

## **Pricing, Market Efficiency, and Consumer Choice in Internet Commerce**

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Sales of consumer products via the Internet by U.S. firms continue to grow rapidly. U.S. retail e-commerce sales for the fourth quarter of 2000 totaled \$8.69 billion, an increase of 67.1 percent from sales in the fourth quarter of 1999 and 35.9 percent from the third quarter of 2000. These e-commerce sales increases are in sharp contrast with the growth of U.S. total retail sales (including e-commerce sales). Total retail sales increased only 4.2 percent from the fourth quarter of 1999 to the fourth quarter of 2000 and 5.4 percent from the third quarter of 2000 to the fourth quarter of 2000. The sustained strong growth in retail e-commerce sales is one indication that consumers are becoming less reluctant to make purchases online.

Even with the much more rapid growth of retail e-commerce sales than total retail sales, the share of total retail sales accounted for by e-commerce transactions reached only 1.0 percent in the fourth quarter of 2000. However, if recent growth trends are sustained, the Internet will, ultimately, become of considerable importance to consumers as an alternative to traditional brick and mortar retailers, and a significant component of total retail sales. The structure of the retailing sector is likely to continue to evolve, but with the longer-term structure of retail distribution being unpredictable at present. However, it does seem likely that there will be some convergence of traditional retailers and Internet sellers over time with many firms making sales via both forms of distribution.

Several questions are raised by rapid growth of consumer product sales via the Internet. First, why are Internet sales growing so rapidly? One hypothesis frequently suggested is that consumers are attracted to Internet sellers by lower prices than are available

from traditional retailers. A second unanswered question concerns the potential for expansion of Internet sales. For a significant number of consumers, anecdotal evidence suggests that the Internet already has largely replaced traditional retailing for purchases of some products and use of the Internet for purchases by these consumers may account for the rapid growth of Internet sales to date. Whether or not large numbers of consumers will come to utilize the Internet for purchases is not clear at present. Further, whether or not sales of a large variety of consumer products will ultimately be made via the Internet or whether sales by this channel of distribution will remain limited to a small number of products remains an open question.

One effect of the growth of sales via the Internet is an increase in the number of sellers from which consumers are able to choose in making purchases. The increased choice results in a number of additional questions about whether the existence of Internet sellers will lead to increased market efficiency in retail markets. Market efficiency is maximized when prices are set equal to both sellers= minimum costs of production (production efficiency) and equal to sellers= marginal costs (allocative efficiency).

Smith, Bailey, and Brynjolfsson (1999) identify four dimensions of Internet market efficiency:

**Price Levels:** Are the prices charged on the Internet lower?

**Price Elasticity:** Are consumers more sensitive to small changes on the Internet?

**Menu Costs:** Do retailers adjust their prices more finely or more frequently on the Internet?

**Price Dispersion:** Is there a smaller spread between the highest and lowest prices on the Internet?

This paper considers two of these four dimensions of Internet market efficiency: price levels and price dispersion.

In terms of price levels, the fundamental question to be answered in assessing the market efficiency impacts of growing e-commerce sales is whether prices charged by Internet sellers are

lower than those charged by traditional retailers. An additional, related question is that if prices charged by Internet sellers are lower, will the retailing sector evolve to a more competitive structure with greater price homogeneity?

### **Review of previous studies**

One factor frequently cited as a reason to believe that market efficiency will be enhanced as a result of increased sales via the Internet is that e-tailing firms are anticipated to have lower costs, and thus will be able to offer lower prices than conventional retailers. A second reason why market efficiency may be enhanced by the existence of Internet sellers is that search costs are reduced. Economic theory indicates that high search costs for sellers leads to prices at above marginal cost levels (Hotelling 1929 and Salop 1979). If consumers are able to more easily ascertain prices via the Internet than via traditional retailers, then search costs are reduced which will lead to lower prices (Bakos 1997).

