Add-ons as an Obfuscation Strategy on the Internet

Sara Fisher Ellison
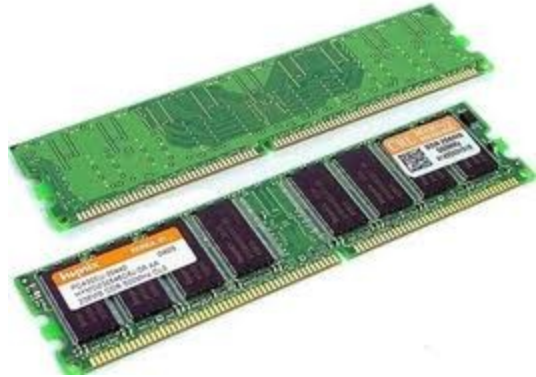
MIT

- Talk today based mostly on

  "Search, Obfuscation, and Price Elasticities on the Internet," Ellison and Ellison, *EMA* 2009

- Will also touch on

  "A Model of Add-on Pricing," Ellison, *QJE* 2005

Motivation for E&E

- Wanted to know how retailers responded to the advent of low-cost price search
  - Chose an internet industry where price search had just become very cheap and easy through a price search engine
  - Effect of internet technologies on search frictions not unambiguous---noticed that firms engaged in add-on pricing strategies to escape the Bertrand paradox

- Interested more generally in how add-on pricing strategies affected demand and competition

The Pricewatch Universe

The Pricewatch Universe

BRAND	PRODUCT	DESCRIPTION	PRICE	SHIP	DATE/HR	DEALER/PHONE	ST	PART#
Generic	PRICE FOR ONLINE ORDERS ONLY - 128MB PC100 SDRAM DIMM - 8ns Gold leads	.- * LIMIT ONE - Easy installation - in stock	$ 68	9.69 INSURED	10/12/00 12:40:05 AM CST	Computer Craft Inc. 800-487-4910 727-327-7559 Online Ordering	FL	MEM-128-100PCT
Generic	ONLINE ORDERS ONLY - 128MB SDRAM PC100 16x64 168pin	- * LIMIT ONE	$ 69	INSURED$9.95	10/11/00 10:59:56 PM CST	Connect Computers 888-277-6287 949-367-0703 Online Ordering	CA	-
Generic	PRICE FOR ONLINE ORDER - 128MB PC100 SDRAM DIMM	- * LIMIT ONE - - InStock, 16x64-Gold Leads	$ 70	10.75	10/11/00 2:11:00 PM CST	1st Choice Memory 949-888-3810 -- P.O.'s accepted Online Ordering	CA	-
Generic	PRICE FOR ONLINE ORDER - 128mb True PC100 SDRAM EEPROM DIMM16x64 168pin 6ns/7ns/8ns Gold Leads	- * LIMIT ONE - in stock - with Lifetime Warranty	$ 72	9.85	10/10/00 11:30:39 AM CST	pcboost.com 800-382-6678 -- P.O.'s accepted Online Ordering	CA	-
Generic	IN STOCK, 128MB PC100 3.3volt unbuffered SDRAM Gold Lead 168 Pin, 7/8ns - with Lifetime warranty	- * LIMIT ONE Not compatible with E Machine	$ 74	10.95- UPS INSURED	10/11/00 12:44:00 PM CST	Memplus.com 877-918-6767 626-918-6767	CA	- 880060
Generic	PRICE FOR ONLINE ORDERS ONLY - 128MB True PC100 SDRAM DIMM - 8ns Gold - warranty	- * LIMIT ONE	$ 74	10.25	10/9/00 6:53:25 PM CST	Portatech 800-487-1327 .	CA	
House Brand	128MB PC100 3.3volt SDRAM 168 Pin, 7/8ns - with LIFITIME WARRANTY	- * LIMIT ONE	$ 74	10.50 FedEx	10/11/00 10:20:23 AM CST	1st Compu Choice 800-345-8880 800-345-8880	OH	-
Generic	128MB 168Pin TRUE PC100 SDRAM - OEM 16X64	DIMM16x64 168pin 6ns/7ns/8ns Gold Leads	$ 75	$10	10/11/00 2:37:00 PM CST	Sunset Marketing, Inc. 800-397-5050 410-626-0211 -- P.O.'s accepted	MD	-

The Pricewatch Universe

Memory Spec. Chart - PC3200 DDR 512MB (Select Your Memory Module)

○ Samsung/Micron or Major 512MB PC3200 [ADD $25]	○ Industry Standard 512MB PC3200 [ADD $15]	◉ OEM 512MB PC3200
• CAS 2.5 Latency • Hand Picked 5ns • 6 Layer Low Noise Shielded PCB Board • 32x8 DRAM Type • Samsung/Micron or Major Brands • Return Shipping Paid • No Restocking Fee • Satisfaction & Compatibility Guaranteed • Lifetime Warranty • 15 Days Full Refund • Memory Tested Before Ship Out • Copper Heat Sink - Cool Down the Memory up to 40%	• CAS 2.5 Latency • Hand Picked 5ns • 6 Layer Low Noise Shielded PCB Board • 32x8 DRAM Type • Industry Standard DRAM Chips • 7 Days No Restocking Fee • Return Shipping not Paid • Improved Compatibility • Lifetime Warranty • Aluminum Heat Sink - Cool Down the Memory up to 35%	• CAS 3 Latency • 4 Layer Module Board • 64x4 DRAM Type • OEM DRAM Downgrade Chips • 20% Restocking Fee According to the Market Value • Verify Compatibility with <u>Memory Configurator</u> • Return Shipping not Paid • 9 Months Warranty

