These notes essentially correspond to chapter 12 of the text.

1 Non-uniform pricing

So far we have discussed a monopolist who can only set a single price for its product. However, a monopolist may be able to increase its profit if it is able to charge more than one price for its product. The three basic types of non-uniform pricing are:

1. Price discrimination – charge different prices to different consumers for the same good

   Think of movie tickets, where students and seniors pay different prices than middle-aged persons.

2. Two-part tariffs – charge a lump sum fee in order to be able to participate in the market and then a price per unit purchased

   Think of Sam's Club – you need to buy a membership, then you can purchase the goods at the listed price in the store

3. Tie-in sales – "force" consumers to purchase a second good if they purchase a first good

   When Microsoft included the Internet Explorer browser with its operating system, this was seen as a tie-in sale.

We will focus primarily on the effects of price discrimination in class.

2 Price discrimination

Price discrimination is the practice of charging different consumers different prices for the same good based on the individual consumer's willingness to pay for that good. In order to effectively practice price discrimination, three requirements must be met in the market:

1. The firm must have market power.

   If the firm does not have any market power then it will not have any control over its price. It is difficult for the firm to charge different prices if it does not have any control over the price.

2. The firm must be able to identify and separate out at least two different groups of consumers with differing elasticities of demand.

   If the firm cannot identify and separate at least two different groups of consumers then it has no idea which price it should charge to which person.

3. The firm must be able to prevent resale from those who buy at the low price to those who buy at the high price.

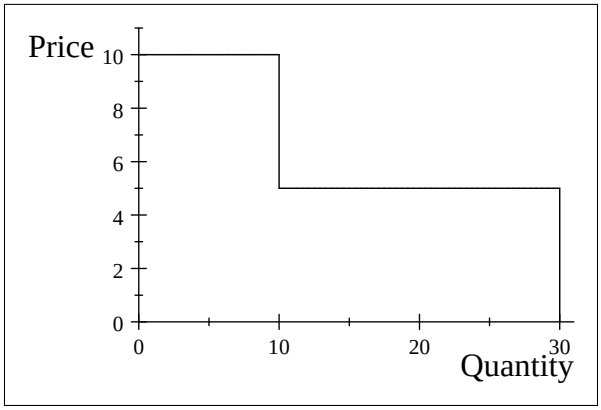
   If the firm cannot prevent resale from those buying at the low price, then the people who can buy at the low price have the incentive to buy more than they want, and then to sell the excess amount to those who will buy at the high price, taking all of the firm's profits that it hoped to make from price discriminating.

2.1 A simple example

Suppose that college students are willing to pay \$10 to see a movie, and that seniors are willing to pay \$5 (we will assume that there are no seniors who are college students for this example). Also assume that the firm can sell one extra ticket to the movie at zero MC (meaning that the MC for the firm is a flat line at zero) and that the firm has no fixed costs, so that $TR = \Pi$. We will look at 3 policies: charging everyone \$10, charging everyone \$5, and charging college students \$10 and seniors \$5 (price-discrimination). The table below shows the profit from each group:

Pricing	10 college students	20 seniors	Total Π
All \$5	\$50	\$100	\$150
All \$10	\$100	\$0	\$100
\$10 College, \$5 Seniors	\$100	\$100	\$200

The demand curve for movie tickets, based upon the patrons values, is also displayed below:



If the firm charges one price to all consumers, it will maximize profit by charging a price of \$5. This will leave the college students with \$50 of consumer surplus. However, the firm can earn more money by price discriminating and charging the college students \$10 and the seniors \$5. Thus, the firm takes the consumer surplus away from the college students, transferring the surplus to its own profit. Notice that this market was fully efficient even when a single price was charged, as the movie theater was selling a quantity of 30 tickets when

