

Lecture 17

Self-selection pricing



Industrial Economics

Second-degree PD

- ★ Often **information asymmetry** prevents segmentation
- ★ The seller **cannot tell** the buyers apart or **cannot prevent arbitrage**
- ★ It is still possible for the seller to discriminate by setting up **self-selection mechanisms**
 - create different **versions / bundles / sets** of the product so that **consumers** will join the appropriate group **voluntarily**
- ★ The mechanisms must be **separating**
 - every consumer type will **join** the group **intended** for them
- ★ Thus, **IC** will be a major concern here

2 consumer types

Second Degree PD Model

- ★ Consumers have a **utility function**

$$U = \theta \cdot V(q) - T(q)$$
 - basically a **surplus function** with a homogeneous of degree-1 **core utility**
- ★ $V(q)$ is the (common) **utility from consumption** of q units
 - $V(q)$ is **concave** and $V(0) = 0$
- ★ θ is a **type shifter** and can take two values $\{\theta_R, \theta_E\}$
- ★ $\theta_E > \theta_R$ **means** that the **enthusiasts** like the product more than the **usuals** (regular consumers)
- ★ The firm **cannot tell** if a consumer is E or R

The 2PT equivalency with two types

Second Degree PD Model

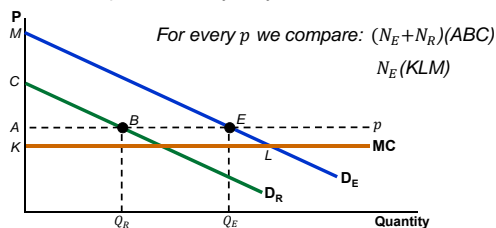
- ★ In this problem we will use the **2-part tariff equivalency**

$$T(q) = A + pq$$
- ★ With **2 types** a single 2PT (A, q) **cannot capture** the entire CS
- ★ With **two types**, $\forall p \in [p_c, p_M]$, $S_E > S_R$ so that
 - ◆ If $A = S_E$, S_E is **fully captured** but **usuals** are priced-out
 - ◆ If $A \in (S_R, S_E)$, only **part** of S_E is captured but **usuals** are still priced-out
 - ◆ If $A = S_R$, a **smaller part** of S_E and the **entire** S_R are captured
- ★ The seller has to solve a complicated non-linear **optimization problem** for $p \in [p_c, p_M]$ and $A \in \{S_R, S_E\}$

Selecting a 2PT with 2 types

Second Degree PD Model

- ★ If types are **vastly different**, we may want to **exclude the usuals** setting $(p, A) = (p_c, S_E)$
- ★ If types are **not too different**, we may want to set $p > p_c$ and $A = S_R$ to **price-in everybody**



Consumers' problem

Second Degree PD Model

- ★ The **problem** for consumer i is

$$\max[\theta_i V(q_i) - A - pq_i]$$
- ★ The FOC then implies that

$$\theta_i V'(q_i) - p = 0 \Rightarrow p = \theta_i V'(q_i)$$
 - which is the **inverse demand** for type $i = R, E$
- ★ The **general form** of inverse demands entail:
 1. The **demand** by E is **always above** the demand by R
 2. For every p , $S_E(p) > S_R(p)$
 3. The market for both types will be **efficient** if $c < \theta_R$

Seller's courses of action

- ★ The seller must compare the profits from **2 possible courses of action**:
 1. Serve only the enthusiasts
in which case **the problem reduces** to that of the first-degree price discrimination with a single type consumers
 2. Serve both types of consumers
choose the two-part tariff that **maximizes** total profit **subject to** giving an incentive to every type to buy
- ★ The seller must **solve both** to select the most profitable.

The discrimination case

- ★ Serving both types **assumes** that $A = S_R(p)$
both types pay participation fee equal to the entire surplus of R
- ★ Then, the seller will **choose** p that maximizes **overall profit**
$$\Pi = N \cdot S_R(p) + (p - c)D(p)$$

 N is the total number of consumers and $D(p)$ is the total demand
- ★ Optimal **unit price** p^* is the root of $\partial\Pi/\partial p = 0$
it can be shown that $p^* > c$
- ★ Then, the optimal **participation fee** will be $A^* = S_R(p^*)$
- ★ So, the **tariff** is $A^* + p^*q$ and $q_R < q_E$.

