

RETAIL STRATEGIES ON THE WEB: PRICE AND NON-PRICE COMPETITION IN THE ONLINE BOOK INDUSTRY*

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Two conflicting predictions have emerged regarding the effect of low-cost information on price. The first states that all Internet retailers will charge the same low price for mass produced goods. The second states that Internet retailers will differentiate to avoid intense price competition. Using data collected in April 1999 on the prices of 107 books in thirteen online and two physical bookstores, we find similar average prices online and in physical stores and substantial price dispersion online. Analysis of product differentiation yields no clear results. The substantial premium charged by Amazon provides indirect evidence of product differentiation.

I. INTRODUCTION

ELECTRONIC COMMERCE IS A SIGNIFICANT FORCE in the consumer economy. One widely-reported prediction is that the availability of low-cost information on price—specifically the rise of comparison shopping engines—will lead all Internet retailers to charge the same price for mass produced physical goods. No retailer will be able to charge more, because customers would not buy from that retailer. This prediction is in tension with another prediction—that firms prefer not to compete directly on price because of the low profits that result and so will seek to differentiate themselves.

If search were easier on the Internet, we would expect competitive pressures there to be stronger, and prices lower, than in conventional channels. Early empirical work yielded conflicting results. Lee [1997] found that prices for used cars were higher on the Internet than in conventional

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channels.¹ A study by Bailey [1998] also found that prices for books, compact disks, and computer software during 1996–97 were *higher* on the Internet than in conventional channels. Subsequent work by Brynjolfsson and Smith [1999] on books and compact disks for 1998–99 found that Internet retailers had *lower* prices. Clemons, Hitt, and Hann [1998] examined product differentiation in the online travel industry. They found that agents responded to identical requests with different time/price pairs, evidence that some differentiation had occurred.

To investigate the effect of comparison shopping engines on the retail price of mass produced physical goods, we collected price data the week of April 19, 1999, for 107 books across thirteen firms in the online book industry and two nationwide chains with physical stores. The books included 40 *New York Times* bestsellers and a random sample of 67 books from *Books in Print*. The firms included Barnes and Noble, Borders, Amazon, Barnesandnoble.com, and Borders.com, as well as lesser-known players such as Spree, Books.com, and Shopping.com.

These data were used to investigate three questions:

1. How does the price of books on the Internet compare to the publishers' suggested retail price and to the price in large bricks and mortar chains?
2. Has the low-cost availability of pricing information led to price convergence on the Internet?
3. If prices fail to converge, can price dispersion be explained by product differentiation?

Bailey [1998] and Brynjolfsson and Smith [1999] addressed the first two questions, and we build on their work by using data for a wider range of books and a large sample of online bookstores. Our study departs from their work in its focus on firms' strategies for differentiating themselves in an online context.

We found that as of April, 1999, prices were the same on and offline, online prices had not converged, and differentiation had had little measurable impact. Controlling for the books that they carried, online and physical stores charged the same unit prices on average. Because sales tax was less than the cost of shipping a single book, total prices were lower in physical stores than in online stores. The average book in our sample sold for 85 percent of the publishers recommended price, well above the lowest online price and industry reports of cost. The average difference between the minimum and the maximum price as a percentage of average price ranged from 27 percent for hardcover random books to 73 percent

¹ There is some question, however, about whether used cars sold over the Internet were of higher quality and therefore commanded higher prices.

for paperback bestsellers, suggesting that prices had not converged. Regressions on the relationship between store attributes and prices proved inconclusive. This suggests that store attempts at product differentiation had not had much of an impact, possibly because the market was not yet in equilibrium. The fact that Amazon's unit prices were 5 percent higher than Barnesandnoble.com's unit prices and 11 percent higher than Borders.com's unit prices provides some indirect evidence of product differentiation.

II. PREDICTIONS

The rise of comparison shopping engines led many observers to predict that prices would be extremely competitive on the Internet, forcing all Internet retailers to set the same low price for mass produced physical goods. For instance, in December, 1998, *Wall Street Journal* article, Rebecca Quick noted 'Many retailers worry that the robots will set off a vicious pricing war in cyberspace and force them to slice profit margins to razor-thin levels'.² And an August, 1999, article in *The Economist* stated 'Fierce competition has forced web companies to slash prices'.³

These predictions draw on the Bertrand model of competition. Markets for standardized mass produced physical goods such as books appear to satisfy some of the restrictive assumptions of the Bertrand model—the books are identical, firms choose the price, and firms can supply market demands at constant marginal cost. There are at least two reasons, however, why we may see price dispersion in the real world: (i) consumers may not have perfect information about prices and (ii) the products that firms offer may not be identical, even if the books are.

