRICE CORRELATIONS BETWEEN AMAZON AND COMPETING ONLINE BOOKSELLERS

	Unit Price Comparisons With Amazon					Unit Price Correlations With Amazon				
Store	Obs	Within 1%	> 1% Above	>1% Below	Overall	NYT Bestseller	Former NYT Bestseller	Computer Bestseller	Former Computer Bestseller	Random Book
Dominant Online Bookstores										
BarnesandNoble.com	3,907	77%	11%	11%	0.56	0.88	0.71	0.55	0.85	0.88
Borders.com	3,953	75%	10%	15%	0.49	0.85	0.57	0.57	0.67	0.83
Wide Selection, Low NYT Prices										
Bookbuyer'sOutlet	1,488	95%	3%	2%	0.79	0.98	1.00	0.98	1.00	1.00
Booksamillion	3,492	65%	10%	25%	0.45	0.82	0.33	0.42	0.47	0.89
Buy.com	3,650	13%	7%	80%	0.42	0.81	0.32	0.55	0.53	0.85
Shopping.com	3,329	52%	12%	36%	0.12	0.78	0.23	0.53	0.62	0.83
Wide Selection, Average NYT Prices										
1Bookstreet	3,739	4%	88%	8%	0.18	0.78	0.44	0.50	0.68	0.80
A1Books	3,833	6%	32%	63%	0.33	0.70	0.45	0.52	0.63	0.81
Alphacraze	3,397	4%	27%	69%	0.17	0.65	0.44	0.33	0.77	0.74
BCY Book Loft	2,778	7%	36%	56%	0.54	0.38	0.52	0.58	0.72	0.34
Books.com	1,005	59%	34%	8%	0.38	0.84	0.48	0.55	0.86	0.87
Fatbrain	3,667	57%	26%	18%	0.18	0.68	0.30	0.67	0.68	0.76
Kingbooks	3,756	1%	52%	47%	0.62	0.66	0.17	0.40	0.75	0.75
Varsitybooks	2,309	5%	48%	47%	0.47	0.44	−0.10	0.20	0.60	0.58

Wide Selection, Close to Full Price										
Booksnow	1,398	1%	85%	14%	0.24	0.24	0.02	0.14	0.16	0.30
Classbook	1,427	1%	71%	28%	0.65	−0.10	0.42	0.47	0.53	−0.27
Codysbooks	3,043	4%	96%	1%	0.74	0.15	0.21	0.54	0.43	0.17
Computerlibrary	2,047	1%	98%	0%	0.80	0.14	0.14	0.49	0.40	0.11
Powells	3,197	6%	85%	9%	0.12	0.02	0.27	0.27	0.40	−0.05
Wordsworth	1,911	12%	83%	4%	0.32	0.57	0.41	0.45	0.62	0.62
Limited Selection, Low Prices										
1000'sofDiscountBooks	18	0%	0%	100%		0.30				0.20
Allbooks4less	93	0%	11%	89%	−0.42	−0.39	0.09			0.27
Bookcloseouts	28	0%	50%	50%	0.73	0.08	0.64			−0.76
Limited Selection, Average to Full Prices										
Alldirect	1,696	2%	27%	71%	0.38	0.73	0.55	0.63	0.91	0.77
Bookpool	1,157	2%	8%	90%		0.72		0.57	0.63	0.35
Books4mom	29	0%	48%	52%	0.50	−0.34	0.18			−0.64
Brian'sBooks	214	2%	49%	49%		0.73		0.74	0.87	0.46
Cherryvalleybooks	129	4%	73%	23%	−0.32	0.38	0.88			0.38
Christianbook	25	48%	40%	12%	0.54	−0.02	−0.62			0.52
Hamiltonbook	297	44%	32%	24%	−0.65	−0.05	−0.23			−0.04
Page1book	1,667	8%	83%	9%	0.48	0.12	0.16	0.67	0.36	0.14
Overall		21%	43%	36%						

Notes: Price comparisons and correlations are based on unit prices that Amazon and other stores list for the same ISBN on the same day. Price comparisons within 1% are based on Amazon's unit price. Correlations are individual correlations of unit prices between Amazon and other stores.

business model towards a model in which it makes positive margins on the merchandise that it sells. Despite having sold $200 million worth of merchandise in the quarter ended September, 2000, Buy.com's stock price recently hit an all time low, and it, along with many other online stores, may be at risk. Shopping.com has transformed from a bookstore into a shopbot.