How is this discrimination?

- ★ Participation fee and unit price **are the same** for both types, **where** is the discrimination in this case?
- ★ The key is in the **average expenditure (price)** for the product by the two groups
- ★ Enthusiasts tend to buy **high** quantities and thus are given a **better average price** for the good
their reservation price decreases in q_E
- ★ Usuals buy **less** so they are asked for a **higher average price**.

The 2PT rule-of-thumb

- ★ Similar demands among the different types
choose p **close** to MC and **high** A (close to S_E)
- ★ Dissimilar demands among the different types
choose **higher** p and **lower** A (close to S_R)
- ★ **Example**: 'Disneyland' and 'Disney-World' have a strategy of high entry fee and charge nothing for the rides.

Tie-in sales

- ★ Assume now that A is not simply a participation fee but the price of a **prerequisite product**
- ★ **One unit** of the prerequisite is **necessary** to consume $q > 0$ units of the **complementary** good at unit price p
Example: A is the price of the **printer** and p is the price of **ink**
- ★ Usually the **same seller** produces both goods and is interested in the **total profit** from both markets
- ★ Consumers draw **utility** from the **combination** of the prerequisite and the units of the complementary good they buy.

Tie-in discrimination

- ★ Because the prerequisite good is **not free of cost** the seller must maximize
$$\Pi = N(S_R(p) - c_0) + (p - c)D(p)$$
- ★ Here c_0 does not affect the maximization thus:
 - ◆ $p^* > c$
 - ◆ $A^* = S_R(p^*)$, which **may** be lower than c_0
- ★ For the sake of PD the firm may sell **below cost** in one market to increase its profit in the other!
- ★ Tie-in is a self-selection price method that **contextually belongs** to the **second degree PD** methods.

The Polaroid Case

- ★ We will now examine the famous case of tie-in, that **Polaroid** applied in 1971
- ★ From the 60's to date the industry of photography **has changed** dramatically.

Funny slide – available only in the lecture

The amazing instant photography

- ★ In 1971, Polaroid **introduced** the SX-70 camera
- ★ The company decided to use an **indirect two-part tariff** for pricing of camera/film
- ★ Of course they had filed for a **patent** for the camera thus, had a **monopoly** in instant cameras
- ★ But **did not** have a monopoly in **film roll**
- ★ Polaroid created a monopoly in film by making the camera work **only with Polaroid special film**.

Polaroid cameras

- ★ Polaroid developed a monopoly in both counterparts and was able to use **tying** as a **two-part tariff**
 - this allowed them **greater profits** than would have been possible if camera used ordinary film
- ★ Buying the camera is like **entry fee**
 - of course, producing a camera is **not free of cost** to the producer (as is the entrance in a bowling alley, for instance)
- ★ **Monopoly in film** was the most **essential** for Polaroid
 - ◆ If **ordinary** film could be used, its price would be close to MC
 - ◆ Polaroid **intended** to gain **most of its profits** from sale of film.

Prices and success

- ★ There was considerable **heterogeneity** of consumer demands in the industry of photography
- ★ The **film** was priced significantly **above marginal cost**
- ★ The price of the **camera** was **cheaper** than what it would have been if it was priced monopolistically
- ★ Compared to what they **would have paid** if tie-in was not used:
 - ◆ **Light users** ended up **spending less** with the 2PT, because they did not consume much film – thus priced-in
 - ◆ **Heavy users** ended up **paying more** with the 2PT, because they used a lot of film.

Tie-in bundling

- ★ Entry price (A) **entitles** the buyer to a fixed number of **free units**
 - ◆ **Razors** sold with several blades
 - ◆ **Printer** comes with free set of inks
 - ◆ **Night club entrance cover** comes with a free drink
- ★ This way the seller can set **higher entry fee, A** without losing usual consumers
 - seller captures more surplus of enthusiasts.

Thank you!



Kosmas Marinakis
www.kmarinakis.org
kmarinakis@hse.ru

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