The Information Economy

Prices (or Lack Thereof)

The Stages of Buying (The Marketing Funnel)

	Marketing	Other Networks	

Value of Consumer (Lower → Higher)

Stage	Marketing	Other Networks
Awareness	• Content • SEO, SEM, display, email and word-of-mouth	• Broadcast of premium content on multiple platforms • Synchronized marketing campaigns
Familiarity	• Frequency of user visits (pull)	• Mass media Broadcast frequency (push)
Opinion	• Rise of third-party reviews • Comments / message boards	• Participation in community features • Brand affiliation
Consideration		• Content / brand affinity
Intent	• Typically lose the user and data at this juncture as users exit the network	• Company X can capitalize on and influence intent
Shopping		• Company X can facilitate process
Purchase		

Company X leverages its relationships with content providers to target a high-value user

Company X network is comprised of high-value users with expressed intent

Basic Monopoly Pricing

Monopoly Pricing: Recap

- Constant marginal cost, c.
- Firm chooses quantity to maximize profits

$$\Pi(q) = q(p(q) - c)$$

- First-order condition

$$MR(q) = c$$

- Inverse elasticity rule

$$\frac{p-c}{p} = \frac{1}{e} \quad \text{where} \quad e = -\frac{p}{q}\frac{dq}{dp}$$

Multi-product monopolist

- ▸ Microsoft sells Windows and MSOffice
    - ▸ If sell separately optimal prices p_w=200, p_o=200.
    - ▸ But they sell both: how should they price them?

- ▸ Knopf sells Tony Blair's biography in Kindle and hardcover
    - ▸ If sell separately optimal prices p_k=10, p_h=20.
    - ▸ But they sell both: how should they price?

- ▸ Economist sells print and online editions
    - ▸ How should they price?

Multi-product monopolist

▸ Firm chooses (q_1,q_2) to maximize

$$\Pi(q_1, q_2) = q_1(p_1(q_1, q_2) - c_1) + q_2(p_2(q_1, q_2) - c_2)$$

▸ Inverse elasticity rule for p_1

$$\frac{p_1 - c_1}{p_1} = \frac{1}{e_{11}} - \frac{(p_2 - c_2)q_2}{p_1 q_1 e_{11}} e_{12} \quad \text{where} \quad e_{12} = -\frac{p_1}{q_2}\frac{dq_2}{dp_1}$$

▸ Substitutes: e_{12}<0
  ▸ Negative externality so increase p_1.
▸ Complements: e_{12}>0
  ▸ Positive externality so reduce p_1.

Price Discrimination

Three types of price discrimination

1. ## First-degree
   - Perfect price discrimination. Theoretical ideal.

2. ## Third-degree (group pricing)
   - Price as function of observables.
   - Examples: Student status, zip code, assets.

3. ## Second-degree (indirect price discrimination)
   - Offer menu of options and let people self-select.
   - Examples: Versioning, quantity discounts.

- ## Pricing often has elements of both second- and third-degree price discrimination.

First-Degree Price Discrimination

- Suppose know customer's demand curve, $p(q)$.
- Firm can extract all consumer surplus
  - Let welfare maximizing quantity be q^*, so that $p(q^*)=c$.
- Three ways to extract
  1. Block pricing: sell q^* units at $W(q^*)=\int_0^{q^*} p(q)dq$
  2. Two-part tariff: price $p=c$ and fee $CS(q^*)=W(q^*)=\int_0^{q^*}[p(q)-c]dq$
  3. Nonlinear prices: Sell q^{th} unit for price $p(q)$.
- Big assumptions
  - Know customers demand.
  - Able to charge different prices to different customers.

Third-Degree Price Discrimination

‣ **Firm can observe customer characteristics**
  ‣ Country (e.g. book prices)
  ‣ Student status (e.g. airline tickets)
  ‣ Individual pricing (e.g. Lexis-Nexis and Universities)

‣ **Optimal pricing: Use inverse elasticity rule for each group.**
  ‣ Lower price to most sensitive groups.

‣ **Assumptions**
  ‣ No resale (e.g. international editions of textbooks)
  ‣ No cost to setting different prices
  ‣ Cannot change characteristics (e.g. hide student card)
  ‣ No ethical issues (e.g. racial discrimination in car sales)
  ‣ Consumer demand and observable characteristics are correlated

‣ **Has internet made easier or harder?**

Second-Degree Price Discrimination

▸ Offer menu of products and see which consumers choose

- ▸ High and low quality products (vertical differentiation).
- ▸ Indian and American textbook (horizontal differentiation).
- ▸ Quantity discounts.