It is unclear how some wide selection stores that offer average *New York Times* prices were attracting and retaining customers. 1Bookstreet is a division of Soda Creek Press. Although it did not have exceptionally low unit prices, it offered free shipping on all orders. In contrast, nearly all other booksellers charged $3.00–$5.00 to ship the first book and $0.90–$1.00 for each additional book. Alphacraze, A1 Books, and BCY Book Loft all seem to have followed a strategy of being slightly cheaper than Amazon for most books other than *New York Times* bestsellers, usually about $0.10 cheaper. Two of the three explicitly identified their advantage as low prices. For instance A1 Books stated, 'We have the best prices, compared to any major online bookstore, on over 500,000 titles.'[13] Alphacraze focused on 'price, selection, and service.'[14] BCY Book Loft carried a wide range of discounted items beyond books. Interestingly, these three were not cheaper on average than Buy.com. BarnesandNoble.com purchased Books.com in the autumn of 1999 and Fatbrain in the autumn of 2000. Kingbooks appears to have gone out of business. And Varsitybooks, as the name suggests, specializes in textbooks. We would predict that the sites most at risk are those offering marginally lower prices and little else to differentiate their products—Alphacraze, A1 Books, and BCY Book Loft.

In contrast, the wide selection stores that offered high prices appear to have been using their websites for customer service rather than sales. Cody's Books, Computerlibrary, Powells, and Wordsworth are all physical stores that operated websites to offer existing customers the convenience of online purchasing, information about book availability, and local delivery. Andy Ross of Cody's Books indicated that customers are familiar with the web services provided by Amazon and expect and value the same services from local booksellers. The two internet-only stores in this group, Booksnow and Classbook sold a wide selection of books, but seemed to do so as an adjunct to their main line of business. For Booksnow (now ClickSmart), this was offering 'services to magazines and Internet content web sites that want to outsource the sale of products, targeted to their

[13] http://www.a1books.com

[14] http://www.alphacraze.com/shop/customercare3.asp?tab=1&acd=6BW5TMLRP3S92KX400J74RCQ8ST0FSUD&tabnew=1#About us

readers' interests, that are mentioned in their print or electronic publications.'[15] For Classbook, its main line of business was textbooks.

The limited selection, low price stores sold remaindered books, attracting customers and making sales through low prices. When unsold books are returned to the publisher, the publisher typically resells these books as remaindered books. Remaindered books are sold by the pallet in mixed bundles and cannot be returned. Moreover, stores purchase remaindered books without knowing the specific titles of any books. Price is often a function of weight or a fixed-fee per title and typically equals 10–20% of the publishers recommended price. Given their low wholesale cost, stores in this category can offer customers discounts of 40–60 percent off of the publisher's recommended price and still operate profitably.

The limited selection, average to high price stores represented a mix of strategies, some differentiation, some low prices, and some advertising. Alldirect and Bookpool are internet-only stores that specialize in low prices for the books they stock. Books4mom and Cherryvalleybooks are no longer operational. (Cherryvalleybooks was the website for the physical children's bookstore of the same name.) Brian's Books is internet-only and specializes in computer books. It is a division of Davidson Computer Services and therefore may be an advertising or promotional tool. Christianbook began as a catalog book and now sells a wide selection of Christian products. It seems to be an example of successful differentiation. Hamiltonbook originated as and continues to be affiliated with a book catalog company of the same name. This too may be a source of differentiation. Page1book is the website of a physical store and seems to be primarily a means for the store to advertise.

VII. CONCLUSIONS

For the online book market, we found that advertising and competitive structure had the predicted effects on prices. Prices were lower for books carried by more online stores, and holding competitive structure constant, prices were lower for more widely advertised books. These results are interesting in light of the strong predictions of some commentators that low-cost search in the form of comparison-shopping engines would lead to Bertrand competition for all commodity goods. Our results provide evidence that competition is not equal for all commodity goods. Further, they suggest that many consumers may not be engaging in search, despite its low cost and significant payoff.

The observed heterogeneity in firm-level behavior is of interest, because it both sheds light on the microfoundations for aggregate pricing behavior

[15] http://www.clicksmart.com/csinsert1.html

and provides insight into how firms view the channel as adding value. The majority of books sold over the Internet are sold by Amazon, Barnes & Noble, and Borders. These three stores offer similar levels of branding and similar prices. Other stores fill specific niches by offering greater coverage of certain categories of books or lower levels of branding combined with lower prices. Two strategies were particularly surprising. First, a substantial number of independent physical bookstores have established websites and are listed in major comparison shopping engines, despite their relatively high prices. These stores seem to view the Internet as adding value primarily by advertising their physical stores and providing additional services for existing customers. Second, some stores appear to offer lower levels of branding than the big three combined with prices that are only marginally below Amazon's prices. Two of the eight stores in this category have since been bought out and one store has failed. The viability of the remaining stores is an open question.

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