Acquiring information about prices on the Internet is much easier than for prices from separate physical bookstores. For instance, one can use comparison shopping engines such as DealTime, PriceScan.com, BestBookBuys.com, and mySimon to obtain price information for books from a wide variety of stores.⁴ For consumers to have perfect information about prices, however, they have to know such search engines exist and use them. Some consumers may not know about the engines and others (including some of the authors of this study) may not always take the time to use them. Thus, some consumers may not be perfectly informed about prices.

² Quick [1998].

³ *The Economist* [1999].

⁴ A recent search on Yahoo turned up eleven comparison shopping engines for books alone. It is important to note that search engines do differ in the amount of information provided and bookstores covered. Thus, even consumers who use a search engine may not have perfect information.

Imperfect information about prices implies that price may not converge, because uninformed customers choose firms based on convenience or word of mouth. Early work by Stigler [1961] predicts advertising that improves price information would cause both price and price dispersion to fall. Empirical studies comparing prices of goods such as eyeglasses, optometry services, and prescription drugs in states that permitted or did not permit advertising showed that advertising was associated with lower prices and price dispersion.⁵ More recent empirical and theoretical work by Varian [1980], Salop and Stiglitz [1977], and Milyo and Waldfogel [1999] suggests that if consumers face differential costs of acquiring information, improved information may not lower price and price dispersion.

Seemingly as a result of imperfect information, some firms seem to have adopted pricing strategies that involve offering low prices only for certain categories of books or low prices but high shipping costs.⁶ These differences in pricing strategies imply that comparisons of price should include factors such as tax and shipping costs. Thus, in the empirical analysis that follows, we examine pricing strategies both with and without tax and shipping costs.

Even if we assume that customers are perfectly informed about prices, although books are homogeneous goods, the book buying experience may not be. The second prediction is that firms prefer not to compete directly on price, and they will seek to differentiate themselves. There are many ways in which firms can differentiate themselves: through book reviews, newsletters, gift services, and loyalty programs, to name just a few. In the empirical analysis, we examine the effect of store attributes on price.

III. DATA

During the week of April 19, 1999, we collected data on book prices for 107 titles at thirteen U.S.-based online bookstores and two bricks and mortar bookstores. In selecting online stores for the sample, we used general bookstores listed in the popular search engine Aces (now DealTime.com) and added data from two other widely used online bookstores—Borders.com and Spree. The resulting sample included industry leaders Amazon, Barnesandnoble.com, and Borders.com and lesser-known sites such as Wordsworth and 1Bookstreet. For comparison, we collected prices from the physical locations of the Barnes and Noble and Borders bookstores in Pittsburgh, Pennsylvania. Although our sample of physical

⁵ See Benham [1972], Cady [1976], Devine and Marion [1979], Feldman and Begun [1978, 1980], Glazer [1981] and Kowka [1984].

⁶ The coupling of low prices with high shipping fees, presumably because some consumers focus on the book price and not the total price, was the subject of an April 5, 1999, *New York Times* article (Tedeschi [1999]).

stores is small, it can be considered representative of prices in large chains. Indeed, these two firms sell between 40 and 50 percent of all books sold through bookstores in the United States. And because both chains have national pricing policies with minor local variations, the prices we observe were what most consumers would have found in their local Barnes and Noble or Borders.

Of the 107 titles, 40 were bestsellers and 67 were randomly selected from *Books in Print*. The mix of titles in the sample (bestsellers vs. randomly selected titles) was chosen to reflect consumer book purchasing behavior. The bestsellers included the top 10 *New York Times* bestsellers in each of four categories—hardcover fiction, hardcover nonfiction, paperback fiction, and paperback nonfiction—for the week of April 12, 1999.⁷ Random titles were selected by taking the first English-language entry on every 100th page from the *Author* volumes of the 1996–97 print edition of *Books in Print*. The sampling resulted in 88 candidate random titles. By eliminating titles that were out of print, this number was reduced to 67 random titles.⁸

For the online stores, pages from the Acses comparison shopping engine and the two sites not covered by Acses (Borders.com and Spree) were archived during the week of April 19, 1999, and later parsed to extract information on prices, shipping, and availability.⁹ Prices and availability for two bricks and mortar chains were determined during this same period through a combination of phone calls and visits to the stores. Qualitative data on store attributes were collected through separate visits to the individual web sites and the two stores.