Smith, Bailey, and Brynjolfsson (1999) provide an excellent review of studies addressing the price level and price dispersion dimensions of Internet market efficiency. Consequently, only selected aspects of previous studies are included here.

Bailey (1998) analyzed Internet market efficiency by comparing prices of books, compact discs, and computer software sold via the Internet and through traditional retailers during 1996 and 1997. He found that prices for products sold via the Internet were higher than those available from traditional retailers. He argued that the higher prices observed via the Internet could have been the result of market immaturity.

Brynjolfsson and Smith (2000) analyzed price levels for books and compact discs sold through the Internet and conventional channels in 1998 and 1999. They found that prices for Internet sellers, even after taking into account costs for shipping, handling, delivery, and sales taxes, were from 9 percent to 16 percent lower than from conventional outlets. The methodologies used by Brynjolfsson and Smith differed from those used by Bailey so that result of the two studies cannot be compared directly. However, Brynjolfsson and Smith do note that one possible explanation for the

difference in results obtained might be that Internet markets became more efficient between 1996 and 1999.

Price dispersion is a second dimension of Internet market efficiency identified by Smith, Bailey, and Brynjolfsson. In a perfectly competitive market, there are a large number of buyers and sellers, products are perfectly homogeneous, no entry barriers exist, and buyers have perfect information about the prices offered by all sellers. In such a market, all sellers are price takers who accept the prevailing market price. No seller has any incentive to lower price since all other sellers would immediately match the reduced price with the resulting reduction in total revenue. In addition, any attempt by a single seller to raise price would result in zero sales since all buyers would turn to other sellers. The lack of entry barriers means that existence of any economic profit by sellers in the industry will attract new entrants with the result that price is driven down to the minimum average cost of production and equal to marginal cost. Market efficiency is maximized under these conditions.

Since buyers typically do not have perfect information about prices of all sellers, it is possible, and indeed highly likely, that sellers will charge different prices, even for homogeneous products. The existence of different prices, even among sellers of homogeneous products, is a reflection of numerous factors including sellers' overall marketing and pricing strategies. In many instances, sellers do not want to compete on the basis of price, choosing instead to compete on other qualitative terms. However, price dispersion also stems from the existence of high search costs (Burdett and Judd 1983; Stahl 1989, 1996) or as a result of consumers who do not have perfect information on prices (Salop and Stiglitz, 1977, 1982 and Varian 1980). If search costs among Internet sellers are lower than among traditional retailers (Bakos, 1997), and if consumers are more perfectly informed about price levels for Internet sellers, then it is reasonable to hypothesize that price dispersion among Internet sellers for the same product should be less than among traditional retailers of that product.

Unfortunately, the hypothesis stated above is not supported by empirical evidence to date. Both the Bailey (1998) and Brynjolfsson and Smith (2000) studies found that price dispersion

was no less among Internet sellers than among traditional sellers. The Brynjolfsson and Smith study found that price differences among Internet sellers for identical books averaged 33 percent while price differences for compact discs averaged 25 percent. The substantial differences were attributed to a variety of factors, including market immaturity and heterogeneity in seller attributes including trust and awareness.

Overall, the findings of empirical studies to date concerning the impacts of sales of consumer products via the Internet on market efficiency are quite dissimilar. The more recent findings indicate that price levels for consumer products among Internet sellers are lower than among conventional retailers. This finding is consistent with the hypothesis that the Internet market is becoming more mature with the entry of more and larger firms that are contributing to downward pressure on prices among all Internet sellers. In terms of price dispersion, empirical studies to date are consistent in finding substantial price dispersion among Internet sellers of consumer products. This finding is inconsistent with the hypothesis that growth of sales via the Internet will lead to greater market efficiency with prices approximating sellers' marginal cost and minimum average cost. The findings are also inconsistent with that of a market structure closely approximating pure competition with little dispersion of prices among sellers.