▸ Big idea

- ▸ Choose options so different types of customers self-select.
- ▸ Want to separate groups that have different WTP.

▸ Classic example: Coupons

- ▸ Put coupons in the newspaper.
- ▸ Annoying to cut out and bring to store.
- ▸ How does this raise profits? Why not just lower price?

A Classic Example

It is not because of the few thousand francs which would have to be spent to put a roof over the third-class carriages or to upholster the third-class seats that some company or other has open carriages with wooden benches. […] What the company is trying to do is to prevent the passengers who can pay the second-class fare from traveling third class; it hits the poor, not because it wants to hurt them, but to frighten the rich.

Jules Dupuit, 1849

How to Price Discriminate

- Theory beautiful but intricate.
  - See notes on website.

- Suppose two types of customers: high and low demand.

1. Set standard monopoly price p*: agents choose q_H, q_L.
   - Consider selling as bundles of q_H and q_L units.

2. Get more money out of high type agent.
   - Raise price of high bundle until high type indifferent between high and low bundle.

3. Degrade lower bundle
   - Lower q_L to make the low bundle unattractive to high type.
   - Self-selection: lowering q_L is worse for high type than low.

Practical Issues of Versioning

▸ How many versions?
   ▸ Want to cleanly separate consumers (e.g. business vs. leisure)
   ▸ Cost to maintaining different product lines.
   ▸ Customer confusion from too many options.
   ▸ Different options may reduce network effects.

▸ Degraded versions
   ▸ Need to ensure customers cannot undo (e.g. unlock software).
   ▸ Use degraded version to promote regular one (e.g. mathematica)

▸ Framing
   ▸ People like "middle" option.

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Other Topics

Bundling

- **Bundling is very common**
  - Bundling of functions (e.g. Excel)
  - Bundling of programs (e.g. MS Office)
  - Bundling of people (e.g. MS Office site licenses)
- **Pure and Mixed Bundling**
  - Pure: only sell bundle.
  - Mixed: see bundle and components separately.

Bundling and Price Discrimination

- Bundling can reduce the dispersion of consumers' WTP.
- Ann and Bob have values for Excel and Word

	Excel	**Word**
Ann (accountant)	100	60
Bob (bureaucrat)	60	100

- If sell separately
  - Prices: $60 for Word, $60 for Excel.
  - Profits $240.
- If sell as bundle
  - Prices: $160 for bundle.
  - Profits: $320.

Bundling and Price Discrimination

- Bundling can reduce the dispersion of consumers' WTP.
- This is easy to see when there are many goods
  - 1000 customers and 10 songs.
  - Each customers' value per song is uniformly distributed on [0,1]
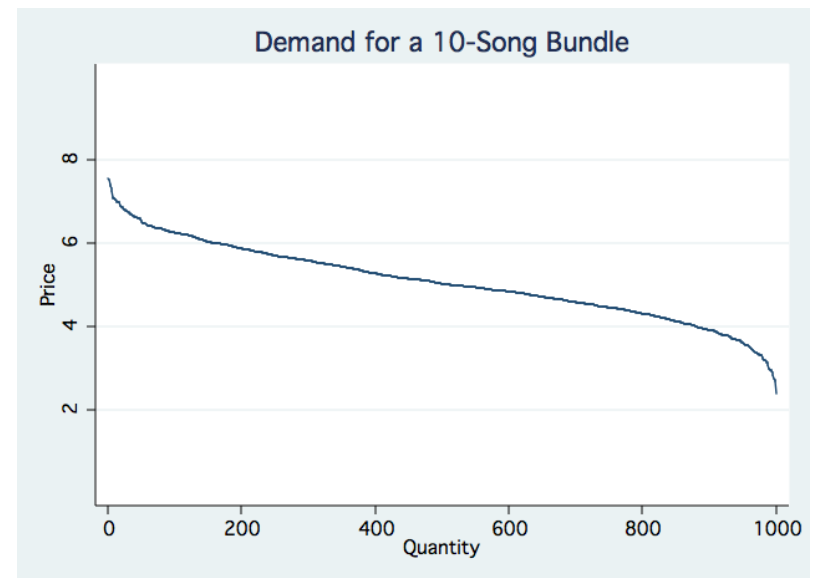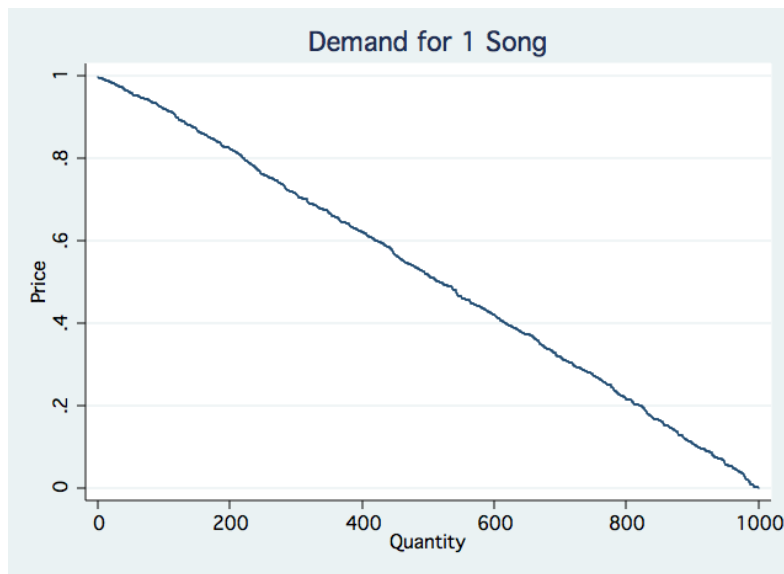
Other Reasons to Bundle