Table I contains a complete list of the fifteen bookstores and the proportion of the titles in the sample that the store could supply. No single store carried all the sample titles. The Barnes and Noble physical store carried the most, 98 percent of the books in the sample. Every store in the sample carried at least 90 percent of the bestsellers. The proportion of randomly selected books that stores carried varied widely, from 3 percent to 97 percent.

⁷None of the titles were on multiple bestseller lists (e.g. hardcover fiction and paperback fiction).

⁸*Books in Print* has a separate entry for each format and edition of a book. We collected the price for the format corresponding to the randomly chosen entry. The ISBNs were checked against the *Books in Print* online database to determine that the books were still in print in 1999. As a result of this check, 18 books were eliminated from the candidate sample. One book, although technically in print, was not available at any bookstore in our sample. For the remaining two books, there were data transmission problems. Since these problems were presumably random, they should not affect our results. A complete list of the books in the sample is available on request.

⁹For *Acses*, (<http://www.acses.com>) the options were always specified as US continental, state = PA, timeout = 40 seconds. Since no major chains are headquartered in Pennsylvania, the choice of state should not matter.

TABLE I
BOOKSTORES AND BOOK AVAILABILITY

Store	% of entire sample	% of best sellers	% of random books
1Bookstreet.com	48	95	19
A1 Books	54	100	27
Amazon.com	83	98	75
Barnes and Noble (physical)	98	100	97
Barnesandnoble.com	92	95	90
BCY Book Loft	40	93	9
Bookbuyer's Outlet	83	98	75
Books.com	45	95	15
Borders (physical)	97	100	96
Borders.com	97	98	97
Kingbooks.com	53	98	27
Powells	38	98	3
Shopping.com	54	98	28
Spree	50	100	19
Wordsworth	48	98	18
Average availability, all stores	65	97	46
Average availability, online	60	97	39
Average availability, physical	98	100	97
Number of books	107	40	67

Notes: The category 'best sellers' includes the top ten selling books listed for the week of April 12, 1999, in the *New York Times* in the hardcover fiction, hardcover non-fiction, paperback fiction, and paperback non-fiction categories. The category 'random books' includes the first English-language titles taken from every 100th page of the *Author* volumes of the 1996–1997 print edition of *Books in Print*.

Table II contains summary statistics. Of the books in our sample, 44 percent were hardcover and 37 percent were bestsellers. The average unit price in the bookstores was \$21.68.¹⁰ The average normalized price for all books and stores was 0.85, indicating that an average book in an average store sold for 85 percent of publishers' recommended price. Although physical stores had higher normalized prices than online stores, the difference was driven largely by availability. Physical stores carried many more of the random books, which tended to be more expensive. Prices for bestsellers were very similar across the two channels.

Customers care about the total price of the purchase, that is, unit price plus shipping or tax. For online stores, total price was unit price plus \$4.07 in shipping on average for standard 3–7 day delivery. For physical stores, total price was unit price plus 7 percent sales tax charged in Pittsburgh (Allegheny County), \$2.02. On average, normalized total prices were lower in physical stores than online because sales tax was less expensive than shipping.

¹⁰ All prices refer to posted prices. We do not observe actual transaction prices.

TABLE II
SUMMARY STATISTICS

	All books	Hardcover, Bestseller	Hardcover, Random	Paperback, Bestseller	Paperback, Random
# of books	107	20	28	20	39
# of observations	1054	281	175	303	290
% hardcover	44	100	100	0	0
% bestseller	37	100	0	100	0
<i>Average (Posted) Prices</i>					
Publisher's price	\$24.55	\$26.15	\$48.52	\$11.54	\$22.13
Unit price	\$21.68	\$18.80	\$47.70	\$8.86	\$22.16
Total price	\$25.33	\$22.56	\$51.59	\$12.50	\$25.58
Shipping cost	\$4.07	\$4.14	\$3.98	\$4.13	\$3.95
Sales tax	\$2.02	\$1.27	\$3.82	\$0.61	\$1.86
<i>Normalized Unit Prices</i>					
NUP – all stores	0.85	0.72	0.96	0.78	0.99
NUP – physical	0.90	0.70	1.00	0.75	1.01
NUP – online	0.84	0.72	0.94	0.78	0.98
<i>Normalized Total Prices</i>					
NTP – all stores	1.10	0.87	1.11	1.13	1.27
NTP – physical	0.96	0.74	1.07	0.80	1.08
NTP – online	1.13	0.89	1.13	1.18	1.34