### **Description of study**

This paper is concerned with a study of prices for consumer products in four categories: (a) books, (b) compact discs, (c) grocery items, and (d) prescription drugs. The analysis is in keeping with the call of Smith, Bailey, and Brynjolfsson for additional empirical research to extend existing studies concerning the market efficiency of Internet markets. This analysis also builds on earlier studies of prices for homogeneous consumer products including books and compact discs by Bailey (1998), Brynjolfsson and Smith (2000) and, in addition, considers two additional product categories, grocery items and prescription drugs. For products in all four categories, the focus is on comparing price levels between Internet sellers and

traditional retailers along with determining price dispersion among Internet sellers, traditional retailers, and all sellers.

### **Data collection methodology**

Price data for books, compact discs, grocery items, and prescription drugs were collected for this study. These products were selected for a variety of reasons. First, in each category the products selected were homogeneous which permitted direct price comparisons among sellers. Second, all of the products selected are sold by numerous traditional retailers in the geographic area selected for analysis and are also available through multiple Internet sellers. In addition, books and compact discs were included because empirical studies of these products have been conducted previously which facilitated a comparison of results with the earlier studies.

For each consumer product category, traditional retailers were selected from four cities and towns in the central region of Contra Costa County, California. This area is approximately 25 miles east of San Francisco. The geographic area from which traditional retailers were selected was deliberately kept small. The purpose was to select only traditional retailers that represented realistic alternatives to consumers in this area. This methodology is substantially different from the Brynjolfsson and Smith (2000) study that selected retailers from geographically dispersed locations including California, Georgia, Maryland, Massachusetts, Oregon, Texas, and Virginia. While their approach resulted in a more representative measure of price levels for the United States, it may also lead to greater variance in prices among traditional retailers than if the sellers were all from the same location. Since this study is concerned with the choices confronting consumers, use of a small geographic area for analysis is desirable but does limit extrapolation of results to a broader geographic area. Still, the results obtained are considered to be representative of results in other geographic areas, but are subject to comparison with results obtained from similar studies in other areas. The seller selection process is described below and seller information is summarized in Table 1. For any single item, the number of Internet retailers shown in Table 1 may not be applicable.

**Table 1.** Summary of Retailers

<u>Category</u>	<u>Traditional Retailers</u>	<u>Internet Retailers</u>
Books	6	25
Compact Discs	5	28
Grocery items	6	2
Prescription drugs	4	6

### **Books**

The specific books selected for analysis were obtained from a list of the best-selling books in the San Francisco Bay Area that was published in the *San Francisco Chronicle* on January 14, 2001. The five best-selling fiction books were selected along with the five best-selling non-fiction books. Five traditional book retailers were selected from the four cities and towns in central Contra Costa using the Yellow Pages of the Contra Costa County Central telephone directory. Only one of the traditional book retailers listed in the Yellow Pages in the geographic area considered was a hybrid retailer that sold books both as a traditional outlet and as a seller on the Internet.

Internet booksellers were obtained by use of mySimon; an Internet based Ashopbot or comparison-shopping service. Each book was identified and mySimon produced a list of Internet sellers from which that book could be obtained, along with the price charged by the seller and any additional charges for handling and delivery. This approach was used because it was believed to result in a reasonably comprehensive list of Internet sellers, from which a typical consumer might choose, for purchase of the book in question. Use of a shopbot for comparison-shopping purposes was thought to provide a broader selection of sellers than a single buyer might obtain by checking websites of individual sellers one by one. The number of Internet sellers obtained using this procedure ranged from 2 to 22.

Prices from traditional retailers as well as from Internet sellers were obtained during a single week in order to avert problems stemming from pricing practices in the industry.

