

December 19, 2002

Online Sales Offer Fresh Look at Economy

By HAL R. VARIAN

ONLINE shopping was supposed to revolutionize the way we buy. That hasn't happened quite yet, but economic research on online commerce is booming.

According to Census Bureau estimates, online purchases in the United States totaled more than \$11 billion in the third quarter this year, up 34 percent over the period in 2001.

Despite this impressive growth, online sales are still tiny compared with total retail sales, which were \$827 billion in the third quarter.

Though online sales are not yet important economically, they are important to economists because they offer a rich source of economic data. It is much easier to collect online prices than offline prices, and with a little bit of ingenuity, you can even harvest data about costs and sales volume, information that is awfully hard to come by in the real world.

The economists Michael R. Baye and Patrick Scholten of Indiana University and John Morgan of the University of California at Berkeley have collected data from online price-comparison sites for over two years. They offer summaries of this information at www.nash-equilibrium.com.

Take a look, for example, at their measure of "Internet competitiveness," an aggregate statistic of various indicators of how competitive online prices are.

For the last year, prices advertised online have been increasing, so competitiveness has declined. But in the last few weeks competitiveness has spiked, perhaps because of an attempt by online merchants to clear out inventories of unsold products.

Another interesting statistic is "relative dispersion," which measures the variation in advertised prices. This measure has grown significantly in the last two years and now stands at about 11 percent. This means that about 32 percent of the advertised prices for a given item vary by more than 11 percent from the average price.

Why is the dispersion of advertised prices so high online? Glenn Ellison and Sara Fisher Ellison, both economists at M.I.T., have shown that "bait and switch" is a common practice among Internet sites.

A computer parts site may advertise a memory module at a rock-bottom price. But when potential buyers click through to the site, they find that it is an inferior model and that the price they must pay for a standard model is much higher.

One of the Ellisons' findings is that the online world can be incredibly competitive for commodity items. Their estimates imply that if a vendor of a low-quality memory module raises the price 1 percent, it could find that sales drop as much as 40 percent. It's rare to see such intense competition for products in the real world.

Judith A. Chevalier and Austan Goolsbee, professors at the Yale School of Management and the University of Chicago Business School, respectively, have looked at a particular case of online competition: Barnesandnoble.com versus Amazon.com.

Each seller ranks titles by total sales on its Web site and reports actual book sales to publishers. Some publishers, like the computer book publisher O'Reilly & Associates, have used these reports to determine the relationship between rank and actual sales.

Professors Chevalier and Goolsbee draw on such estimates, as well as other sources, to determine actual sales for particular books at the two online booksellers.

The data on actual sales can be used to estimate how demand responds to price changes. The authors find that a 1 percent price increase at [Amazon](#) reduces sales there by about 0.5 percent, but a 1 percent price increase at [Barnes & Noble](#) means a 4 percent sales decline — eight times as large.

The difference in price responsiveness is striking. It appears that Amazon's investment in building customer loyalty has paid off. Of course, all that investment in customer loyalty is expensive, and loyalty doesn't necessarily translate directly into profit.

The impression one gets from looking at online consumer behavior is that there are two types of online consumers: some relentlessly shop for the lowest price, while others are happy to buy at a reliable brand-name merchant. Faced with these two groups of price-sensitive and price-insensitive consumers, sellers will find it in their interest to vary their prices. This allows them to sell, on average, at a high price to the price-insensitive group, while still competing for the price-sensitive customers.

The Baye-Morgan-Scholten team has developed some models of this sort of competition, based on earlier models of sales and other forms of price promotion. I wrote one of the early papers in the literature, in 1980, and it has been gratifying to see this work resurrected in recent years.

This experience shows what I have long believed: you don't need a new economics to understand the "new economy." Many of the phenomena that are unfolding now in online markets have their parallels in the real world.

What has changed are the transaction costs. Searching for the lowest price used to be a costly activity; now it can be performed automatically by shopbots. Changing prices used to be costly for merchants, but now it can be done with a keystroke.

In the first instance, this makes markets for commodity products, like memory modules, much more competitive. But by the same token, it also leads sellers to invest in finding ways to differentiate their products through their personalized services, policies on returns, services like recommendations and one-click shopping, and the like. Consumers who find these services valuable buy from the sites that provide them, while other, less demanding shoppers buy at bare-bones sites that offer low prices.

The same economic forces that lead to premium and discount sellers in the offline world are at work in the online world. But the differences in transaction costs make the price differences both more extreme and easier to observe, a result that is a great boon to economists who study retail behavior.