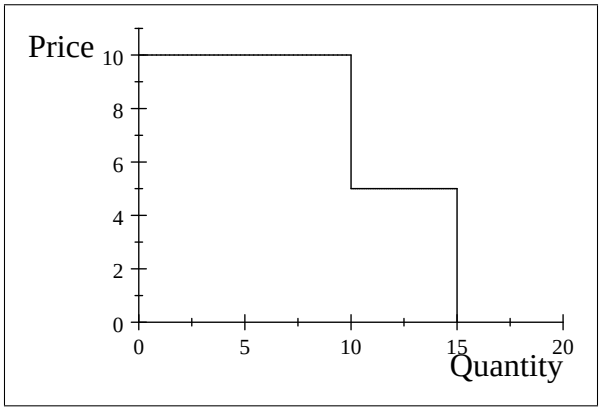
it priced at \$5. In this example, price discrimination allows for a transfer of consumer surplus to producer surplus (or profit since there are no costs in this example).

2.2 Another simple example

Keep the same parameters from above, only now there are only 5 seniors instead of 20. The table becomes:

Pricing	10 college students	5 seniors	Total Π
All \$5	\$50	\$25	\$75
All \$10	\$100	\$0	\$100
\$10 College, \$5 Seniors	\$100	\$25	\$125

The demand curve for the tickets is now:



The profit-maximizing single price in this example is \$10. Note that this excludes the seniors, which leads to a deadweight loss of \$25. However, if the firm can price discriminate, then it will be able to sell the 5 additional tickets to the seniors, which will increase efficiency (while at the same time increasing the firm's own profits). So in this example the ability to price discriminate actually increases the efficiency in the market.

2.3 Perfect price discrimination

Perfect price discrimination is also known as 1^{st} degree price discrimination. A firm practices perfect price discrimination if it charges every buyer exactly their maximum willingness to pay for each unit purchased. This means that the firm sets a price for each unit sold according to the demand curve for the product. Notice that if a firm perfectly price discriminates it will sell the quantity that society would deem efficient because now the demand curve IS the firm's marginal revenue curve. Also note that there will be zero consumer surplus if the firm perfectly price discriminates – all of the gains from trade will be captured because the efficient quantity is being traded, but all of the gains from trade will be captured by the firm.

2.4 Multi-market price discrimination (mathematically)

The typical method the firm uses to price discriminate is similar to the method used above – break the consumers into 2 or more groups and then charge the consumer a price based upon the group into which he falls. Suppose that we have two groups, seniors and college students. College students have the inverse demand function: $P(Q) = 204 - 5Q$ and seniors have the inverse demand function $P(Q) = 152 - 2Q$. Suppose that the marginal cost per unit is constant at \$4, or $MC = 4$ and that the $TC = 4Q$. If the monopolist can perfectly separate the two groups then it should act as a monopolist in both markets, and set the profit-maximizing single-price in EACH market. For the college students:

$$MR(college) = 4$$

$$204 - 10Q = 4$$

$$200 = 10Q$$

$$20 = Q$$

So the price for the college students is: $P(20) = 204 - 5(20) = 104$. The firm earns total revenue of $104 * 20 = 2080$ from the college students.

For the seniors:

$$MR(seniors) = 4$$

$$152 - 4Q = 4$$

$$148 = 4Q$$

$$37 = Q$$

The price for the seniors is: $P(37) = 152 - 2(37) = 78$. The firm earns total revenue of $37 * 78 = 2886$ from the seniors.

The firm's total cost is $TC = 4Q = 4 * (37 + 20) = 228$. Its profit is then: $2886 + 2080 - 228 = 4738$. If the firm were to set one price in this market, it would set a price around \$85. It would sell about the same number of units, 57, but the firm's profit would only be 4631 as opposed to the 4738 above.

You should note that this type of analysis to find the profit-maximizing price *only* works when the marginal costs are constant. When the marginal costs are not constant, then one must sum the two demand curves and find the marginal revenue curve for this summed demand curve, and then find where $MR = MC$.