For many book retailers, prices are influenced by whether or not a book is listed on *The New York Times* list of best-selling books. For books on this list, retailers discount prices heavily. When a book is removed from the best-selling list, prices are increased to the publisher's list price. For this reason, it was important to collect price information essentially at a single point in time to ensure that any price differences observed were the result of retailers' pricing decisions at one point in time and did not reflect the influence of other factors. Collection of price data over time could result in price differences stemming from the fact that some prices were the result of discounting while a book was on *The New York Times* best-selling list and other prices could have been obtained when a book was no longer on the best-selling list. Such price discrepancies could be a source of bias in studies that collect price data over a considerable period of time.

### **Compact discs**

A procedure similar to that used for books was utilized to select compact discs used for price comparison purposes. The specific compact discs selected were obtained from the Billboard 2000, a list available on the *Billboard* website. The listing for February 10, 2001 was used to select the top ten best-selling compact discs. Four traditional music stores selling compact discs were selected from the four cities and towns in central Contra Costa using the Yellow Pages of the Contra Costa County Central telephone directory. Three of the four traditional music stores listed in the Yellow Pages in the geographic area considered was a hybrid retailer that sold compact discs both as a traditional outlet and as a seller on the Internet. As was done for books, Internet booksellers were obtained by use of mySimon, an Internet based shopbot or comparison-shopping service. Each of the compact discs selected for analysis was identified and mySimon produced a list of Internet sellers from which that compact disc could be obtained along with

the price charged by the seller and any additional charges for handling and delivery. The rationale for this approach is the same as provided previously for books and is not explained further here. Similar to the procedure used for books, prices from both conventional retailers and Internet sellers were obtained during a single week to avert any problems stemming from price differences depending on whether or not a compact disc was listed on the *Billboard* list of best-selling compact discs. The number of Internet sellers for which price information was obtained for each individual compact disc ranged from 5 to 22.

### **Grocery items**

Eight grocery items were selected for price comparison. The items were all national brand items that could be considered as homogeneous for comparison purposes across sellers. All of the products were Staples,® that is, items that consumers purchase on an ongoing basis. No fruits and vegetables, meat, or dairy products were included since price differences for such items among sellers could be considered to be partially the result of quality differences. Six traditional supermarkets were selected from the four cities and towns in central Contra Costa using the Yellow Pages® of the Contra Costa County Central telephone directory. Prices for each of the grocery items selected also were obtained from each of the two Internet sellers that operate in the central Costa County area. While price differences over time for grocery items were not considered to be as much of a problem as for books and compact discs, prices from both conventional grocery stores and Internet sellers were all obtained during the same week.

### **Prescription drugs**

The data collection strategy for this category included surveying prices for ten common prescription drugs. These are routinely prescribed by primary care, Internal Medicine specialists. There are no narcotics or otherwise highly controlled drugs in the list, and all were routinely available from both Internet and traditional retailers. Four traditional retailers were chosen in the central Contra Costa County area. Large chains dominate pharmacy retailing in this

area B either drug store chains or drug store divisions of grocery chains. The traditional pharmacies selected included two drug store chain outlets, one grocery chain outlet, and one independent pharmacy. The Internet retailers were selected to include the two largest online pharmacies, drugstore.com and PlanetRX, as well as three other Internet retailers that allow visitors to preview prices before making their purchases. These retailers were identified from a search for prescription drugs using Google, accepting sites for which retail prices were available for comparison-shopping and excluding sites that prevented comparison-shopping.

### **Empirical results**

The data collected for each of the four consumer product categories were analyzed in terms of price levels and dispersion of prices among traditional sellers, Internet sellers, and among all sellers. The first objective was to ascertain whether prices for each product are lower from Internet sellers, from traditional retailers of that product, or whether no conclusion could be drawn in terms of the lowest-price source of the product. The second objective was to ascertain and compare the magnitudes of price dispersion for each product among Internet sellers, among traditional retailers, and among all sellers of each product. Finally, potential explanations for the results obtained are discussed and implications for consumer choice among sellers considered.

All of the pricing results discussed below include any tax or shipping charges applied to the purchase. In California, food and prescription drug items are not subject to sales tax, while books and compact discs are. Internet retailers predominantly do not charge sales taxes, even for shipments to customers in states with a sales tax. The current political climate concerning state taxes for Internet sales suggests that this practice may change in the future.

