Industrial Organization, Week 7
Price Discrimnation

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Agenda

Price discrimination plan

- Plan: Price discrimination
- First we will look at what each kind of discrimination is
- How do you price discrminate?
- We look at some examples of price discrmination

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Definition

- Price Discrmination: The pricing of the same or similar goods at different levels
- Requires: No arbitrage or resale
- No resale requires either: 1) Non transferability, 2) high transaction cost, 3) Resale Illegal

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First degree price discrimination

Feautures:

- Every consumer charged their highest willingness to pay
- No consumer surplus
- Efficient but rare
- Linguistically: perfect price discrmination or perfect appropriation

Third degree price discrimination?

Feautures:

- Selection by indicator(age, sex, etc)
- Different price for each type
- Movie tickets for young or old

Second degree price discrimination?

Feautures:

- Self-selection by consumers
- Consumer type unknown to producer
- Example: Mobile telephone, subscription services

Types of price discrimination?

- If goods are homogenous: menu pricing over quantity
- Vertically differentated goods
- degree of price discrimination does not neccesarily entail the surplus taken

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Look into the demand

A downward sloping demand curve function can be generated by three different processes

1. A single individual with continous demand
2. Many identical individuals with continous
3. Heterogenous individuals

Consumer preferences

A single consumer with continous demand interpretation:

$$U_i = v_i q_i - \frac{q_i^2}{2} - t(q_i) \tag{1}$$

In first degree price discrmination, this equation will always equal 0 in equilibrium

The two part tarrif

- A two part tarrif can always lead to the monopolist extracting all surplus
- Requires a two part tarrif for every type of consumer, then all producer surplus.
- $t(q) = T + pq$
- The oprimal price is the welfare maximizing quantity
- The optimal subscription fee is the individual rationality equation

Two part tarrif

- The monopolist chooses the welfare maximizing quantity or price
- The monopolist charges each type of consumer their exact surplus as a fixed fee
- This reasoning works when employed in other industries, lump sum taxes are efficient.

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Look into the demand

- The producer can distinguish between different kinds of demands.
- Example: Children, senior citizens, etc.
- Compared to monopoly: monopolist better off, some consumers worse off(not always)

Example:

A mini example to gain some intuition

- Suppose consumers have a WTP between $0 - 1$
- Costs of production are 0.
- Profit whilst blind: $p(1 - p)$
- Profit whilst distinguishing between upper and lower half: $p_1(1 - p_1)$ for upper half and $p_2(\frac{1}{2} - p_2)$ for lower half

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Second degree price discrimination

More uncertainty

- Consumers have heterogenous demands
- Monopolist cannot differentiate between them
- The return of incentive compatibility
- Perfect discrimination impossible
- '3 for 2', 60p for 1m 1.20 for 3.

Example of second degree price discrimination

Suppose we have two types of consumers in equal proportions

- Utility function: $U_i = \frac{(A_i - p_i)^2}{2} - T_i$
- Suppose that $q_l = 2 - p; q_h = 3 - p$
- Firm sets two packages, $(p_1, T_1), (p_2, T_2)$
- Individual Rationality L: $\frac{(2-p_1)^2}{2} - T_1 > 0$
- Individual Rationality H: $\frac{(3-p_2)^2}{2} - T_2 > 0$
- Incentive compatibility of low(ICL): $\frac{(2-p_1)^2}{2} - T_1 > \frac{(2-p_2)^2}{2} - T_2$
- Incentive compatibility of high(ICH): $\frac{(3-p_2)^2}{2} - T_2 > \frac{(3-p_1)^2}{2} - T_1$

The profit function

It turns out that we only need IRL and ICH

$$T_1 = \frac{(2-p_1)^2}{2} \tag{2}$$

$$T_2 = \frac{(3-p_2)^2}{2} + \frac{(2-p_1)^2}{2} - \frac{(3-p_1)^2}{2} \tag{3}$$

$$\pi = \frac{1}{2}((2-p_1)p_1 + (3-p_2)p_2 + T_1 + T_2) \tag{4}$$

$$\rightarrow (p_1, T_1) = (1, 0.5) \tag{5}$$

$$\rightarrow (p_2, T_2) = (0, 3) \tag{6}$$

Result

- Option 1, low fixed cost, high per unit price
- Option 2, High fixed cost, low unit price

Conclusion

- Price discrmination increases welfare
- From first, to third, to second, the firm loses capacity to discriminate.