Monopoly and Oligopoly

Introduction to Economics
ETH Zürich, Prof. Dr. Jan-Egbert Sturm
Winter Term 2006/07
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International Trade

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The Lessons for Trade Policy

- Discussed Benefits of International Trade are due to Comparative Advantage
  - Other Benefits of International Trade
    - Increased variety of goods
    - Lower costs through economies of scale
    - Increased competition
    - Enhanced flow of ideas
THE ARGUMENTS FOR RESTRICTING TRADE

- Jobs
- National Security
- Infant Industry
- Unfair Competition
- Protection-as-a-Bargaining Chip
Monopoly and Oligopoly

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Figure 1: The Types of Market Structure

Number of Firms?
- Many firms
  - Monopoly
    - Tap water
    - Public transport
  - Oligopoly
    - Supermarkets
    - Gas Stations
  - Monopolistic Competition
    - Cars
    - Movies
  - Perfect Competition
    - Wheat
    - Milk
- Few firms
- One firm
• While a competitive firm is a *price taker*, a monopoly firm is a *price maker*. 
• A firm is considered a *monopoly* if . . .
  • it is the sole seller of its product.
  • its product does not have close substitutes.
WHY MONOPOLIES ARISE

• The fundamental cause of monopoly is *barriers to entry.*
WHY MONOPOLIES ARISE

- Barriers to entry have three sources:
  - Ownership of a key resource.
  - The government gives a single firm the exclusive right to produce some good.
  - Costs of production make a single producer more efficient than a large number of producers.
Monopoly Resources

- Although exclusive ownership of a key resource is a potential source of monopoly, in practice monopolies rarely arise for this reason.
Government-Created Monopolies

- Governments may restrict entry by giving a single firm the exclusive right to sell a particular good in certain markets.
Government-Created Monopolies

- Patent and copyright laws are two important examples of how government creates a monopoly to serve the public interest.
Natural Monopolies

- An industry is a *natural monopoly* when a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms.
Natural Monopolies

- *A natural monopoly* arises when there are economies of scale over the relevant range of output.
Figure 1: Economies of Scale as a Cause of Monopoly

The graph shows the relationship between the quantity of output and the average total cost. As the quantity of output increases, the average total cost decreases, indicating economies of scale.
HOW MONOPOLIES MAKE PRODUCTION AND PRICING DECISIONS

- Monopoly versus Competition
  - Monopoly
    - Is the sole producer
    - Faces a downward-sloping demand curve
    - Is a price maker
    - Reduces price to increase sales
  - Competitive Firm
    - Is one of many producers
    - Faces a horizontal demand curve
    - Is a price taker
    - Sells as much or as little at same price
Figure 2 Demand Curves for Competitive and Monopoly Firms

(a) A Competitive Firm's Demand Curve

(b) A Monopolist's Demand Curve
A Monopoly’s Revenue

- **Total Revenue**
  
  \[ P \times Q = TR \]

- **Average Revenue**
  
  \[ \frac{TR}{Q} = AR = P \]

- **Marginal Revenue**
  
  \[ \frac{\Delta TR}{\Delta Q} = MR \]
### Table 1 A Monopoly’s Total, Average, and Marginal Revenue

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<thead>
<tr>
<th>Quantity of Water</th>
<th>Price</th>
<th>Total Revenue</th>
<th>Average Revenue</th>
<th>Marginal Revenue</th>
</tr>
</thead>
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<tr>
<td>(Q)</td>
<td>(P)</td>
<td>(TR = P × Q)</td>
<td>(AR = TR/Q)</td>
<td>(MR = ΔTR/ΔQ)</td>
</tr>
<tr>
<td>0 gallons</td>
<td>$11</td>
<td>$0</td>
<td>—</td>
<td>$10</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td>$10</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
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<td>4</td>
<td>7</td>
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<td>7</td>
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<td>8</td>
<td>3</td>
<td>24</td>
<td>3</td>
<td>–4</td>
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</tbody>
</table>
A Monopoly’s Revenue