Table 2 presents results by product category, comparing prices available from traditional retailers with those available from Internet retailers. Mean prices for books and grocery items were lower from Internet sellers than from traditional retailers. However, the price differences were not statistically significant. For compact discs, prices available from traditional retailers were lower than from

Internet sellers but, again, the price differences were not statistically significant. For prescription drugs, prices available from Internet sellers were lower than those available from traditional retailers and the difference in prices was found to be statistically significant at the 99 percent confidence level. Overall, prescription drugs was the only product category for which statistically significant price differences were found, with Internet sellers having lower prices than traditional retailers.

Some shoppers may take the time to find the lowest price item, even if it means visiting different retail outlets or Internet sites. To evaluate this choice, a basket of goods was constructed to determine the lowest price for each item within a product category from traditional retailers and separately from Internet retailers. Combining these lowest prices into a collection of purchases gives the results shown in Table 3.

Table 2. Comparing Mean Prices

<u>Category</u>	<u>Traditional Retailers</u>	<u>Internet Retailers</u>	<u>Two-tailed t</u> <u>Significance</u>
Books	\$21.64	\$21.12	.565
Compact Discs	\$16.55	\$16.68	.679
Grocery items	\$2.16	\$2.05	.712
Prescription	\$61.54	\$38.66	.004

drugs

**Table 3.** Lowest Price Basket of Goods

<u>Category</u>	<u>Traditional Retailers</u>	<u>Internet Retailers</u>
Books	\$158.46	\$162.45
Compact Discs	\$155.75	\$128.87
Grocery Items	\$ 16.52	\$ 16.85
Prescription	\$501.74	\$308.73

Drugs

Note: The total price of a market basket is derived as the lowest price for each item, within each type of retailer, aggregated for all individual products within a product category.

If each of the 10 books selected for this study had been purchased from the Internet seller having the lowest price, the total price of the 10 books would have been \$162.45. Purchase of each of the 10 books from the traditional retailer having the lowest price would have resulted in a total price of \$158.46. While the total price of the Amarket basket@ from traditional retailers is lower than that from Internet retailers, it is only about 2 percent lower. The usual tests to determine statistical significance are not relevant to this comparison so no additional inferences can be drawn.

Results of comparing the price of a market basket of grocery items between traditional retailers and Internet sellers is similar to that obtained for books. For compact discs, the total price of the market basket from the lowest-price Internet sellers is 17 percent lower than that available from the lowest-price traditional retailers. Total price of the market basket of prescription drugs from

the lowest-price Internet sellers was 38 percent lower than from the lowest-price traditional retailers. These results are consistent with results reported in Table 1 to the effect that, with the exception of prescription drugs, the hypothesis that prices available from Internet sellers are lower than from traditional sellers is rejected.

One test of market efficiency is the dispersion of prices among competitors. Economic theory suggests that in more perfectly competitive markets, prices are less dispersed, while in markets characterized by monopolistic competition, sellers have greater latitude to establish their own prices and thus prices may be more dispersed. Table 4 presents both the absolute value of the range of prices, averaged within a product group, and that range expressed as a percentage of the mean. The greatest dispersion occurs for books and prescription drugs, and the largest difference in dispersion between traditional and Internet retailers occurs for compact discs. Higher dispersion ranges suggest that retailers of products in these categories do have considerable latitude to set prices, perhaps as part of a promotional strategy.

