Monopoly

1. Types of market structure

2. The diamond market

3. Monopoly pricing

4. Why do monopolies exist?

5. The social cost of monopoly power

6. Government regulation

7. Price discrimination

Announcements

- We are going to cover sections 10.1-10.4, sections 11.1-11.2, and for all practical purposes skip chapter 12.

- Ben Friedman will speak in class on March 23 on his book *The Moral Consequences of Economic Growth*

Types of Market Structure

In the real world there is a mind-boggling array of different markets.

- In some markets, producers are extremely competitive (e.g. grain)

- In other markets, producers somehow coordinate actions to avoid directly competing with each other (e.g. breakfast cereals)

- In others, there is no competition (e.g. flights out of Tweed-New Haven airport).

In general we classify market structures into four types:

- perfect competition – many producers of a single, unique good.

- monopoly - single producer of an unique good (e.g. cable TV, diamonds, particular drugs)

- monopolistic competition – many producers of slightly differentiated goods (e.g. fast food)

- oligopoly – few producers, with a single or only slightly differentiated good (e.g. cigarettes, cell phones, BDL to ORD flights)

What determines market structure?

- It really depends on how difficult it is to enter the market. That depends on control of the necessary resources or inputs, government regulations, economies of scale, network externalities, or technological superiority.

It also depends on how easy it is to differentiate goods:

- Soft drinks, economic textbooks, breakfast cereals can readily be made into different varieties in the eyes and tastes of consumers.

- Red roses are less easy to differentiate

The Diamond Market

- Geologically diamonds are more common than any other gem-quality colored stone. But if you price them, they seem a lot rarer ...

- Why? Diamonds are rare because The De Beers Company, the world's main supplier of diamonds, makes them rare. The company controls most of the worlds diamond mines and limits the quantity of diamonds supplied to the market.

- The De Beers monopoly of South Africa was created in the 1880s by Cecil Rhodes, a British businessman. In 1880 mines in South Africa dominated the world's supply of diamonds. There were many producers until Rhodes bought them up.

- By 1889 De Beers controlled almost all the world's diamond production.

- Since then large diamond deposits have been discovered in other African countries, Russia, Australia, and India. De Beers has either bought out new producers or entered into agreements with local governments

- For example, all Russian diamonds are marketed through De Beers.

Monopoly

- A monopolist is a firm that is the only producer of a good that has no close substitutes. An industry controlled by a monopolist is know as monopoly.

- In practice, true monopolies are hard to find in the U.S. today because of legal barriers. If today someone tried to do what Rhodes did, s/he would be accused of breaking anti-trust laws.

- Oligopoly, a market structure in which there is a small number of large producers, is much more common.

Monopoly Pricing

- A monopolist, unlike a producer in a perfectly competitive market, faces a downward sloping demand curve.

- Average revenue is

$$\frac{P(Q) \times Q}{Q} = P(Q)$$

  is just the market demand curve.

- Recall from before break, the profit maximizing production condition was

$$MR = MC$$

- Table 10.1

- Figure 10.1

- Recall a firm's profit is the difference between its revenue and its costs:

$$\pi(Q) = R(Q) - C(Q)$$

  where

$$\pi(Q) = \text{profits}$$
$$R(Q) = \text{total revenue}$$
$$C(Q) = \text{total economic cost}$$

- Since a monopolist faces a downward-sloping demand curve, At higher prices, the monopolist sells less output. The price it can charge depends negatively on the quantity it sells.

  In this case $R(Q) = P(Q) \times Q$ and the revenue function is curved.

- Marginal revenue is the change in total revenue generated by an additional unit of output. It is the slope of the revenue curve.

- Profits are maximized where the slope of the profit function is zero

$$\frac{\Delta\pi(Q)}{\Delta Q} = \frac{\Delta R(Q)}{\Delta Q} - \frac{\Delta C(Q)}{\Delta Q} = 0$$

- This implies that the firm maximizes profits when the marginal revenue is equal to marginal cost.

$$\frac{\Delta R(Q)}{\Delta Q} = \frac{\Delta C(Q)}{\Delta Q}$$
$$MR = MC$$

- Profit is maximized by producing the quantity of output at which marginal revenue of the last unit produced is equal to its marginal cost.

- Figure 10.3

- Note:

$$MR = \frac{\Delta R(Q)}{\Delta Q} = \frac{\Delta(PQ)}{\Delta Q}$$

- An increase in production by a monopolist has two opposing effects on revenue

  1. A *quantity effect:* One more unit is sold, increasing total revenue by the price at which the unit is sold: $(1) \times P = P$

  2. A *price effect:* In order to sell the last unit, the monopolist must cut the market price on *all* units sold. This decreases total revenue: $Q \times (\Delta P/\delta Q)$.

