

Competitive Strategy: Week 5

Static Pricing

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Single Product Monopolist

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

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

- 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

$$\Pi(q_1, q_2) = \left[q_1(p_1(q_1, q_2) - c_1q_1) \right] + \left[q_2(p_2(q_1, q_2) - c_2q_2) \right]$$

- Inverse elasticity rule

$$\frac{p_1 - c_1}{p_1} = \frac{1}{\epsilon_{11}} - \frac{(p_2 - c_2)q_2}{p_1q_1\epsilon_{11}}\epsilon_{12}$$

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

- Suppose offer range of qualities.
 - Similar to quantity discounts.
 - Charge high markup for low quality good, q_L .
 - Charge low markup on high quality increment, $q_L \rightarrow q_H$.
 - Intuition: need to stop high value customers buying low quality product.
- 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 on \$100 item.
- Fairness
 - Motives. Increasing price because cost \uparrow vs. demand \uparrow .
 - 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).

Summary

- Types of price discrimination
 - 1st degree: Full extraction.
 - 3rd degree: Identity dependent pricing.
 - 2nd degree: Discrimination through self-selection.
- Bundling
- Complexity