Alternative Pricing Schemes  
*Industrial Organization*

Session 12  
K. Graddy

Outline

• The Coase Conjecture and Price Skimming  
  • Sales  
  • Non-linear pricing  
  -- Two part tariffs and the Disneyland monopolist  
  • Geographical price discrimination  
  -- Cars  
• Bundling

Coase model of a durable monopoly good

-- Assume a seller cannot sign contracts limiting his future production.  
  • Upon sale of a unit, optimal strategy is to try to sell another unit at  
    as high a price as he can get  
  • This would go on until price equals marginal cost  
-- Suppose very little time is needed to transact  
  • Intelligent consumers, assuming the price will soon fall to the  
    competitive level, will be unwilling to pay more than the  
    competitive price for the early units.  
  • This could go on until price equals marginal cost; monopolist can  
    lose all control of situation.

Assumptions of Model

• Lifetime of good exceeds the basic “period”  
  -- Period is the length of time between price revisions  
  -- Goods offered by monopolist at two different dates are substitutes  
  -- Customers have “rational” expectations

Example

• 7 customers  
• Valuations $v=1,2,...,7$  
• Each consumer derives utility from 1 unit of the good  
• Time is discrete $t=1,2,...$ and discount factor $\delta$ between periods  
• No cost to produce the good and the good is infinitely durable

• First  
  -- Assume monopolist makes once and for all offer in the  
    first period of the monopoly price, which is 4. He sells  
    to consumers with valuations 4 to 7  
    -- Monopoly profit is $4 \times 4 = 16$  
• At beginning of period 2, have residual demand of consumers with valuations 1 through 3. Monopolist is then tempted to charge a lower price.  
  -- Some consumers with high valuations may still accept  
    paying 4 because they are eager to get the good  
  -- However, likely that consumer with valuation 4 does  
    not buy, because his surplus is zero  
  -- Necessary condition to purchase: $v - 4 \geq \delta(v - 2)$
• Equilibrium:
  – A sequence of prices and consumers’ expectations such that the expectations are rational given the firm’s behaviour and such that the firm’s behaviour is optimal given the consumers’ expectations
  – Monopolist price discriminates over time
    • Books
    • Computers
  • Flexibility hurts the monopolist

• Responses
  • An artist may make a lithograph and destroy the plate
  • A seller rents rather than sells
    – IBM
    – Xerox
      • Crucial difference between seller and renter is that if a renter “overproduces” he suffers capital loss on old units, the costs are internalised; rational for him to limit production
      • For a seller, buyer suffers cost; sellers end up overproducing
      • Firms that rent can resemble monopolists producing nondurable goods

• Find ways of capacity commitment (spend too little on fixed costs and too much on marginal cost)
• Give price guarantees (a money-back guarantee exercisable at any time) – makes it very expensive for firms to lower price to new consumers
• Transfer monopoly power to service contracts or in another area
  – Car servicing
  – Polaroid in film
  – Gillette in blades
• Implicit contracts not to lower price – DeBeers never reduced nominal price of diamonds.

A Price Discrimination Model of Sales (Conlisk, Gerstner, Sobel QJE 1984)

• Empirical features of retail sales
  – Sales come as no surprise to consumers, indeed regular sales are expected
  – Sales induce greatly increased purchases for a short period
  – Sales are followed by substantial price rises

Assumptions
• Durable goods
• New potential consumers in each period
• If consumer makes a purchase then does not enter the market again for some time
• Heterogeneous consumers (for simplicity just two groups, with high and low initial reservation prices)
• Discount factor of $\beta$

Price Path
Let the reservation prices be $V_h^{(high)}$ and $V_l^{(low)}$

$n$ period cycle, with prices $p_1, p_2, \ldots, p_n$

$p_n = V_1$ in the sale

Price in period $j$ must satisfy the following inequality when compared with prices $h$ periods later:

