Monopoly

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Monopoly

A monopoly

- A sole provider of a viable product or service.
- A lack of any close substitutes for consumers to choose from.
- High barriers to deter the entry of any potential competitors.

Past Example of Monopoly (Standard Oil)

- Founded by the John D. Rockefeller.
- In 1882, Standard Oil's properties were incorporated into the Standard Oil Trust.
- Under this banner, Rockefeller formed a conglomeration that handled all oil production, transportation, refinement and marketing.
- By 1890, Standard Oil controlled 88% of the refined oil flows in the United States.
- At the turn of the century, the company controlled 91% of oil production and 85% of its final sales.
- In 1909, Standard Oil's hold on the oil industry began to slip. The US Department of Justice sued the company under federal anti-trust law for sustaining a monopoly.
- "discriminatory practices in favor of the combination by railroad companies; restraint and monopolization by control of pipe lines, and unfair practices against competing pipe lines."

Examples of monopoly

- De Beers (Diamond trade)
- U.S. Steel
- American Telephone And Telegraph
- Monsanto (Organic product, seed market)

Monopoly

- Only one firm active in the market
- What is a monopolist's problem?
    - Maximize profit by setting price (quantity)
    - Subject to downward sloping demand
- The difference between perfect competition and monopoly!
    - Monopolist firm is a price setter vs price taker (perfect competition)
- Can the firm set both price and quantity? Why or why not?
- Does it matter whether the firm set price or quantity?

Analysis of Monopoly Scenario

Demand $P = A - BQ$ and total cost function $Tc(Q)$

- Find $MC(Q)$.
- Find $MR(Q)$ using calculus or twice slope rule.
- Find Q s.t. $MC(Q) = MR(Q)$.
- Find P associated with Q.
- Find profits.

Monopoly Pricing
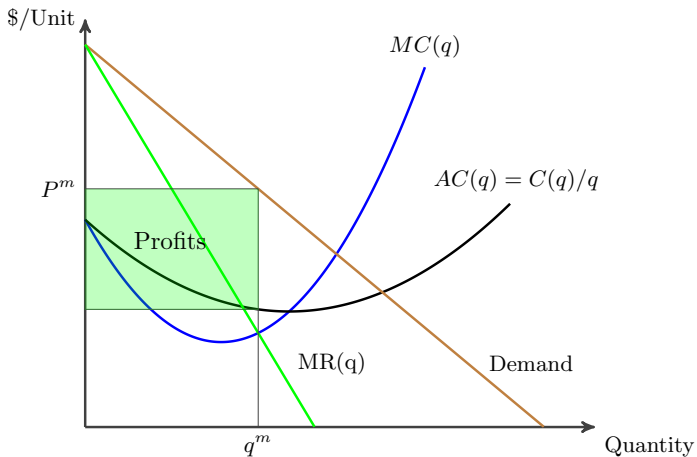
Monopolist's problem!

- The setting
    - Suppose a monopolist own n factories
    - Assume each factory has the same production technology:
      $Tc(q) = Dq + Eq^2$ (increasing marginal cost),
      where q is the quantity the firm chooses to produce
- Question: If the monopolist decides to produce Q units, how to optimally allocate the production among the n factories?
- Consider the following two extreme allocations
    - One factory produces all Q unit
    - Even allocation: each factory produces Q/n
- The most efficient ways to produce?

Example

- Setting
  - Suppose a monopolist owns 20 factories, and each factory's marginal cost: $MC(q) = 10 + 2q$ and total cost $Tc(q) = 10q + q^2$
  - Demand: $Q^d = 1100 - 50P$.
- Question:
  - If the monopolist decides to produce Q units, how to optimally allocate the production among the 20 factories?
  - The equilibrium price!

Monopoly Example

- Demand (as before): $Q^d = 1100 - 50P$.
- Monopolist's total cost:
  $C(Q) = 20 \times (10\frac{Q}{20} + (\frac{Q}{20})^2) = 10Q + \frac{Q^2}{20}$.
- marginal cost: $MC(Q) = 10 + 2 \times \frac{Q}{20} = 10 + \frac{Q}{10}$.

1. Linear Demand, so use twice slope rule:
   $P = 22 - \frac{Q}{50} \Rightarrow MR(Q) = 22 - \frac{Q}{25}$.
2. Equate $MR(Q) = MC(Q)$, solve for $Q^m = 600/7 = 85.7$.
3. Plug Q into demand to get price, $P^m = 22 - \frac{12}{7} = 20.3$.