Notes: Publishers' price is the publishers' recommended price, unit price is the purchase price listed by the bookstore, and total price is unit price plus the cost of shipping or sales tax. Shipping cost is the cost of shipping 1 book via the standard or default shipping option (equivalent to UPS ground 3–7 day delivery). Average shipping cost is calculated only for online bookstores. The sales tax in Pittsburgh (Allegheny County) is 7 percent. Average sales tax is calculated only for books carried by physical bookstores. Normalized Unit Price (NUP) is unit price/publishers' recommended price. Normalized Total Price (NTP) is total price/publishers' recommended price.

Table III contains a listing of the attributes of the stores in the sample. In April, 1999, more than half of the stores maintained lists of national bestsellers and books that had won national awards, offered reader or store reviews of books, sent out newsletters with promotions, conducted author interviews, offered gift certificates and gift wrapping, and carried non-book products or maintained links to stores that did. Some stores also offered gift recommendations, maintained loyalty programs, provided book recommendations via email, and allowed customers to access book reviews from one or more major national newspapers. And a few seemed to be experimenting with additional services such as registries or wish lists, birthday and holiday reminders, more sophisticated recommendation systems, links to international bookstores, and a place where customers could trade used books.

IV. PRICE DIFFERENCES ACROSS STORES AND STORE TYPES

To explore the issue of price differences further, we ran a number of regressions with fixed effects for store type (physical or online) and on

TABLE III
BOOKSTORE ATTRIBUTES

Manner of Differentiation	% of bookstores offering
Bestseller/award lists	73
Gift certificates	67
Gift wrapping	67
Carry non-book products	60
Links to non-book sites	60
Author interviews	60
Newsletter with promotions	53
Reader reviews of books	53
Store reviews of books	53
Gift recommendations	47
Loyalty program	33
Email book recommendations	33
3rd party book reviews	33
Personalized registry/wish list	7
Birthday/holiday reminders	7
Survey-based recommendations	7
Past-purchase based recommendations	7
Book-in-view recommendations	7
Links to international book sites	7
Used book trading	7

Notes: Attributes included those available on bookseller websites or in physical stores during the week of April 19, 1999. Loyalty programs are very complex. Some offer frequent flier miles, others offer points towards or discounts on additional books or other goods, and still others depend on how many books people that you refer buy. Reducing this complexity to a manageable number of variables became very difficult, so we opted to just use a dummy variable that indicated whether a store offered any loyalty program or not.

individual stores. To control for compositional effects, we use book fixed effects in all regressions.¹¹ To address heteroscedasticity and the correlation of errors within stores, regressions were also run with robust standard errors clustered by store. The results of these regressions are reported in Table IV.

The regression in the first column of Table IV compares physical and online stores. The coefficient on physical stores is not significant, indicating that once we control for composition, prices did not differ across the two distribution channels.

The regression in the second column of Table IV examines the effect of store attributes (attempts at product differentiation) on pricing. The sample bookstores had a wide variety of attributes, many of which were correlated. To address this, we used principal factor analysis with a varimax rotation to decompose the proxy variables into a linear com-

¹¹ We also controlled for compositional effects by restricting the statistical tests to bestsellers carried by all the 15 bookstores in the sample. The results are similar in magnitude and direction to those reported in Table IV and are not reported separately.