▶ Complimentary consumption (e.g. shoes)

▶ Complimentary production (e.g. CDs)

▶ Reduce the number of payments (e.g. newspaper articles)

▶ Blocking entry (e.g. Microsoft)

Price Complexity

- ▶ Airline Pricing
  - ▶ Airline prices used to be very complex: price depends on whether single/return, on how match flights etc.
  - ▶ Increasingly sell single tickets (e.g. Virgin America)
- ▶ Complex prices
  - ▶ May be optimal form of price discrimination
  - ▶ Makes price comparison hard, and softens competition
- ▶ But…
  - ▶ Confuses customers
  - ▶ People may think differential pricing is unfair

Framing

- Customers stick with default options (endowment effect)
  - Put object "in hands" of customer.
- Don't overwhelm consumers (choice overload)
  - People more likely to buy nothing.
- Product positioning (reference effects, anchoring)
  - Choose middle option
  - Choose second cheapest (or second most expensive) wine
  - Search by brand then price (affects how recommend)
- Mental accounting
  - People subdivide expenditures (e.g. insurance on computer).

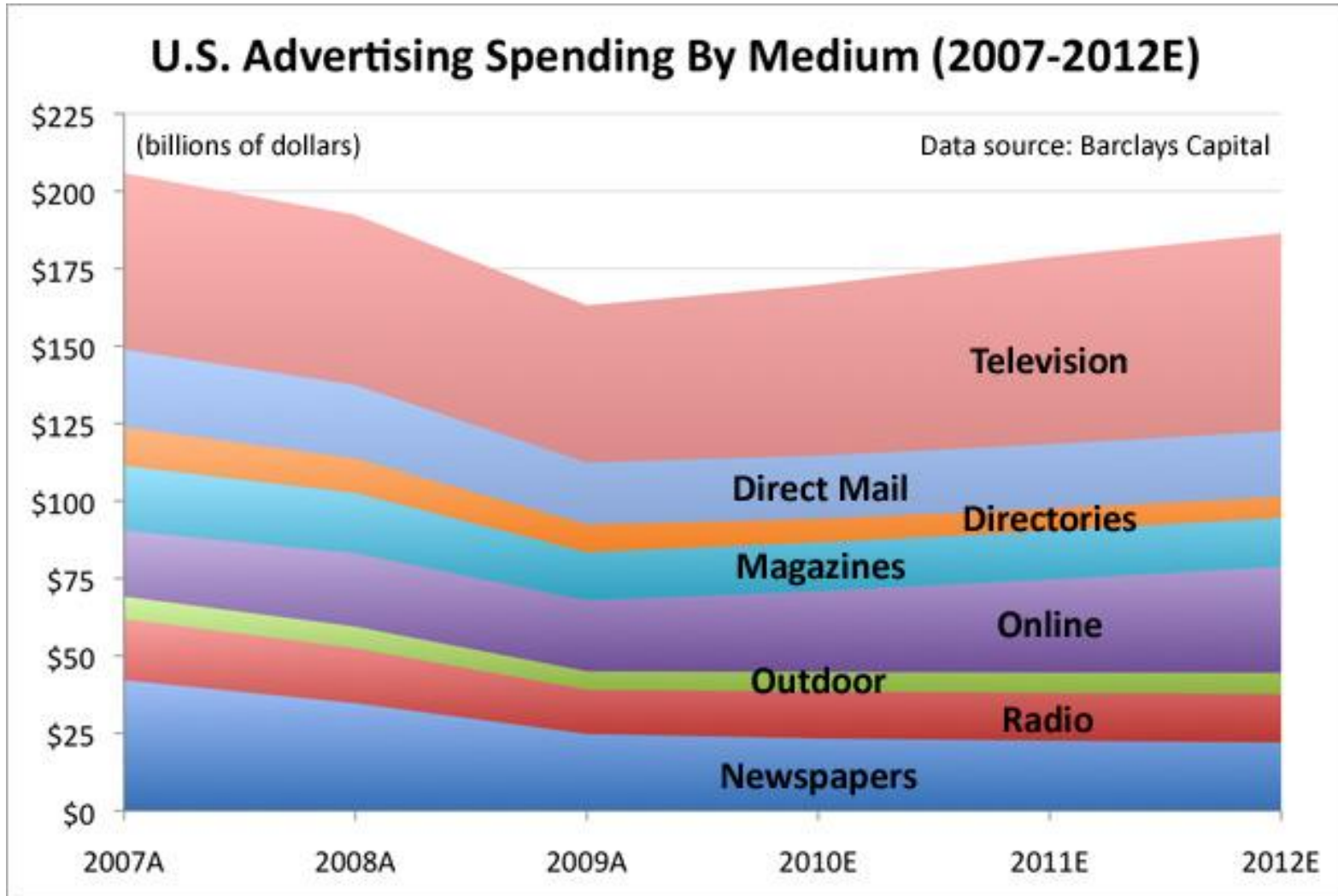# Beyond Prices

Zero Prices

- Zero prices are commonplace (but not universal)
  - Email accounts, Internet hotspots, Online newspapers
- How earn money?
  - Advertising (e.g. gmail)
  - Selling complementary goods (e.g. support with Sun's MySQL)
- Advantages of zero price (over small prices)
  - No transactions costs (billing, usernames, passwords)
  - Create environment of experimentation
  - Maintain privacy
- Problems
  - Overconsumption if MC$\neq$0 (e.g. data plans, email spam)
  - Hoarding (e.g. IP addresses)

Online Advertising

U.S. Advertising Spending By Medium (2007-2012E)

(billions of dollars)