- Thus,

$$\begin{aligned}
MR &= P + Q\frac{\Delta P}{\Delta Q} \\
&= P + Q\frac{\Delta P}{\Delta Q}\frac{P}{P} \\
&= P + P\frac{Q}{P}\frac{\Delta P}{\Delta Q}
\end{aligned}$$

- $\frac{Q}{\Delta Q}\frac{\Delta P}{P}$ is the reciprocal of the elasticity of demand, so

$$MR = P + P\frac{1}{\epsilon_d}.$$

- Since the profit maximizing production decision is set $MR = MC$,

$$MC = P(1 + \frac{1}{\epsilon_d})$$

or

$$P = \frac{MC}{1 + \frac{1}{\epsilon_d}}$$

Since ϵ_d is a negative number, the denominator is less than one.

- A monopolist charges a price greater than marginal cost, but by an amount that depends inversely on the elasticity of demand.

- If demand is very elastic, the mark-up of price over marginal cost will be small.

  – Example: Amtrak and its inter-city fares

- If demand is very inelastic, the mark-up of price over marginal cost will large.

  – Example: pharmaceutical drugs for life-threatening illnesses

- What if marginal cost is zero? Well rewrite the pricing equation as

$$\frac{P - MC}{P} = -\frac{1}{\epsilon_d}$$

So if $MC = 0$, it must mean $\epsilon_d = -1$. If marginal cost is zero, maximizing profits is equivalent to maximizing revenue. Revenue is maximized when $\epsilon_d = -1$.

A monopolist has no supply curve

- Since the price charged depends on the elasticity of demand there is no one-to-one relationship between price and quantity produced.
- Figure 10.4 (a) and (b)
- A monopolist always operates on the elastic region of the market demand curve.
  - That is, the region in which the price elasticity of demand is between -1 and $-\infty$.
  - Suppose the firm was operating in inelastic region of the demand curve. It could raise price, reduce quantity, but the price effect would dominate the quantity effect and total revenue would increase. Since quantity goes down, total cost goes down.
  - If revenue goes up and costs go down with a price increase in the inelastic region of the demand curve, keep doing it until you are in the elastic region

Why Do Monopolies Exist?

- For a profitable monopoly to persist there must be *barriers to entry*. That is, something that prevents other firms from entering the industry.
- Barriers to entry can take several forms
1. Control of a scarce resource.
   - De Beers and diamonds

2. Economies of scale
   - In an industry with large fixed costs such public utilities, often the largest firm has a huge cost advantage since it is able to spread the fixed costs over a larger volume.
   - Hence a larger firm will have lower average fixed costs and lower average total costs than a smaller firm.
   - Consider the laying of gas lines or water lines through out a community.
   - A natural monopoly is a firm that produce the entire output of the market at a lower cost than what it would be if there were several firms.
   - In this case, the marginal cost curve is always below the average cost curve, so average cost is always declining.

3. Technological superiority
   - A firm that is able to maintain a consistent technological advantage over potential competitors can establish itself as a monopolist.
   - For example, Intel computer chips, though AMD occasionally rivals Intel.
4. Network externalities
   - Consider Microsoft's Windows Operating System.
   - Critics argue that Microsoft products are often technologically inferior to competitors, but try living without a Windows machine ...
5. Government-created barriers
   - Patents for goods such a pharmaceutical drugs (usually last 20 years).
   - Copyrights granted to authors and composers (usually last the lifetime of author plus 70 years)
   - Patents and copyrights encourage innovation through the promise of monopoly profits.

The Social Costs of Monopoly Power

- There is a loss of consumer surplus and a deadweight loss from monopoly pricing.
- Figure 10.10
- Consider the case with constant marginal cost.

Government Regulation of Monopolies

- Public ownership of natural monopolies
  - Examples include: Amtrak; U.S. Post Office; some publicly-owned electric power companies; wireless internet service in some towns.
  - Typically viewed as a bad idea. See Gary Becker's article in the reading packet.
  - Wireless internet service seems to be a success.
- Price regulation. Unlike in the perfectly competitive market case, imposing a price ceiling on a monopolist is not necessarily a bad thing.
- Imposing a price cap on a natural monopoly can increase consumer surplus.
- Figure 10.12
- But sometime the cure is worse than the disease. There are deadweight losses due to monopolies; but sometimes government control leads to the politicization of pricing and incentives for corruption. The costs from these can sometimes be larger than the deadweight loss.