TABLE IV
REGRESSION RESULTS FOR NORMALIZED UNIT PRICE AND NORMALIZED TOTAL PRICE

Variable	Dep. variable: Normalized Unit Price			Dep. variable: Normalized Total Price		
	constant	0.853 *** (0.006)	0.852 *** (0.005)	0.941 *** (0.022)	1.140 *** (0.007)	1.095 *** (0.006)
physical store	-0.005 (0.014)			-0.224*** (0.017)		
store dummies	Yes ***			Yes ***		
factor 1 (baseline)	0.003 (0.006)			-0.053*** (0.007)		
factor 2 (loyalty programs, reviews)	-0.010* (0.005)			0.046*** (0.006)		
factor 3 (recommendations)	0.012** (0.005)			0.032*** (0.006)		
factor 4 (wish list, registry)	-0.021*** (0.005)			-0.052*** (0.006)		
Number observations	1,049	1,049	1,049	1,049	1,049	1,049
R-squared (within)	0.0001	0.0270	0.1915	0.1630	0.1786	0.3403

Notes: Standard errors in parentheses. All standard errors are robust standard errors clustered by store. * significant at 10% level, ** significant at 5% level, *** significant at 1% level. All regressions were estimated using a fixed-effects model. Normalized Unit Price (NUP) is the publishers' recommended price/unit price. Unit price is the purchase price listed by the bookstore. Regressions involving delivery time were only for online stores. Normalized Total Price (NTP) = total price/publishers' recommended price. Total price is the unit price plus the cost of shipping or sales tax.

bination of the underlying constructs plus measurement error. What this effectively does is group highly correlated attributes together. A principal factor analysis of all the potential regressors shows the four factors with eigenvalues greater than one. These four factors collectively explain 71 percent of the standardized variance of the differentiation among bookstore characteristics.

Table V outlines the four factors and the sign that the individual components have within the factor. Factor 1 can be thought of as a baseline. Many stores offered a package of amenities that tended to include reviews, interviews, bestseller lists, gift certificates, and non-book products. Stores with these attributes also had lower than average shipping costs. This factor was not significantly related to unit price. Factor 2 is a mix of other amenities, such as loyalty programs, reader and third party reviews of books, and newsletters with promotions. With the exception of newsletters with promotions, the attributes are positively correlated. The factor is negatively and significantly related to price, possibly because stores with these amenities offer low prices to gain market share. Factor 3 includes a number of less common amenities such as recommendations and links to

TABLE V
COMPONENTS AND IMPACT OF INDIVIDUAL ATTRIBUTES ON FACTORS

<i>Factor</i>	<i>Attribute</i>	<i>Sign</i>
<i>Factor 1</i>	Store reviews of books	+
	Author interviews	+
	Carry non-book products	+
	Gift certificates	+
	Bestseller/award lists	+
	Avg. cost to ship	-
<i>Factor 2</i>	Loyalty program	+
	Email book recommendations	+
	Newsletter with promotions	-
	Birthday/holiday reminders	+
	Reader reviews of books	+
	3rd party book reviews	+
	Used book trading	+
<i>Factor 3</i>	Past-purchase based recommendations	+
	Book-in-view recommendations	+
	Links to international book sites	+
	Survey-based recommendations	+
<i>Factor 4</i>	Personalized registry/wish list	-

Notes: Factors were constructed using principal factor analysis with a varimax rotation from to decompose the proxy variables for bookstore attributes into a linear combination of the underlying constructs plus measurement error. Factors with eigenvalues greater than one were retained. Individual proxy variables for each factor are listed if its factor loading exceeds 0.5 or falls below -0.5.

international book sites. These attributes are positively correlated with one another, and the factor is positively and significantly related to price. This is largely an Amazon effect, since it has by far the largest factor score and higher than average prices. Factor 4 is a personalized wish list or registry. The negative sign on the factor and negative and significant relationship between the factor and the price translate into a positive price effect.

The regression in the third column of Table IV indicates that measurable store attributes have relatively little explanatory power relative to store dummies. Specifically, although three of the four factors in the second column are significant at the 10 percent level or better, the *R*-squared was only 0.0270. The *R*-squared for the third column, where we include store dummies, is 0.1915. Our interpretation of this result is that stores were following pricing or branding strategies that were relatively uncorrelated with their attributes. Stores may have been experimenting, trying to find the optimal combination of prices, brand, and attributes to drive sales. Unfortunately we cannot capture store experimentation because of the cross sectional nature of the data.

In the fourth, fifth, and sixth columns of Table IV, we ran the same regressions on normalized total price, which includes shipping or tax. The regression in the fourth column compares physical and online stores.