Our Data

TABLE I

SUMMARY STATISTICS FOR MEMORY MODULE DATA (128MB PC100 MEMORY MODULES; 683 WEBSITE DAY OBSERVATIONS)

Variable	Mean	Stdev	Min	Max
LowestPrice	62.98	33.31	21.00	120.85
Range 1–12	6.76	2.52	1.00	13.53
PLow	66.88	34.51	21.00	123.49
PMid	90.71	40.10	35.49	149.49
PHi	115.19	46.37	48.50	185.50
$\log(1 + P\text{LowRank})$	1.86	0.53	0.69	3.26
QLow	12.80	17.03	0	163
QMid	2.44	3.33	0	25
QHi	2.02	3.46	0	47

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Demand Estimates

TABLE II
DEMAND FOR 128MB PC100 MEMORY MODULES[a]

Independent Variables	Dep. Var.: Quantities of Each Quality Level		
	Low q	Mid q	High q
log(1 + PLowRank)	−1.29*	−0.77*	−0.51*
	(10.9)	(4.6)	(2.9)
log(PLow)	−3.03	−0.59	1.49
	(2.3)	(0.4)	(0.9)
log(PMid)	0.68	−6.74*	2.38
	(0.8)	(5.9)	(1.7)
log(PHi)	0.17	2.72	−4.76*
	(0.2)	(1.8)	(3.3)
SiteB	−0.25*	−0.31*	−0.59*
	(3.5)	(2.9)	(5.6)
Weekend	−0.49*	−0.94*	−0.72*
	(8.4)	(8.3)	(5.8)
log(LowestPrice)	1.20	0.83	−0.14
	(1.1)	(0.6)	(0.1)
Number of obs.	683	683	683

[a] Absolute value of t-statistics in parentheses. Asterisks (*) denote significance at the 5% level.

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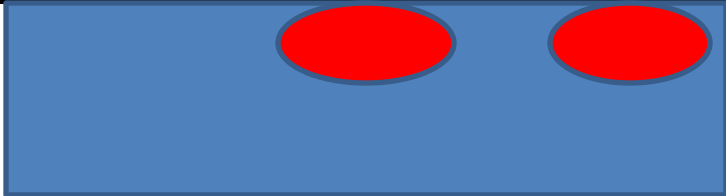
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Demand Estimates

	128MB PC100 Modules			128MB PC133 Modules		
	Low	Mid	Hi	Low	Mid	Hi
PLow				−33.1*	−11.2*	−4.9*
PMid				0.8	−3.6*	0.5
PHi				0.2	−4.8*	−4.8*
	256MB PC100 Modules			256MB PC133 Modules		
	Low	Mid	Hi	Low	Mid	Hi
PLow	−17.4*	−8.1*	−4.1	−24.8*	−12.5	−6.6
PMid	5.7	−7.8	−4.1	0.3	3.3	3.9*
PHi	0.7	6.4	−3.8	−0.9	−7.2	−0.8

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Demand Estimates

	128MB PC100 Modules			128MB PC133 Modules		
	Low	Mid	Hi	Low	Mid	Hi
PLow				−33.1*	−11.2*	−4.9*
PMid				0.8	−3.6*	0.5
PHi				0.2	−4.8*	−4.8*
	256MB PC100 Modules			256MB PC133 Modules		
	Low	Mid	Hi	Low	Mid	Hi
PLow	−17.4*	−8.1*	−4.1	−24.8*	−12.5	−6.6
PMid	5.7	−7.8	−4.1	0.3	3.3	3.9*
PHi	0.7	6.4	−3.8	−0.9	−7.2	−0.8

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Observations on Demand

- Bertrand paradox
  - Own-price elasticity -25
- Bait and switch/loss leaders
  - Reduction in rank of low quality increases sales of higher quality
- Search frictions
  - Less elastic demand for medium and high quality
- Adverse selection problem
  - Reduction in rank of low quality increases sales of higher quality less than it increases sales of low quality
- Consistency across products
  - Results not shown here but in paper

Evidence on Markups

MEAN PERCENTAGE MARKUP IN SIX PRODUCT CLASSES[a]

	128MB Memory		256MB Memory	
	PC100	PC133	PC100	PC133
Actual low markup		−2.5%	4.3%	2.9%
Actual mid markup		15.6%	16.2%	19.9%
Actual hi markup		26.9%	24.3%	24.9%
Overall markup		11.5%	12.7%	15.8%
Overall elasticity ε		−27.7	−16.0	−21.2
$1/\varepsilon$		3.6%	6.3%	4.7%
Adverse selection multiplier		3.5	1.7	2.4
Predicted markup		12.8%	10.9%	11.4%

[a] The table presents revenue-weighted mean percentage markups for products sold by websites A and B in each of four product categories along with predicted markups as described in Sections 2.2 and 7.

Evidence on Markups

TABLE VI
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	Product Category			
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Comments on Markups

- Low quality markups very low
- Medium and high quality substantially higher
- Overall markups higher than naïve expectation based on price elasticity

Conclusions

- Price search can lead to super elastic demand and potential for Bertrand paradox.

- In addition to facilitating price search, the internet can also facilitate sales strategies that frustrate price search (like add-on pricing).

- Add-on pricing leads to higher prices through customer mistakes and equilibrium effects of adverse selection.