Data source: Barclays Capital

Television
Direct Mail
Directories
Magazines
Online
Outdoor
Radio
Newspapers

Motives for Advertising

- ## Informative (e.g. restaurants)
  - Inform customers of products existence
  - Advertise specific features or price
  - Signal quality through commitment to product
- ## Persuasive (e.g. branded drugs)
  - Change customer's view of product
  - Jam their memory, so first think of your product.
- ## Importance of advertising depends on type of good
  - Search good – inform of existence, jam memory of customer
  - Experience good – persuade customer quality will be high

Intensity of Advertising

- The intensity of advertising varies a lot across industries
  - Breakfast cereals - advertising is 10% of revenue
  - Salt - advertising is essentially 0% of revenue
- Amount of advertising depends on
  - The sensitivity of demand to advertising
  - The markup
  - The efficiency of advertising
  - Whether advertising helps your firm, or helps all firm.
- The sensitivity depends on
  - The amount of product differentiation
  - Search vs. experience good
  - Market concentration

Advertising Strategy

- ▸ Single firm
    - ▸ Suppose advertising shifts the demand curve.
    - ▸ Care about the WTP of the marginal customer.
    - ▸ Analogous to vertical differentiation.
    - ▸ Like quality, advertising is also investment in brand equity.
- ▸ What if there are many firms?
- ▸ Advertising about features can soften price competition
    - ▸ Consumers realize products differentiated.
    - ▸ Spurious product differentiation (e.g. Nutrasweet vs. generics)
- ▸ Advertising about prices can increase price competition
    - ▸ If prices known, firms can cut price to get more customers.