$V_h - p_j \geq \beta^h (V_h - p_{n+h})$

Let period $j = n$ period $h$ then $p_{n+h} = p_n = V_1$ then

$V_h - p_j \geq \beta^{n-h} (V_h - V_1)$, rearranging

$p_j \leq (1 - \beta^{n-h}) V_h + \beta^{n-h} V_1$

Over the cycle, less weight is put on $V_1$ and more weight is put on $V_h \Rightarrow$ price falls steadily over a cycle ending with a sale.
Summary
• 6 key ingredients of the model
  – Sufficient consumer heterogeneity
  – Monopolist must regularly update his strategy
  – A continual influx of new consumers
  – Consumers must understand enough to want to wait for a sale
  – Stationary setting and free of competition
  – Monopolist sells rather than rents the product
• Cumulation of low-valuation customers forces the sale

Uncertainty Theory of Sales  
Lazear, 1986
• Example of clothing retailer who is uncertain about consumer tastes for style, color, etc.
• Retailer offers a range at the beginning of the season, some sell, some do not
• Prices of latter group are marked down to clear
• Not price discrimination, just reaction to better information about consumer tastes

What exactly is uncertainty in Lazear’s model?
• In the two period model, a firm encounters one buyer in the first period who is willing to pay V for the good, but no more.
• The firm is uncertain about V, but does know how it is distributed.
• He learns from what happens in the first period, and encounters another buyer in the second period also with value V.
• Relates directly to new products

How does this relate to fashion?
• Some goods go out of style quickly whereas others seem to retain popularity
• Fashion or obsolescence can be modelled as follows:
  • In the first period the good is worth V, but in the second period it is worth V/K, where K≥1

Evidence on Sales  
(Pashigan and Bowen, 1991)
• Study of retailing of clothes in US
• Two seasons: spring-summer and fall-winter
• Each seasons starts with high prices and ends with sales: price dispersion over season
  – has increased over time since 1960s
  – is much greater for women's clothing than for men's clothing
  – is greater than for other durable consumer goods

Evidence
• Frequency of discounting: higher for imported, fancy, retail chains
• Size of discounts: largest for imported, fancy and retail chains
• Pashigan and Bowen conclude that evidence is more favourable to uncertainty hypothesis than to price discrimination. Do you agree?
Another Example of Inter-temporal Pricing

• Peak-time pricing schemes

Two Part Tarriffs (Oi 1971)

• A two-part tariff is one in which the consumer must pay a lump sum fee for the right to buy a product
• Examples
  – Tennis Clubs
  – Block tariffs decreasing with the level of consumption – electricity, gas, and telephone service
  – Photocopiery: machines are leased with user paying a fee depending on use
  – Disneyland!
• Examples aimed at consumers having different willingnesses to pay and sellers having no information on consumer types.

• Case 1: All consumers have same demand curve. Set fee equal to entire consumer surplus and the price equal to marginal cost for each unit thereafter

• The lump-sum fee it charges cannot exceed T1 if Type 1 consumers are to participate.
• Opposing forces:
  – If it charges a low price, it sells more of its product and can charge a higher lump-sum fee.
  – Its ability to charge a high lump-sum fee is constrained by Type 1 consumers.

• Suppose that there are two types are customers each with different demand curves

• The firm may make higher profits by concentrating on Type 2 consumers, letting Type 1 not buy the product
• With two types of customers, optimal to charge fixed fee equal to less than entire surplus of low-demand customers, and p₁<ζₐ for rest of items
• Intuition: Tirole, p. 146, or BETTER, Oi (1971) p. 82 and 83
  – Suppose p=ζ₁ and the fixed fee was equal to the entire surplus of the low demand customers. Can lower the fixed fee slightly and raise p. You as the monopolist will have a slightly lower revenue (Tirole calls this a second order effect) from these customers because of the deadweight loss of p=ζ₁. However, this will be more than offset by the higher price charged to the high demand customers (Tirole calls this a first order effect because it is greater).
Now suppose that \( p = p_m \). The monopolist could lower price slightly. This would reduce his profit from the price slightly (Tirole terms this second order), but increase the consumer surplus by a lot more (a first order effect). Because the monopolist can charge a lump-sum “admission” fee he can capture this consumer surplus and thus his profits are higher.

