Competitive Strategy: Week 4

Static Pricing

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Single Product Monopolist

- For simplicity assume constance marginal cost, c.
- Firm chooses quantity to maximise

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

- First order condition:

$$MR(q) = c$$

- Inverse elasticity rule:

$$\frac{p - c}{p} = \frac{1}{\epsilon}$$

where $\epsilon = -(p/q)(dq/dp)$.

Multi–product Monopolist

- Firm chooses (q_1, q_2) to maximise

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

- Inverse elasticity rule

$$\frac{p_1 - c_1}{p_1} = \frac{1}{\epsilon_{11}} - \frac{(p_2 - c_2)q_2}{p_1 q_1 \epsilon_{11}}\epsilon_{12}$$

  where $\epsilon_{12} = -(p_1/q_2)(dq_2/dp_1)$.

- Substitutes ($\epsilon_{12} < 0$). Negative externality so $p_1 \uparrow$.
- Complements ($\epsilon_{12} > 0$). Positive externality so $p_1 \downarrow$.

Third Degree Price Discrimination

- Suppose customers differ and firm can observe their identity?
- Suppose firm charges single price (no two–part tariffs).
  - Price function of identity (e.g. student airfares).
- Suppose there are two groups $i \in \{1, 2\}$
  - For each group i use inverse elasticity rule:

$$\frac{p_i - c_i}{p_i} = \frac{1}{\epsilon_{ii}}$$

- Special case of multi–product monopoly with $\epsilon_{12} = 0$.
- Assumes no resale.
- Especially useful when market very different (e.g. AIDS drugs).
- Example: business vs. personal moving service.

First Degree Price Discrimination

- Suppose customers are identical.
- Suppose the firm knows the demand curve.
- The firm can extract all consumer surplus
  - Firm solves for welfare maximising quantity, $p(q^*) = c$.
  - Firm calculates welfare $W(q^*) = \int_{p(q^*)}^{\infty} q(p)\, dp$.
  - Firm charges offers quantity q^* at fee $W(q^*)$.
- Implement through two–part tariff (Disneyland pricing).
  - Charge price $p = c$ and up–front fee $CS(q^*)$.
- Implement through nonlinear pricing.
  - Price for q^{th} unit is $p(q)$.
- Example: Niagara Mohawk individual electricity pricing.

Second Degree (Indirect) Price Discrimination

- Suppose customers differ and firm can observe identity.
  - Use first degree PD for each type of customer.
- Suppose customers differ, but firm *cannot* observe identity?
  - Firm discriminate using self–selection.
  - Theory is very beautiful but tricky.
- Coupon books.
  - Two types of customer: (1) Student, (2) Banker.
  - Students have more time and is more price sensitive.
  - Students use coupons. Pay lower prices.
  - Bankers don't use coupons. Pay higher prices.

Quantity Discounts

- Two types of customer: Low and High
  - Demand $p_i(q) = a_i - q$, where $i \in \{H, L\}$, $a_L \in [a_H/2, a_H]$
  - Each customer's a_i is private information.
- Initially offer one price $\hat{p}$.
  - Sell $\hat{q}_L$ and $\hat{q}_H$ to two types.
- Instead charge nonlinear price:
  - Charge $\hat{p}$ for first $\hat{q_L}$ units.
  - Price $\max\{p_H(q), c\}$ per unit for $q \geq \hat{q}_H$.
- Firm does better with nonlinear price.
- Example: Cell phone plans.

Quantity Discounts: Optimal Solution

- Suppose use FDPD. Offer two (quantity, transfer) packages:
  - (q^L, t^L) for the low type. (q^H, t^H) for the high type.
  - FDPD: $q^i = a_i$ and $t_i = W^i(q^i)$.
  - Problem: Type H pretends to be type L.
- Idea: reduce q_L to lower H's incentive to copy L.
  - H values good more than L, so lowering q_L helps separation.
- Consider choosing $q_L \leq a_L$. When lower q_L by Δ [see picture]
  - H's consumer surplus falls by $(a_H - a_L)\Delta$
  - Profit from L falls by $(a_L - q_L)\Delta$
  - Equalising, the optimal solution is $q_L = 2a_L - a_H$, $q_H = a_H$.

Quality and Price

"It is not because of the few thousand francs which 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 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).

- Suppose offer range of qualities (similar to quantity discounts).
  - Firm doesn't want high value clients buying low quality goods.
- Example: IBM LaserPrinter E
  - IBM inserted chip to deliberately slow printer down.
  - Then reduced price and marketed to households.
  - Inefficient but help price discriminate.

Bundling and Price Discrimination

- Two products: A and B.
  - Agent i has values $v_i(A), v_i(B)$.
  - Two agents: 1 and 2

$$(v_1(A), v_1(B)) = (10, 3) \quad \text{and} \quad (v_2(A), v_2(B)) = (3, 10)$$

- Selling separately
  - Charge \$10 for each. Profits \$20.
- Sell as bundle
  - Charge \$13 for bundle. Profits \$26.
- Mixed bundling
  - Sell as bundle and separately.
  - Giving package discount always increases profits. It's magic!

Four Reasons to Bundle

1. Price discrimination (e.g. Fugative & Free Willy).
2. Complimentarity consumption (e.g. shoes).
3. Complimentary production (e.g. music albums).
4. Blocking entry (e.g. Microsoft)

Price Complexity

- Airlines
  - AA has up to 500,000 fares.
  - AA greatly simplified pricing. Copied by others.
  - TWA undercut AA. Scheme unraveled.
- Complex Pricing
  - Pro: Optimal price scheme may be complex.
  - Pro: Price comparison hard: softens price competition.
  - Pro & Con: Confused customers make mistakes
  - Con: Frustration damages view of product.
  - Con: System may be thought unfair.

Altering Valuations

- Standard economics takes values as given.
  - Valuations are not exogenous: Depend on *frame*.
  - Do preferences exist? Are they constructed on the spot?
- Reference price effect (anchoring).
  - Values depend upon product group (e.g. Loctite).
  - Bias towards middle (e.g. Bread maker).
  - Low introductory pricing can reduce valuations.
- Proportional price sensitivity.
  - \$10 saving on \$1000 item vs. \$10 saving om \$100 item.
- Fairness
  - Motives. Increasing price because cost ↑ vs. demand ↑.
  - Implementation. Hotels: High price vs. long minimum stay.

Altering Valuations cont.

- Role of Status Quo: Losses loom larger than gains.
  - High price with discounts vs. low price with surcharges.
  - Unbundle gains and bundle losses.
  - When thanking customers, they prefer gifts to cash.
- Overwhelming alternatives
  - Buy more when given fewer options (e.g. jams).
- Other effects
  - Status and exclusivity.
  - Minimise regret. More regret about action than inaction.
  - Hyperbolic discounting.
  - Endowment effect (e.g. mugs and chocolate).

Assignment: A Puzzler

- Read GM article, WSJ, 20 July, 1993, p.A3 (on website).
- Describe the key elements of the coupon scheme.
- Over 15 months, 2m people want to buy GM light trucks. 30% of these are previous owners. For simplicity, assume the buyers all value a truck at $20k, while the manufacturing cost is $15k.
- What's is GM's optimal price without coupons?
- Given the number of coupons offered, what if the equilibrium price of coupons on the second hand market?
- What is GM's optimal price with coupons?
- How much will the coupon scheme cost GM?
- How much would the scheme cost GM if coupons couldn't be resold?