Some Economics of Internet Retail

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The U.S. retail sector employs approximately 15 million workers.

The stock market history of e-retail has amazing boom and bust cycles. Amazon's value reached $35 billion in 1999, fell to $3 billion in 2001, and climbed back to $25 billion in 2003.

The sales history of e-retail is very different. Sales have grown fairly steadily at about 25% per year since 2000. E-retail sales are approaching $100 billion per year.

The growth of e-retail brings up lots of questions:

- How large will the e-retail be?
- Will e-retail be profitable?
- How will the growth of e-retail affect traditional retail?
- What can we learn from the e-retail experience about other industries?

Basic Thoughts

As in any industry we need to think about costs and demand characteristics.

The eventual size of the e-retail sector will be greatly affected by the level of costs relative to traditional retail.

Various aspects of demand are also important:

- Profitability and investment requires $p > mc$. Will demand be sufficiently different from the Bertrand model to let firms avoid marginal cost pricing?
- The degree of substitutability between e-retail and traditional retail will greatly affect how the less efficient format fares.

E-retail Competition

One factor driving the 1999-2001 collapse in e-retail stocks was a growing realization that comments about the promise of "frictionless commerce" were internally inconsistent. With no frictions, prices fall to marginal cost. E-retail won't be highly profitable. The investments that Amazon, Webvan, e-toys, etc. were making could not be recouped.

Fear of frictionless commerce was spurred by the growth of internet price search engines: Dealtime, Pricewatch, Pricescan, Shopper, Kelkoo, Bizrate, Sidestep, etc.

"Search, Obfuscation, and Price Elasticities on the Internet"

Sara Fisher Ellison and I use the "Pricewatch Universe" to explore how search technologies affect demand and e-retail markups.

We note that it is not at all obvious that Internet will eliminate search frictions and drive price down to cost.

- The equilibrium level of search frictions is determined in a balance-of-power game. Search engines want to reduce search frictions, but firms are equally interested in maintaining some frictions.
- The Internet facilitates obfuscation in a number of ways:
  - personalized prices
  - nonstandard terms of trade
  - proliferation of products and offers
  - add-on pricing
- Obfuscation is ubiquitous on Pricewatch.

Data

To examine demand and markups empirically we put together several data sources.

1. We downloaded price data from Pricewatch every hour for over a year. We recorded prices from a dozen Pricewatch categories: 128MB PC100 memory modules, 128MB PC133 memory modules, 256MB PC100 memory modules, 650MHz AMD Athlon CPUs, etc.
2. We obtained sales data from a private firm that operates several computer parts websites. Websites A and B regularly sell memory modules. Websites B and C regularly sell CPUs. We have sales data for approximately one year from mid-May, 2000 to mid-May, 2001. We have the data in real time at the level of the individual order.
3. We obtained acquisition cost data from the same retailer. We use this to assess markups.

Some Facts

1. The demand for products indexed by Pricewatch is extremely price-sensitive. A 1% increase in price leads to a 25%-40% reduction in demand.

   The markup formula $\frac{p-c}{p} = -\frac{1}{\epsilon}$ suggests 3% equilibrium markups. This is very low – Walmart's SGA costs are 16% of sales.

2. Our firm's gross margin on memory modules is about 12% on average. This is sufficient to let an efficient low-advertising firm survive.

How is Obfuscation Raising Markups? Part 1

Firms' obfuscation strategies appear to be successful in limiting consumer knowledge.

- Comparing sales of the multiple websites run by the firm that provided us with data, we see that the vast majority of purchases of (low-quality) indexed products are through the lower-priced website.
- In contrast, other products are **not** more likely to be bought from the lower-priced website.
- The nontrivial average markup is entirely attributable to high markups on the "other products."

How is Obfuscation Raising Markups? Part 2

Why don't firms compete away the rents they earn on higher products by charging lower prices for indexed products, i.e. using them as loss leaders?

Our finding on this is:

Firms cutting prices face an adverse selection problem.

- When in the tenth lowest-price position on the Price-watch screen, our firm's websites talk 65% of their customers into buying a higher-markup product.
- When in the lowest-price position, this drops to 37%.

"Cheapskates" are analogous to sick people. The desire to avoid attracting cheapskates deters firms from price-cutting. I develop this argument further in "A Model of Add-on Pricing," *Quarterly Journal of Economics* 2005.

Other Big Issues

I'll talk more quickly about other important factors affecting e-retail.

1. Costs

2. Substitution between e-retail and traditional retail.

A Brief History

The traditional retail sector in the U.S. has undergone several transformations. Costs appear to have played an important role:

- 1880's. Retail is mostly small firms in small towns.
- 1890's. Sears first full-length (532 page) catalog appears in 1895. By 1906 Sears moved into "the largest commercial building in the world."
- 1920's. Chain retail. Sears goes from 1 store to 400. It's retail sales surpass its catalog sales.
- 1970's. Walmart reaches $1 billion in annual sales faster than any other retailer: it is 17 years old and has 276 stores.
- 2000's. Walmart annual sales reach $300 billion. It employs 1.7 million workers.

  Amazon makes $1 billion in sales in its 4th year.

  Total e-retail sales approach $100 billion.

Costs - Lessons from Balance Sheets

Many of the shifts in traditional retail are easily understood in light of accounting data on retailer's costs.

Firm	SGA costs/Sales
Walmart	16%
Sears	25%
Federated	36%
Sharper Image	47%
Lands End	47%

A second important factor in the rise and fall of Amazon has been changing views of costs: is e-retail more like the Sears catalog or Walmart?

- In the 2nd quarter of 2000 Amazon's SGA costs were 39% of sales (and it had 39% in other costs too.)
- In 2002 Amazon's SGA costs were 23% of sales.

E-Retail and Traditional Retail

In "Tax Sensitivity and Home State Preferences in Internet Purchasing," Sara Fisher Ellison and I exploit another feature of our Pricewatch data (and U.S. taxes) to explore substitution between online and offline retail.

- In the U.S. traditional retailers charge sales taxes. These are typically about 6%. They vary by state (and within state). Some states have no sales taxes. In others the rates are over 8%.
- Sales by small internet retailers to out-of-state purchasers are *de facto* tax free.
- Pricewatch's price lists include the state in which each retailer is located. Our quantity data is at the consumer-level and includes each consumer's address.
- Pricewatch prices react very quickly to wholesale price fluctuations.

Tax Sensitivity ...

Results

We look for evidence of online-offline substitution by looking at how online sales vary with the gap between online and offline prices. We look separately at several sources of variation.

- In state-level aggregate sales regressions we find that e-retail sales are substantially affected by sales taxes. Consumers in states with high sales taxes buy more on the Internet. The effect is larger for more expensive products. For the products we study, taxing online sales might reduce online sales by 25%. This suggests substantial online-offline substitution.
- We find little evidence of consumers' reacting to the transitory gaps between online and offline prices that result from traditional retailers' updating prices less often.

Conclusions

1. Given the apparent cost structure of e-retail it can survive as more than just a niche business.
2. Whether search technologies will substantially reduce frictions in the future is not clear.
3. Add-on pricing may play a key role in allowing firms to survive and invest if it does. It may also be an important factor in explaining how many traditional firms survive.
4. Online and offline retail stores appear to be close substitutes in the sense that market shares will shift with general price differences. Consumers appear have limited price information, however, when making individual purchases.