**Table 4. Price Dispersion Ranges of Prices**

<u>Category</u>	<u>Mean of Ranges</u>		<u>Range as Percent of Mean</u>	
	<u>Traditional Retailers</u>	<u>Internet Retailers</u>	<u>Traditional Retailers</u>	<u>Internet Retailers</u>
Books	\$9.24	\$10.34	43%	49%
Compact discs	\$2.38	\$6.30	14%	38%
Grocery items	\$0.24	\$0.10	11%	5%
Prescription	\$21.74	\$16.60	35%	43%

\$

### **Search, Shipping, and Travel Costs**

The shopping experience in a traditional setting differs from the Internet setting in a number of ways. Three factors

involved in purchases can serve to complicate the consumer's decision:

- X Search Costs: Consumers looking for the lowest price on a retail item can engage in different price discovery strategies, which differ between traditional and Internet purchases. Generally, a price comparison among traditional retailers involves travel to competing outlets, unless prices are published in directories or advertisements. Internet purchasers can either visit competing retail web sites or they can make use of shop-bot sites that collect and report prices on comparable products.
  
- X Shipping Costs: Many Internet retailers add a shipping cost to the retail price of an item. The analysis of price differences reported above includes shipping costs in the total price. Not included, however, are the costs involved for a shopper to obtain an item by

visiting traditional retail outlets. Shipping costs for Internet items averaged:

- \$3.98 for Books
- \$3.02 for CDs
- \$1.12 for Drugs (many online pharmacies do not charge shipping)
- \$4.95 delivery fee for grocery item orders less than \$87.50 (No delivery fee was included in the price data for grocery items)

If shipping costs were excluded from prices charged by Internet sellers, prices for products obtained from Internet sellers would be reduced substantially. However, such prices would not reflect actual costs incurred by consumers in making purchases from Internet sellers.

X Travel Costs: Prices paid by consumers for purchases from traditional retail outlets are understated by the

direct costs and opportunity cost of travel to traditional stores. Consumers in a suburban setting, such as the area where these data were collected, spend money on gasoline and sometimes parking in order to shop in-person. In addition, these shopping expeditions take time, for which there is an opportunity cost. As a rough estimate of travel costs, gasoline (at \$1.80 per gallon) for a 15-mile round trip would be \$1.80 to \$2.00 depending on gas mileage of the vehicle used. The time required to drive to a shopping area in this suburban location, browse just one traditional store, make a purchase, and return home may be safely estimated at one hour. Using the minimum wage as the lowest possible opportunity cost for this trip adds \$6.50 to the cost of this purchase. This represents a total travel cost of \$8.30 to \$8.50 for a purchase from a traditional outlet. Adding this travel cost to traditional retail purchase prices results in total prices for traditional outlets that

are substantially higher than prices available from Internet sellers.

It is likely, however, that consumers shopping at traditional outlets combine several purchases in one shopping trip. This changes the calculus for the shopper, in evaluating whether to shop online or via traditional stores. For example, the data obtained in this study showed no significant difference in prices for books, between traditional and Internet outlets. If a shopper were to choose to make a trip to buy one book, the true cost of that purchase would be the price of the book (averaged at \$21.64) plus the travel costs (estimated at \$8.30) for a total cost of \$29.94. If the shopper selected two books, or a book and another item, the cost of the trip could be spread over each item, adding only \$4.15 in travel costs per item. It would take more than five items purchased in one trip, to return the costs to near equality between

Internet and traditional outlets. If a shopper could make the round trip in thirty minutes instead of an hour, it would take the purchase of three to four books to make total costs comparable.

### **Summary and conclusions**

With the exception of prescription drugs, there is no evidence in the data to suggest that prices charged by Internet retailers are significantly different from prices charged by traditional retailers.

The prescription drug results are confounded by the increasing involvement of health insurance and managed care plans in the provision of drug benefits and these plans= negotiations for favorable prices for their covered members. For a growing proportion of prescription drug buyers, out-of-pocket expenses for prescription drugs are significantly reduced by insurance coverage. This means purchases of prescription drugs at retail prices are coming to represent a much smaller proportion of total expenditures on these products.