On two-part tariffs

- Only when there is one type of consumer (unrealistic) is it necessarily optimal to charge fixed fee (A) equal to entire surplus and then mc for rest of items.
- The less similar are Type 1 to Type 2 consumers, the more difficult to extract consumer surplus from Type 2 with a single two-part tariff

Can have two two-part tariffs, but pricing structure is subject to self-selection constraint: one group must not prefer other group’s two-part tariff
- For example, \((T_1, p_1), (T_2, p_2)\), where \( T_2 > T_1 \) and \( p_2 < p_1 \)
- Example: mobile phones!
- Note: finding general optimal nonlinear pricing scheme is extremely complicated

Commodity Bundling

- Assume production costs are 90

<table>
<thead>
<tr>
<th>Type of consumer</th>
<th>Word processor</th>
<th>Spreadsheet</th>
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<tbody>
<tr>
<td>Type A consumers</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>Type B consumers</td>
<td>100</td>
<td>120</td>
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</tbody>
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General example
Adams and Yellen (1976)
- Consumers characterized by their reservation prices R1 and R2 for goods 1 and 2 respectively

Three options open to firms
- 1) Set the single price on each commodity separately, \((p_1^*, p_2^*)\), which yields the greatest profits. A pure components strategy or simple monopoly pricing
- 2) Offer the two commodities for sale only in a package comprised of one unit of each at the price \( p_2^* \) chosen so as to maximize profits. This is the pure bundling strategy.
- 3) Combine strategies 1 and 2 by offering each commodity separately and a package of both, at a set of price \((p_2^*, p_2^*, p_2^*)\), which maximizes overall profits. A mixed bundling strategy.
No bundling offered

A (consumers purchase both)

B (consumers purchase good 2 only)

C (consumers purchase neither Goods)

D (consumers purchase good 1 Only)

(single prices for each good, \( P_1 \) and \( P_2 \))

Only Bundling Offered

A

B

C

D

(Goods only available in pair at price \( P_{AB} \))

Price Discrimination in Cars
(Verboven 1996)

• Hedonic Price index
  – Car pre-tax prices are regressed on car characteristics and country dummies: showed country effects: Belgium 100, France 105, Germany 110, Italy 116, UK 120

• Geographical market segmentation arising from:
  – Selective and exclusive distribution systems allowed under EC regulation 123/85
  – Bureaucratic difficulties for individuals importing cars from another EU country
  – Right hand drive in UK

• Concentration does not differ much across different geographical markets
• Quotas on Japanese imports are very strict and small in France, Italy; less restrictive in Germany and UK; non in Belgium
• Dealer mark-ups in UK thought to be high
• RESULTS
• Large differences in demand elasticities across countries: firms tend to have lower own price elasticities in their ‘domestic’ markets; so price of a car is usually higher if sold in domestic market rather than in a ‘foreign’ market
• Demand elasticities higher for smaller, less sophisticated car: so mark-ups lower for these cars than for better cars

• High mark-ups on Japanese cars where import quotas are binding
• Definite evidence of geographical market segmentation: consumer preferences correlated across cars with same country of origin, but not across similar cars from different countries
• Analysis cannot account for all cross-country price differences: other possibilities
  – Collusion between manufacturers in UK and in Germany
  – Higher dealer mark-ups in UK
  – Prices in UK may include warranties and road side assistance (could explain 10-15% of differentials)
Conclusion

- Pricing and elasticities
- Price discrimination
- A durable goods monopolist
- Sales
- Two-part tariffs
- Geographical price discrimination
- Bundling