1 Price Discrimination

1.1 Types

First-Degree: Charge everyone what they are willing to pay.

Second-Degree: Make different packages or qualities or options available and **let the consumers choose** which they prefere.

First-Class/Coach Airline Service.

Tiers of Whiskey

Limited Edition/ Special Edition (Shoes, Games, Collector Edition)

Iphone Pro / Vs Regular

Uber X / Uber Black

Hardcover / Softcover Books

Ads / No Ads

Car Trim Levels

Third-Degree: Identify different types of consumers and force them to buy at different prices.

Student Tickets,

Child Tickets to Amusement

Resident Discounts

Employee Discounts

Financial Aid

Vet. Discounts

1.2 Example First Degree

Person 1: \$3

Person 2: \$2

Person 3: \$1

Suppose you have zero cost. Maximizing revenue is the same as maximizing profit.

What if you just charge one price:

The optimal thing to do is set price to \$2 and sell to person 1 and 2 earning \$4 of profit.

If you can charge everyone their full willingness to pay, you can earn \$6 instead.

1.3 Example Third Degree

Non-students: $q_n = 100 - p$

Students: $q_s = 100 - 2p$

$c(q) = 0$

Baseline: charge one price to both groups.

Total demand if you change the same price for everyone is:

$$(100 - p) + (100 - 2p) = 200 - 3p$$

$$q_{total} = 200 - 3p$$

The inverse demand:

$$p = \frac{200 - q}{3}$$

Suppose you want to sell 100 tickets, you can charge:

$$\frac{200 - 100}{3.0} \quad = \quad 33.3333$$

Profit if you change the same price for everyone:

$$\pi(q) = q\left(\frac{200 - q}{3}\right) - 0$$

$$\pi(q) = \frac{1}{3}200q - \frac{1}{3}q^2$$

The marginal profit is:

$$\frac{1}{3}200 - \frac{2}{3}q$$

Set that to zero to find the optimal number of tickets to sell:

$$\frac{1}{3}200 = \frac{2}{3}q$$

$$\frac{3}{2}\frac{1}{3}200 = q$$

$$100 = q$$

Plug this into the inverse demand to get the price:

$$p = \frac{200 - q}{3} = \frac{200 - 100}{3} = 33.3333$$

The profit earned is:

$$100\left(\frac{100}{3}\right) = 3333.33$$

How much better can you do by charging students and non-students a different price?

Student demand: $q_s = 100 - 2p_s$. Inverse demand $p_s = 50 - \frac{1}{2}q_s$

Profit earned by selling q_s tickets:

$$\pi(q_s) = \left(50 - \frac{1}{2}q_s\right)q_s$$

$$= 50q_s - \frac{1}{2}q_s^2$$

Maximize this by looking for where marginal profit is zero:

$$50 - q_s = 0$$

$$q_s = 50$$

$$p_s = 25$$

$$\pi_s(q_s) = 50 * 25 = 1250$$

Non-Student Demand: $q = 100 - p$. Inverse demand $p = 100 - q$

$$\pi(q_n) = (100 - q_n) q_n$$

$$100q_n - q_n^2$$

Where is this marginal profit zero:

$$100 - 2q_n = 0$$

$$100 = 2q_n$$

$$q_n = 50$$

Plug this into the non-student inverse demand to get the non-student ticket price:

$$100 - q_n = 100 - (50) = 50$$

$$p_n = 50$$

$$\pi_n(50) = 50 * 50 = 2500$$

Total profit:

$$2500 + 1250 = 3750$$