There is considerable price dispersion among both traditional retailers and Internet sellers for each product category. As noted previously, this result is inconsistent with the notion of a competitive market structure and suggests that both traditional retailers and Internet sellers have substantial latitude to establish their own prices based on cost and competitive considerations. From an economic perspective, these results suggest either differences in data sampling or a shift in market dynamics. Though one cannot dismiss the first, the second line of thinking is intriguing.

As recently as two years ago, many Internet retail outlets were pursuing low-price strategies as a means of attracting consumers and boosting their market-share, if not profits. Internet access among households and Internet buying by households was not as prevalent in 1998 and 1999 as it is today. Internet retailers needed to bring first time customers to their sites, and then develop customer loyalty through pricing, ease of use, and other techniques of engagement. Today, investors have spoken very clearly about their desire to see earnings and earnings growth, rather than merely revenue growth from e-commerce businesses. As a result, there is

growing pressure on Internet retailers to raise prices as a step towards profitability. For traditional sellers, the growth of online purchasing may have registered as development of a more intense competitive market, fostering more aggressive pricing tactics as a defensive move.

Consumers may have adapted their purchasing habits in the last two years as well. Early adopters of the Internet as an alternative distribution channel may have viewed their online shopping as experiments, for small numbers of items. As the breadth and diversity of products available online has increased, consumers may have incorporated these options into their standard shopping strategies. A shift in demand towards Internet retailers would allow monopolistically competitive Internet sites to gradually raise prices over time.

Search and travel costs were discussed earlier in this paper. Hidden or indirect costs such as search time, travel time for shopping, delayed gratification while shipping is completed, and direct costs for transportation may all affect price comparisons between traditional outlets and Internet outlets. In addition, as Brynjolfsson and Smith (2000) noted, there is evidence of

monopolistic competition among Internet sites, citing Amazon.com as a prime example. Though the number of Internet retailers has increased substantially over the last two years, there has been consolidation as well, and heavy investing in name and brand recognition. As noted above, monopolistic competition can foster increased customer loyalty, exposing individual Internet retailers to a downward sloping demand curve, and permitting each such seller greater latitude to establish prices.

A question that is raised by the several studies that have analyzed price differences between Internet sellers and traditional retailers is why, frequently, no significant price differences are found. Overall, it is probably not surprising that prices of products sold via the Internet are not significantly lower than prices available for the same products sold by traditional retailers. Since distribution costs account for only a relatively small percentage of total costs for most products, cost differences for different channels of distribution would have to be extremely large to yield any significant difference in total costs of a product. The bulk of any product's cost stems from costs incurred in producing the product

and these costs are largely the same, regardless of the method of distributing the product to the final consumer. That is, Internet sellers and traditional retailers face nearly identical prices for the products that they purchase for resale. Differences in prices at which products are sold to consumers, then, reflect only differences in operating costs and pricing strategies employed by the different types of sellers. Since the percentage of a product's total cost accounted for by distribution costs are relatively small, differences in prices to the final consumer by Internet sellers and traditional retailers are likely to be relatively small also. Price discounts offered from time to time by different sellers to boost sales and gain market share might be expected to contribute to greater price dispersion, at least for short time periods. Such increased price dispersion could be protracted if sellers in a non-traditional method of distribution, such as sales via Internet sellers, are challenging firms in a traditional distribution system, and are selling at low prices for a time in an attempt to attract consumers and gain market share rapidly. This may explain why some of the early price comparison studies found

prices offered by Internet sellers to be lower than those offered by traditional retailers.

Results of this study indicate that there are not statistical differences in prices for books, compact discs, and grocery items purchased through Internet sellers compared with traditional retailers of these products. These results are consistent with the argument made above. However, results of this study indicate that prices for several types of prescription drugs are lower from Internet sellers than from traditional drugstores. Some further explanation is required for this observation.

