Chapter 5: Pricing Decisions

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Price Discrimination

Instead of selling each ticket at the same price, a team might find it more profitable to charge different prices to different customers. Economists call this price discrimination.

In economics, price discrimination usually has to do with the same product (see the example in the book). However, seats at a sports event are usually "different" products (and is thus not price discrimination). For example, seats in the nosebleed section and seats in the lower-level seats provide different experiences, and are thus different products.

Examples of price discrimination?

- Student pricing
- Online vs in-person tickets
- Local vs non-local.

Conditions for price discrimination

To make our analysis simpler, we will assume that the products (for example seats) are all the same.

Two assumptions must be met for successful price discrimination.

- The club must be able to identify (and exploit) two or more separate groups that have different demands
- The club must be able to prevent or at lease minimize arbitrage, which is the practice of buying in the low-price market and reselling in the higher-price market

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Different price for different types of customers

Assume the conditions for price discrimination have been met, and the seller can identify 2 groups (with different demands) to sell to. The seller wants to set prices and outputs to maximize profits. Now the function of profit is now:

$$\pi = P_1(Q_1)Q_1 + P_2(Q_2)Q_2 - C(Q)$$

where $Q = Q_1 + Q_2$,
$P_1(Q_1)$ is price to group 1 given quantity, and $P_2(Q_2)$ is price to group 2 given quantity.

Profit maximization requires that:

$MR_1 = MR_2 = MC$

Example

Let there be two types of customers. Each type has the below demand functions respectively.

$$P_1 = 100 - Q_1$$

$$P_2 = 80 - Q_2$$

Also assume that there is no marginal cost.

What are the prices and quantity that the team will set?

We can simply set $MR_1 = MR_2 = MC$

In this case

$MR_1 = 100 - 2Q_1$ and $MR_2 = 80 - 2Q_2$.

Therefore setting them equal to MC = 0. We get the optimal price and quantity.

$$Q_1^* = 50, \quad P_1^* = 50$$

$$Q_2^* = 40, \quad P_2^* = 40$$

And the corresponding profit = \$ 2,500 + \$1,600 = 4,100

Two part tariff

Two part pricing is another way to reduce dead-weight loss. This involves charging a lump-sum access fee and then a separate user fee.

Examples of two part tariff

- Providing a personal license fee in order to get the privilege of buying tickets.
- At the University of Florida, season tickets to Gator football games are sold at relatively low prices. To have the privilege of buying season tickets, the fan must make a lump-sum donation to the university.

The most efficient lump sum price is the consumer surplus under competitive market. And the price would be set to MC.

Example

Let the demand for golf rounds for one member at a golf club be denoted by

$$P = 50 - 2Q$$

Also assume that the marginal cost is equal to $10 and every member has the same demand function

What is the price, quantity (golf rounds) and lump-sum fee (membership fees) that the club will set for each member?

In order to find price and quantity can simply set $P = MC$ and solve for Q.

In this case

$P = MC = 10.$

Therefore the optimal quantity is.

$$Q^* = 20, \quad P^* = 10$$

What about the lump sum membership fee?

We will need to find the consumer surplus (CS)

$$CS = 0.5 * 40 * 20 = 400$$

Therefore, the club will set the membership fee at 400

Two part tariff with different types of customers

Now let there be two customers. Each has the below demand functions respectively.

$$P_1 = 80 - Q_1$$

$$P_2 = 100 - Q_2$$

Also assume that there is marginal cost = \$ 10.

If the club can set only one price and one lump sum fee, what will the price, quantity and lump sum fee be?

The profit for the team if they sell to both buyers is.

$$\pi = 2CS_1 + (P - MC) * (Q_1 + Q_2)$$

$$= (80 - P)^2 + (P - 10) * (180 - 2P)$$

Since, $Q_1 + Q_2 = 100 - P + 80 - P = 180 - 2P$ and

$CS_1 = (80 - P) * Q_1 = 0.5 * (80 - P) * (80 - P) = 0.5 * (80 - P)^2$

Taking the first order derivative and setting it equal to 0 we get

$$\frac{d\pi}{dP} = (-2)(80 - P) + (-2)(P - 10) + (180 - 2P) = 0.$$

Therefore the optimal price is.

$$P^* = 20, \quad Q^* = 140$$

$$Q_1^* = 60, \quad Q_2^* = 80$$

Next the lump sum fee $= CS_1 = 0.5 * (80 - 20)^2 = 1,800$

The associated profit $= 2 * 1800 + (20 - 10) * (60) + (20 - 10) * 80 = 5,000$ What happens if the club decides to sell only to buyer 2.

In that case we will set $P = MC$ and charge lump sum fee $= CS_2$

The lump sum fee = $CS_2 = 0.5 * (100 - 10)^2 = 4,050$

And the price and quantity are .

$$P^* = 10, \quad Q^* = 90$$
$$Q_1^* = 0, \quad Q_2^* = 90$$

And the associated profit is equal to $\$4,050$.

Since $\$4,050 < \$5,000$, the club will sell to both the buyer.

In conclusion, when there is two part tariff with different types of buyer, we need to compare profit profit by selling to both the buyers vs profit form selling to only one buyer (with the higher demand) in order to determine price, quantity an lump-sum fee.

What happens when demand for one customer is extremely high

Now consider, the two customers have the below demand functions respectively.

$$P_1 = 80 - Q_1$$

$$P_2 = 200 - Q_2$$

Also assume that there is marginal cost = \$ 10.

If the club can set only one price and one lump sum fee, what will the price, quantity and lump sum fee be?

The profit for the team if they sell to both buyers is.

$$\pi = 2CS_1 + (P - MC) * (Q_1 + Q_2)$$

$$= (80 - P)^2 + (P - 10) * (280 - 2P)$$

Since, $Q = Q_1 + Q_2 = 200 - P + 80 - P = 280 - 2P$ and

$CS_1 = (80 - P) * Q_1 = 0.5 * (80 - P) * (80 - P) = 0.5 * (80 - P)^2$

Taking the first order derivative and setting it equal to 0 we get

$$\frac{d\pi}{dP} = (-2)(80 - P) + (-2)(P - 10) + (280 - 2P) = 0.$$

Therefore the optimal price is.

$$P^* = 70, \quad Q^* = 210$$
$$Q_1^* = 10, \quad Q_2^* = 130$$

Next the lump sum fee $= CS_1 = 0.5 * (80 - 70)^2 = 50$

The associated profit $= 2 * 50 + (70 - 10) * (10) + (70 - 10) * 130 = 8,500$

What happens if the club decides to sell only to buyer 2.

In that case we will set $P = MC$ and charge lump sum fee $= CS_2$

The lump sum fee $= CS_2 = 0.5 * (200 - 10)^2 = 18,050$

And the price and quantity are .

$$P^* = 10, \quad Q^* = 190$$
$$Q_1^* = 0, \quad Q_2^* = 190$$

And the associated profit is equal to $\$18,050$.

Since $\$18,050 > \$8,500$, the club will sell only to buyer 2.

Example from book. Chapter 5 Question 1

Suppose that demand is given by

$$P = 100 - Q$$

and marginal revenue is

$$MR = 100 - 2Q$$

and marginal cost is constant at 20.

1. What single price will maximize a monopolist's profit?
2. What will be the prices and quantity under two-part pricing?
3. Calculate profits for each option.

Ticket Scalping

Using the opportunity to sell a ticket at higher price than the original face value.

In some states, scalping is illegal.

However, scalping increases social welfare since both the buyer of a resale ticket and the seller benefit from the transactions.