Physical stores were now cheaper, because the sales tax on an average book was less than the cost of shipping a single book. This result is driven by our focus on the prices of a single book. If we considered bundles of books, physical stores would likely have been equally or more expensive. The regressions in fifth and sixth columns of Table IV examine the effect of product differentiation by bookstores and incorporate store dummies. Although a number of factors are significant, they still have relatively little explanatory power in comparison to store dummies.

It is useful to compare the foregoing results on the difference between physical and online channels with the Brynjolfsson and Smith study [1999] covering Feb 1998 to May 1999. We find that the two channels had the same unit prices and that the physical channel had lower total prices, whereas they find that the Internet had lower unit and total prices. These disparate findings can be accounted for by differences in the samples of books and stores, the weighting of samples, and the treatment of shipping costs and the opportunity cost of time. Both samples have a mix of bestsellers and nonbestsellers, but their nonbestsellers were chosen to ensure that most physical and online stores carried them, making it more likely that these books were discounted online. There may also be some compositional effects in the Brynjolfsson and Smith sample, because not all stores in their samples carried all books, making the comparisons of means difficult to interpret. The physical channel baselines were different as well, because we only focused on large chains (Barnes and Noble and Borders) whereas they considered a much broader range of physical stores. These stores had higher average prices than the major chains. Thus, their books were more likely to be discounted on the Internet and the physical baseline was higher, making it more likely that they would find lower prices in the Internet channel.

Choices of whether to weight Internet prices by indirect measures of sales also influenced the results. Our comparisons are unweighted, whereas they present both weighted and unweighted, but focus on the weighted. In their sample, the differences between the two channels were larger for weighted averages (basically a measure of Amazon's price) than for unweighted averages, so weighting made that channel appear even more favorable. Weighting by sales would, if anything, have made the physical channel look marginally better in our sample, because Amazon's price was slightly above the average for the Internet channel.

When comparing total price, Brynjolfsson and Smith prorated shipping to reflect the fact that shoppers typically purchase three books at a time and included a measure of the cost of a trip to the store (\$0.53). We assume that shoppers purchase one book at a time and that going to the store is free. The relative merit of the two sets of assumptions is an open question. Had we used their assumptions, physical and Internet stores would have the same total as well as unit price.

V. PRICE CONVERGENCE ON THE INTERNET

The two predictions of the Bertrand model are: (i) all firms will charge the same price and (ii) price will fall to cost. Prices had clearly not converged. Table VI documents that all stores were not charging the same price. Table VII reports a number of measures of price dispersion for the four categories of books that we examined. The standard deviation as a fraction of average price ranged from 0.10 for hardcover random books to 0.18 for paperback bestsellers. The difference between the highest and

TABLE VI
RELATIVE RANKING OF STORES BASED ON UNIT PRICE

<i>Bookstore</i>	<i>Norm. Unit Price</i>	<i>NUP Ranking</i>	<i>Norm. Total Price</i>	<i>NTP Ranking</i>
1. 1Bookstreet	0.94	3	1.14	7
2. A1 Books	0.80	12	1.09	11
3. Amazon	0.89	4	1.17	4
4. Barnes & Noble (physical)	0.86	6	0.93	14
5. Barnesandnoble.com	0.84	8	1.12	9
6. BCY Bookloft	0.81	11	1.17	3
7. Bookbuyers Outlet	0.87	5	1.14	6
8. Books.com	0.83	10	1.12	10
9. Borders (physical)	0.83	9	0.90	15
10. Borders.com	0.78	13	1.06	12
11. Kingbooks	0.86	7	1.14	5
12. Powells	1.10	1	1.54	1
13. Shopping.com	0.76	15	1.01	13
14. Spree	0.77	14	1.13	8
15. Wordsworth	0.95	2	1.23	2
<i>Average</i>	<i>0.86</i>		<i>1.13</i>	

Notes: Reported prices are the sum of the coefficients of the store dummies and the constant from the regressions reported in Table IV. The omitted store was 1Bookstreet.