As noted previously, books, compact discs, and grocery items are products for which consumers are able to easily compare prices among sellers. Price comparisons for prescription drugs among traditional retailers are more difficult since prices are not posted as they are for the other three types of products. Obtaining prices for prescription drugs from traditional retailers requires consumers to make a personal inquiry, either by telephone or in person. For many people, inquiring about price may be a source of personal embarrassment, inhibiting price comparisons. In

addition, prescription drug purchases frequently are made with some sense of urgency, again inhibiting price comparisons and limiting price comparisons among sellers, especially limiting any consideration of Internet sellers due to the increased time required to submit an order and for the product to be shipped. Still further, there may be some greater sense of loyalty by consumers to a particular traditional retailer for prescription drugs than there is for the other three products included in this study. Overall, consumers' lack of ability to easily compare prices, especially among traditional retailers, probably alters the nature of competition among these sellers and results in reduced price competition and higher prices than if price comparisons could be made more easily.

In contrast, price comparisons among Internet sellers are relatively easy, resulting in significantly lower prices and less price dispersion. These factors, in conjunction with the likelihood that retailing costs account for a larger percentage of the price of prescription drugs than for the other products considered, may account for the result that prices for prescription drugs from Internet

sellers are statistically lower than from traditional drugstores. Clearly, however, additional research is required to test these hypotheses.

Overall, distribution costs and operating margins currently are receiving increased scrutiny by e-commerce sellers. This is in keeping with signals from the investor community for growth of earnings rather than just market share and revenue growth. In addition analysts and e-commerce consultants now have a better understanding of the importance of choosing the right product mix to offer online - a mix that includes higher margins on each product and relatively low shipping costs. Of the four product categories in this study, three met this test: books, compact discs, and prescription drugs. The fourth, grocery items, probably does not meet the above requirement, given the traditionally low margins in the grocery industry and high distribution costs. Recent reports of financial and management problems for WebVan and PeaPod may give further credibility to this reality. The importance of product choice for Internet sellers is illustrated by the bad experience of Pets.com, which sold large bags of dog food, each of which had low margins and high shipping costs.

An additional consideration in assessing the future direction of price differences between traditional retailers and Internet sellers concerns the collection of sales taxes on e-commerce transactions. Currently, states generally don't have the authority to impose sales taxes on Internet firms and other out-of-state retailers. This is the result of two decisions by the U.S. Supreme Court and a moratorium imposed by the U.S. Congress in 1988 on any new taxes on Internet transactions. The rationale for the Supreme Court's decision is that if states could tax business activity beyond their own borders, such actions could restrict interstate commerce, and only Congress has the ability to regulate interstate commerce.

The Congressional moratorium on new taxes on Internet transactions is scheduled to expire in October 2001 and a number of states are attempting to devise a means of taxing e-commerce transactions that will be able to gain general acceptance. The stakes are high since it is generally estimated that states will lose about \$2 billion in sales tax revenue in 2001 and that losses will increase to more than \$5 billion by 2004. One of the difficulties in coming up with such a plan to tax e-commerce sales is making the

large variety of local tax systems more uniform. At present, there are approximately 7,500 state, county, city, and special tax districts in the United States, each of which has its own rules. A coalition of 32 states is working to implement a Streamlined Sales Tax Project that incorporates simplified product definitions and tax rates.

Imposition of a sales tax on Internet sales would result in significant erosion of any price advantage that Internet sellers currently have. In addition, shipping costs for Internet sellers are likely to continue rising, further eroding any cost advantages held by Internet sellers, or contributing to their price disadvantage. Taken together, these factors suggest that Internet sellers will be affected adversely by likely cost increases over the next few years that will result in a loss of competitive position vis-à-vis traditional retail sellers.

The existence of Internet sellers results in an increase in the number of sellers from which consumers can choose in making purchase decisions. For many consumers, the availability of Internet sellers results in a reduction of search costs in determining the lowest-cost seller of an item, and thus provides an increase in

convenience, but not necessarily a lower price than could be obtained from traditional sellers. From an economic efficiency perspective, the existence of Internet sellers is a positive development, resulting in an increase in the number of firms from which consumers can choose, and increased emphasis on price competition.

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