Monopsony

- Refers to the case where there is a single buyer for a good.
  - U.S. Government with military equipment
  - U.S. Government and pharmaceutical drugs – NOPE
  - Hospitals in small cities and nurses
  - Wal-Mart and some consumer goods
- Can make a case for the minimum wage in the labor market case.
- This is a topic we can skip. You can wait for Econ 150 to learn more about this.

Price Discrimination

- If someone is willing to pay a lot for a good, why charge them only what the last person is willing to pay for the good?
- There is a surplus generated whenever there is a voluntary trade. But there is nothing that guarantees that the surplus is evenly shared. One side or the other may try to maximize their share of the surplus at the expense of the other side of the transaction.
- Why let the customer walk away with a big chunk of the surplus?

First-Degree Price Discrimination

- Recall that the demand curve is sometimes called the "willingness to pay curve."

- A person's *reservation price* is the maximum price s/he is willing to pay for a good.

- The idea is the charge each customer what they are willing to pay and no less.

- Figure 11.2

- Want the tailor the price to each consumer. This is what negotiations are all about. Why don't new cars have fixed-posted prices?

- Some consumers benefit because they may pay a lower price than if the firm was restricted to pay just a single price to all customers (and thus these customers enter the market).

- College and university tuition. If you want to pay less than full-price you need to turn over a tremendous amount of financial data on your family and then Yale figures out how much your family would be willing to pay to attend Yale.

Third-Degree Price Discrimination

- Practice of charging different prices to different market segments.

- What to distinguish between different consumer groups.

- Prices paid by customers on-board United Airlines Flight 815 from Chicago to Los Angeles on October 15, 1997.

Ticket Price	Number of Passengers	Average Advanced Purchase (days)
$2,000 or more	18	12
$1,000 to $1,999	15	14
$800 to $999	23	32
$600 to $799	49	46
$400 to $599	23	35
$200 to $399	23	35
less than $200	34	26
$0	19	–

- OK – so some of the difference is due to first-class versus coach-class tickets.

- Two types of consumers

  - Those with inelastic demand (e.g. business travelers, "I need to tell her not to marry him!!")

  - Those with elastic demand (e.g. "I might fly, I might drive, I might vacation elsewhere...")

- If the airline must charge a single price to all customers, it has two options

  - Charge a high price and get as much as possible out of the business traveler market, but lose the vacation traveler market.

  - Charge a low price and attract both types of buyers, but don't make as much as it could off business travelers.

- What it wants to do is charge business travelers a high price and tourists a low price.

- Figure 11.5

- So how does the airline distinguish between business travelers and tourists?

  - The Saturday-night stayover

  - Discounting tickets bought well ahead of time.

- See the reading packet on ticket pricing for Broadway shows (Phil Leslie is a Yale PhD and former Econ 115 TA).

- Ticket pricing for movies.

  - Senior citizens pay less for for movies than I do.

Sales

- Brooks Brothers puts blue blazers on sale twice or three times a year.
- Assume there are two types of customers.
  1. inelastic demand ("My blazer just ripped, and I have a meeting tomorrow")
  2. elastic demand ("I need to buy a new sport coat one of these days...")
- Most of the year, they just sell to the price-insensitive customers.
- Patient, price-sensitive customers wait for the sale.

Second-Degree Price Discrimination

- Practice of charging different prices per unit for different quantities of the same good or service.
- Quantity discounts.
- Idea is that consumers who buy a lot of a good are more likely to be price-sensitive than those who only buy a little.

Is Price Discrimination Bad?

- Compared to a single price monopolist, price discrimination – even when it is not perfect – can increase the efficiency of the market.
- If sales to consumers formerly priced out of the market but now able to purchase the good at a lower price generate enough surplus to offset the loss in surplus to those now facing a higher price and no longer buying the good, then total surplus increases when price discrimination is introduced.
- Of course there are issues of fairness ...
- Typically, governments worry about deadweight losses from monopolies rather than fairness.

Oligopoly

- So most market are somewhere between monopoly and perfect competition.
- Oligopoly is the most prevalent market structure.
- Four-firm concentration ratios

Industry	market share	firms
cigarettes	98.9	Philip Morris; R.J. Reynolds; Lorillard; Brown and Williamson
batteries	90.1	Duracell; Enegizer; Rayovac
beer	89.7	Anheuser-Busch; Miller; Coors; Strohs
light bulbs	88.9	Westinghouse; General Electric
breakfast cereals	82.9	Kellogg's; General Mills; Post; Quaker Oats

- In these industries, firms will want to take into account how their competitors will response when making pricing decisions.
- Need to think strategically.
- This will lead us to game theory ...