Online Advertising

- Advantages of online advertising
  - Highly targeted (IP, time, registration info, previous pages, GPS)
  - Low fixed cost

- Major types of ad
  - Display ads - visual appeal, branding
  - Search ads – very contextually specific
  - Text ads – specific, unobtrusive
  - Mobile ads – time and location sensitive

- Methods of payment
  - Pay per view
  - Pay per click

| Advertising format | Share of advertising coming from this format | | | | | | | | |
	2000	2001	2002	2003	2004	2005	2006	2007	2008
Display related	78%	72%	60%	42%	39%	34%	32%	34%	33%
Banners	48%	36%	29%	21%	19%	20%	22%	21%	21%
Sponsorships	28%	26%	18%	10%	8%	5%	3%	3%	2%
Rich media	2%	2%	5%	8%	10%	8%	7%	8%	7%
Slotting fees	0%	8%	8%	3%	2%	1%	0%	0%	0%
Digital video	0%	0%	0%	0%	0%	0%	0%	2%	3%
Search	1%	4%	15%	35%	40%	41%	40%	41%	45%
Classifieds	7%	16%	15%	17%	18%	17%	18%	16%	14%
Lead generation	4%	2%	1%	1%	2%	6%	8%	7%	7%
E-mail	3%	3%	4%	3%	1%	2%	2%	2%	2%
Interstitials	4%	3%	5%	2%	0%	0%	0%	0%	0%
Other	3%	0%	0%	0%	0%	0%	0%	0%	0%
Total (million $)	8,087	7,134	6,010	7,267	9,626	12,542	16,879	21,206	23,400

Ad Formats Definitions: Display ads on websites look like those in newspapers and magazines. A **banner** is a space (usually rectangular) on a web page that shows the advertiser's message; this category includes all display ads except for the other specialized categories listed below it. **Sponsorships** represent custom content and/or experiences created for an advertiser that may or may not include ad elements (for example, reskinning a section of a website with the advertiser's branding). **Rich media** refers to advertisements that incorporate animation, sound, and/or interactivity in any format. **Slotting fees** are the fee charged for premium ad placement and/or exclusivity. **Digital video format** includes commercials that appear in live, archived, and downloadable streaming content. **Search** refers to paying Internet companies to present an advertisement linked to a specific search word or phrase. It includes paid listings (text links appear at the top or side of search results for specific keywords); contextual search (text links appear in an article based on the context of the content rather than on the basis of a user-submitted keyword); and paid inclusion (guarantees that a marketer's URL is indexed by a search engine). Although this data source includes "contextual advertisements" in the search category, these ads are targeted display ads that are not based on the use of a search engine and are treated as part of display ads in the remainder of this paper. Contextual advertisements accounted for about 8 percent advertising revenue in 2008. "**Classifieds**" refer to the posting of a product or service in an online listing for a fee. "**Lead generation**" indicates referrals to qualified purchase inquiries. **E-mail ads** include banner ads, links, or advertiser sponsorships that appear in commercial e-mail communication. **Interstitials** are ads displayed during a transition from one Web page to the next.

Industry Structure

- ▸ **Advertising on search site**
  - ▸ Second price auction for adwords
  - ▸ Bids ranked, and slots allocated with highest first
  - ▸ Pay per click
  - ▸ Price depends on word ($99 for mesothelioma; typically $0.4)
- ▸ **Advertising on other websites**
  - ▸ Pay per view for display
  - ▸ Media site: $12 per 1000 impressions
  - ▸ Social networks historically lower: $0.5 per 1000 impressions
  - ▸ Large firms find own advertisers for display.
  - ▸ Otherwise use advertising network (e.g. Doubleclick)

Market Structure

	What	Who	Examples
Advertiser	Producing ads	Advertising agencies and creative tools	Ominicom Group, WPP Group plc, Interpublic, Publicis
	Managing ad campaigns, sending ads to publishers	Advertiser tools	DoubleClick, Google, aQuantive
	Matching advertisements to inventory and setting prices	Intermediation, direct sales, ad networks, ad exchanges	Speigel's sales force, Valueclick, Google, Right Media, DoubleClick
	Managing publisher inventory, serving ads into ad space	Publisher tools	DoubleClick, Google, aQuantive, 24/7 Real Media
Eyeball	Attracting eyeballs with content	Publishers	Liberto.it, Spiegel.de, FT.com, engadget.com