TABLE VII
MEASURES OF PRICE DISPERSION

	Hardcover, Bestseller	Hardcover, Random	Paperback, Bestseller	Paperback, Random
St. dev. of unit price	3.40	3.69	2.19	3.32
St. dev. as fraction of avg. unit price	0.15	0.10	0.18	0.14
Diff. min and max unit price	13.40	9.63	8.81	8.03
Diff. as fraction of avg. unit price	0.60	0.27	0.73	0.38

Notes: Unit price is the purchase price listed by a store. Standard deviation (St. dev.) was computed by book for unit price and as a percentage of the mean unit price for that book and then averaged across books. Diff. min and max unit price is the difference between the minimum and maximum unit prices for a book was computed by book for unit price and as a percentage of the mean unit price for that book and then averaged across books.

lowest price as a fraction of average price ranged from 0.27 for hardcover random books to 0.73 for paperback bestsellers.¹²

Without extremely detailed information on cost, it is difficult to document whether prices have fallen to cost or not. The average book in our sample sold for 85 percent of the publishers' recommended price. And the least expensive of the categories, hardcover bestsellers, sold for 72 percent of the publishers' recommended price. Online bookstores face very similar wholesale prices for books, usually 45–55 percent of the publishers' recommended price.¹³ Order fulfilment costs are typically reported to be around 15 percent, and holding costs may be significant for less popular titles. Thus, some of the lowest priced stores may be charging prices that are at or close to cost. Many other stores appear, however, to have been charging prices that are above cost.

Analysis by Clay, Krishnan, and Wolff [2001] of a larger data set covering more books, types of books, and stores from August 1999 to January 2000 confirms the above findings. Prices fell between April 1999 and August 1999, as many stores increased their discounts on bestsellers to 50 percent. Between August 1999 and January 2000, prices were stable and measures of price dispersion such as standard deviation declined, but only slightly.

VI. PRICE AND NON-PRICE STRATEGIES

In this section, we explore firms' price and non-price strategies in greater detail. The variability in pricing across categories of books and in shipping costs suggests that firms adopted specific strategies with respect to these.

The average normalized unit price for each store and its ranking are presented in Table VI. This price was obtained by adding the coefficient on the store dummy in the third column of Table IV to the constant in that column. The store ranked number 1, Powells, had the highest prices and the store ranked number 15, Shopping.com, had the lowest prices. A shopper who switched from Powells to Shopping.com would have saved \$6.71 on average for a single book. The physical stores for Barnes and Noble and Borders were ranked numbers 6 and 9; their prices differed by 3 percent. The physical stores of the major chains were more expensive than their .com counterparts. For Barnes and Noble, the price difference was 2 percent and for Borders it was 5 percent.

¹² Brynjolfsson and Smith [1999] find average differences of \$5.98 or 33 percent, with prices for some books differing by as much as 47 percent.

¹³ As a result of lawsuits in the book industry, all players with even minimal volume faced very similar wholesale prices for books in the spring of 1999. Prices may not have been identical due to factors such as return rates, but otherwise all stores faced the same prices for books. (Conversation in November, 1999, with Y. S. Chi, COO, Ingram Book Group, Friedman [1999], and Bookweb.org [1999]).

The biggest variable with respect to pricing seemed to be how aggressively firms chose to discount bestsellers, since discounts on random books were typically zero. Most stores offered discounts of 30 percent on hardcovers and 20 percent on paperbacks. Eleven of the 15 stores, including Barnes and Noble and Borders physical and online stores offered these prices. Shopping.com and books.com offered discounts of 40 percent on both hardcover and paperback bestsellers. What this suggests is that the physical stores and many online stores offered low prices on bestsellers to attract customers to the store with the hope that they would purchase additional books at full or nearly full price.¹⁴

Some stores' prices may have been more competitive than they seemed. For instance, Powells, the most expensive store in the sample, sells both new and used books. Used books are its primary focus, so Powells may have offered new books at high prices to make its prices on used books appear more attractive. Other stores such as Wordsworth, 1Bookstreet.com, Barnesandnoble.com, and Spree offered loyalty programs.¹⁵ The complexity of these programs makes it difficult to compute the exact magnitude of the discount, although three percent would appear to be an upper bound.

Amazon was among the most expensive stores and did not offer a loyalty program. It is interesting to compare Amazon to two other well-known stores—Barnesandnoble.com and Borders.com. Amazon was 5 percent more expensive than Barnesandnoble.com and 11 percent more expensive than Borders.com. The premium that Amazon commanded suggests either that Amazon had succeeded at differentiating its product relative to its two main competitors or that the difference was temporary. Data from August 1999 to January 2000 supports that latter argument. During this later period, Amazon, Barnesandnoble.com and Borders.com followed nearly identical pricing policies.

