Monopoly

- Monopoly and perfect competition.
- Profit maximization by a monopolist.
- Inefficiency of a monopoly.
- Why do monopolies occur?
- Natural Monopolies.
Monopoly and Perfect Competition

- **Perfect competition**: each firm takes market price as given and decides how much to produce.

- **Monopoly**: does not take market price as given when deciding quantity. Figures that higher production will lead to different price.
Monopoly and Perfect Competition: Demand Curves
Profit Maximization

Monopolist maximizes profits:

$$\max_y r(y) - c(y)$$
Profit Maximization: Revenue

Competitive firm: \[ r(y) = p^* \times y \]

Monopolist: \[ r(y) = p_D(y) \times y \]
Profit Maximization

- **Solve:** \( \max_y r(y) - c(y) \)

- **Optimality condition:**

\[
MR(y) = \frac{\partial r(y)}{\partial y} = \frac{\partial c(y)}{\partial y} = MC(y)
\]
Profit Maximization

**Optimality condition:**

\[ \frac{\partial r(y)}{\partial y} = \frac{\partial c(y)}{\partial y} \]

**Marginal revenue:**

\[ \frac{\partial r(y)}{\partial y} = \frac{\partial [p_D(y)y]}{\partial y} = p_D(y) + \frac{\partial p_D(y)}{\partial y} y \]
Profit Maximization

- Competitive firm:

\[ p_D = MC(y) \]

- Monopolist:

\[ p_D(y) + \frac{\partial p_D(y)}{\partial y} y = MC(y) \]
Profit Maximization: Example

- Inverse market demand:
  \[ p_D(y) = 1,000 - 4y \]

- Marginal revenue:
  \[ MR(y) = (1,000 - 4y) + \frac{\partial (1,000 - 4y)}{\partial y} y \]
  \[ = (1,000 - 4y) - 4y \]
  \[ = 1,000 - 8y \]
Profit Maximization: Example

\[ p_D(y) = 1000 - 4y \]
\[ MC(y) = 100 + 2y \]
\[ MR(y) = 1000 - 8y \]
Profit Maximization: Example

\[ p_D y = 280 \]

\[ y^* = 90 \]

\[ p^* = 640 \]

\[ MC(y^*) = 280 \]

\[ MR(y) \]

\[ MC(y) \]
Profit Maximization: Example
Profit Maximization: Markup Pricing

- Price exceeds marginal cost:

\[ p_D(y) + \frac{\partial p_D(y)}{\partial y} y = MC(y) \]

- Rearrange:

\[ p_D(y) \left[ 1 + \frac{\partial p_D(y)}{\partial y} \frac{y}{p_D(y)} \right] = MC(y) \]
Profit Maximization: Markup Pricing

- **Markup pricing:**

  \[
  p_D(y) \left[ 1 + \frac{1}{\varepsilon} \right] = MC(y)
  \]

- **Price/marginal cost = markup:**

  \[
  \frac{p_D(y)}{MC(y)} = \frac{1}{1 + \frac{1}{\varepsilon}} > 1
  \]
Inefficiency of a Monopoly

\[ p_D \]

\[ p_M \]

\[ p_C \]

\[ MR(y) \]

\[ MC(y) \]

\[ p_D(y) \]
Inefficiency of a Monopoly: Deadweight Loss
Inefficiency of a Monopoly: What about Inventions?

- Patents in the US grant monopoly to a company over an innovative product or process for 17 years.

- Company will sell the product for 17 years at monopoly prices: deadweight loss.
Inefficiency of a Monopoly: What about Inventions?

- No patent protection \(\rightarrow\) little incentive to innovate.

- Too strong patent protection
  1) Deadweight loss for longer time
  2) Low incentives to innovate

- Optimal patent life balances these conflicting effects.
Why Do Monopolies Occur?

1. Cartels.
2. Patents.
3. Incumbent’s strategy of threatening potential entrants in industry to engage in a price war.
4. Relationship between the Minimum Efficient Scale and the Demand Curve.
Minimum Efficient Scale and Demand

$p^*$

$p^*$

$MES$

$y$

$MES$

$y$
Antitrust Laws

Sherman Act of 1890:

- **Section 1**: prohibits contracts and conspiracies, explicit or implicit, to restrain trade by fixing prices or restrict output.

- **Section 2**: illegal to monopolize or attempt to monopolize a market.
Antitrust Laws

Clayton Act of 1914:

- Illegal for a firm with a large market share to require a buyer not to buy from a competitor.
- Prohibits mergers and acquisitions if they substantially lessen competition.
- Illegal to sell a product at different prices to different buyers, if this injures competition.
Regulation: Natural Monopoly

- Some monopolies can be regulated: government sets price equal to marginal cost.

- Problems with this policy:
  1) incentives to invest in research and innovation decrease.
  2) At that price monopoly could be making negative profits!
Regulating Natural Monopolies

- Examples: phone companies, gas companies, public utilities in general.

- Regulations:
  1. Let monopolist charge price equal to average cost. What is a firm’s cost function?
  2. Government operates service: price equal marginal cost and subsidy to the firm to cover losses.