Monopoly Example II

The cellular phone market, is now monopolized. The monopolist operates 50 identical plants, each sharing the same cost function

Total Cost Function: $TC(q) = 100 + 10q + q^2$

Marginal Cost Function: $MC(Q) = 10 + \frac{Q}{25}$

Market Demand: $Q_D = 6000 - 50P$

a. Marginal Revenue Function: Demonstrate that the monopolist's marginal revenue (MR) function is:
$MR(Q) = 120 - \frac{18Q}{50}$

b. Profit-Maximizing Output: The monopolist's profit-maximizing output level Q_M is 275. Determine the price set by the monopolist to sell this level of output.

c. Plant Profit Calculation: Calculate the profit earned at each one of the monopolist's plants.

Welfare and Surplus

We use surplus to measure how well-off consumers and firms are in the economy.

- **Consumer Surplus** - Difference between consumers willingness to pay and the amount they actually pay.

- **Producer Surplus** - Difference between cost of production and amount they actually receive

- **Total Surplus** = Consumer Surplus + Producer Surplus.

Surplus under Competition
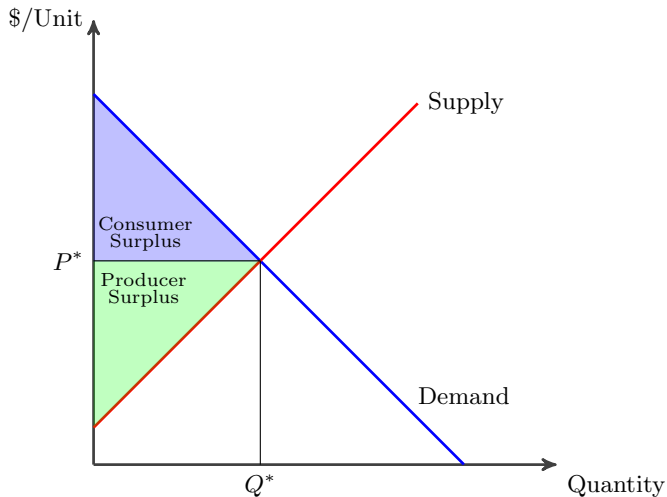
Competitive Efficiency

The competitive outcome maximizes total surplus:

- Producing less would reduce surplus:
  - consumers would be willing to pay more than it costs to produce the good.
- Producing more would reduce surplus:
  - additional goods would cost more to produce than consumer's willingness to pay.

Therefore, the competitive outcome is **efficient**. We cannot change the allocation to make anyone better off without making someone else worse off.

Surplus under Monopoly
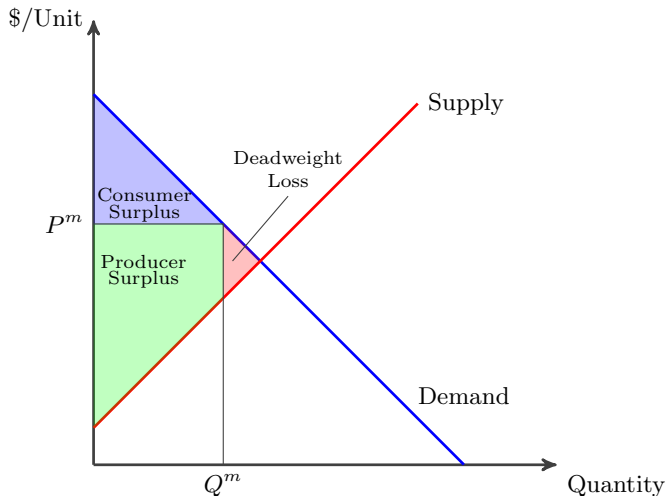
Example Consumer and Producer Surplus

Return to the cellular phone industry when it was organized as a perfectly competitive industry. Use the information in previous slides to work out consumer surplus and producer surplus in a competitive equilibrium.

  a. Show that when $Q_C = 500$ units and $P_C = \$30$ per unit then consumer surplus is equal to \$22,500 and producer surplus is equal to \$5,000. This results in a total surplus equal to \$27,500.

  b. Show that when an output of 275 units is produced in this industry, the sum of consumer and producer surplus falls to \$21,931.25.

Summary

- We have examined market outcomes under perfect competition and monopoly.
- Perfect competition is efficient and monopoly leads to a deadweight loss (less total surplus).
- The key difference is that a monopolist can directly affect the market price by withholding production.