The average normalized price including shipping or tax for each store and its ranking are presented in the third and fourth columns of Table VI. It is interesting to note the changes. Although Powells still had the highest prices, the Barnes and Noble and Borders physical stores now had the lowest prices. A shopper who switched from Powells to a Borders physical store would have saved \$15.46 on average for a single book.

¹⁴In the *Wall Street Journal* (Rose and Quick [2000]), Steve Riggio, vice chairman of Barnesandnoble.com states, 'best sellers, which make up only 3 percent of sales, have long been treated as loss leaders'.

¹⁵Our expectation was that stores with loyalty programs would also have higher prices, both because loyalty programs represent a discount and because they make customers less price sensitive. Stores may also use loyalty programs for other purposes such as to obtain demographic information about customers or to improve price discrimination, by only offering coupons to marginal buyers.

Table VI provides evidence that some stores were offering low unit prices and high shipping costs. Ignoring the physical stores, we would expect the online stores to have the same relative ranking if they all charged the same price for shipping. BCY Bookloft's ranking increased, however, from 11 to 3, and its price rose from 5 percent below average to 4 percent above average. Spree's ranking also increased, from 14 to 8, and its price rose from 9 percent below average to average. Thus, at least two stores—Spree and BCY Bookloft—appear to be following the low unit price, high shipping cost strategy. There are a couple of possible rationales for this. The stores may believe that customers focus on unit price and not total price. Alternatively, the stores may be trying to attract customers who were willing to pay a higher fixed fee (shipping) in order to get lower unit costs, because those customers make sizeable purchases. 1Bookstreet's ranking fell from 3 to 7 and its price fell from 8 percent above average to 1 percent above average. Thus, 1 Bookstreet seemed to be following the reverse strategy, namely the high unit price and low (free) shipping. The rationale for this approach is less clear, although it might be that their customers preferred to order one book at a time.

Firms' non-price strategies at this stage in the evolution of the Internet are of interest. In equilibrium, one would expect to see firms that offered more amenities charging higher prices. In the spring of 1999, however, this relationship was tenuous at best. Amazon charged higher than average prices, and this appears to be reflected in the significance and signs of factors 3 and 4 in both the unit and total price regressions. Factor 1, which includes the most commonly offered amenities, had no effect on price in the unit price regression and a negative and significant effect in the total price regression. Factor 2, which included reminders, reviews, and loyalty programs, had a small and significant negative effect in the unit price regression and a larger and significant positive effect in the total price regression. Thus, offering some amenities seemed to lead to lower total prices (factor 1), while offering other amenities seemed to lead to higher total prices (factor 2). Overall, although firms seemed to be experimenting with differentiation, store attributes had relatively little power to explain price.

VII. CONCLUSIONS

Many observers expected ease of comparison shopping on the Internet to drive firms to charge the same prices for mass produced goods. Severe price competition was also expected to drive down prices in the Internet channel relative to the physical channel. Neither prediction was supported by our data from April 1999. We found similar average prices online and in physical stores and significant price dispersion online, evidence that firms were not charging the same prices.

Examining firm level price and non-price attributes highlights a number of interesting points and provides some indirect support for the prediction that firms will seek to differentiate themselves. Almost all firms were offering 30 percent off of hardcover bestsellers and 20 percent off of paperback bestsellers. Two stores, Shopping.com and books.com, were more aggressive, with 40 percent off on both. Most stores opted to charge \$3.00–4.00 for the first book and \$0.75–1.00 for each additional book. Two stores, BCY Bookloft and Spree, offered low prices and high shipping costs. Interestingly, one store, 1Bookstreet, offered high prices and low shipping fees. Firms seemed to be experimenting with other means of differentiation such as offering reviews, recommendations, loyalty programs, and other amenities. Regression results suggest that these amenities were not strongly related to price. The premium that Amazon was able to command relative to Barnesandnoble.com and Borders.com suggests that it had succeeded in (at least temporarily) differentiating its product.

A drawback of the current study is that it examines the industry at a given point in time. Clearly existing firms' strategies are evolving and new firms are entering. We have built agents to automate data collection for a larger number of books and bookstores over time. This much larger data set will allow us to track the evolution of the industry.

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