• A Monopoly’s Marginal Revenue
  • A monopolist’s marginal revenue is always less than the price of its good.
    • The demand curve is downward sloping.
    • When a monopoly drops the price to sell one more unit, the revenue received from previously sold units also decreases.
A Monopoly's Revenue

- A Monopoly’s Marginal Revenue
  - When a monopoly increases the amount it sells, it has two effects on total revenue ($P \times Q$).
    - The output effect—more output is sold, so $Q$ is higher.
    - The price effect—price falls, so $P$ is lower.
Figure 3 Demand and Marginal-Revenue Curves for a Monopoly
Profit Maximization

• A monopoly maximizes profit by producing the quantity at which marginal revenue equals marginal cost.
• It then uses the demand curve to find the price that will induce consumers to buy that quantity.
1. The intersection of the marginal-revenue curve and the marginal-cost curve determines the profit-maximizing quantity. . .

2. . . . and then the demand curve shows the price consistent with this quantity.
Profit Maximization

• Comparing Monopoly and Competition
  • For a competitive firm, price equals marginal cost.
    \[ P = MR = MC \]
  • For a monopoly firm, price exceeds marginal cost.
    \[ P > MR = MC \]
A Monopoly’s Profit

• Profit equals total revenue minus total costs.
  • Profit = $TR - TC$
  • Profit = $(TR/Q - TC/Q) \times Q$
  • Profit = $(P - ATC) \times Q$
Figure 5 The Monopolist’s Profit

The graph illustrates the costs and revenue of a monopolist. The demand curve is depicted by the blue line labeled "Demand." The marginal cost curve is represented by the red line labeled "Marginal cost." The average total cost curve is shown as another red line. The monopoly price is indicated by point E, where the demand curve intersects the marginal cost curve. The quantity produced, $Q_{MAX}$, is where the demand curve intersects the average total cost curve at point C. The shaded area represents the monopoly profit, calculated as the area between the demand curve and the average total cost curve up to $Q_{MAX}$.
A Monopolist’s Profit

• The monopolist will receive economic profits as long as price is greater than average total cost.
Figure 6 The Market for Drugs

Costs and Revenue

Price during patent life
Price after patent expires
Marginal revenue
Marginal cost
Demand

Quantity

Monopoly quantity
Competitive quantity
THE WELFARE COST OF MONOPOLY

• In contrast to a competitive firm, the monopoly charges a price above the marginal cost.

• From the standpoint of consumers, this high price makes monopoly undesirable.

• However, from the standpoint of the owners of the firm, the high price makes monopoly very desirable.
Figure 7 The Efficient Level of Output

- Value to buyers is greater than cost to seller.
- Value to buyers is less than cost to seller.

Efficient quantity
The Deadweight Loss

- Because a monopoly sets its price above marginal cost, it places a wedge between the consumer’s willingness to pay and the producer’s cost.
- The monopolist produces less than the socially efficient quantity of output.
Figure 8 The Inefficiency of Monopoly

![Graph showing the inefficiency of monopoly with labels for price, quantity, monopoly price, monopoly quantity, efficient quantity, demand, marginal cost, marginal revenue, and deadweight loss.](image)
BETWEEN MONOPOLY AND PERFECT COMPETITION

- Imperfect competition refers to those market structures that fall between perfect competition and pure monopoly.
BETWEEN MONOPOLY AND PERFECT COMPETITION

• Imperfect competition includes industries in which firms have competitors but do not face so much competition that they are price takers.
BETWEEN MONOPOLY AND PERFECT COMPETITION

• Types of Imperfectly Competitive Markets
  • Oligopoly
    • Only a few sellers, each offering a similar or identical product to the others.
  • Monopolistic Competition
    • Many firms selling products that are similar but not identical.
MARKETS WITH ONLY A FEW SELLERS

• Because of the few sellers, the key feature of oligopoly is the tension between cooperation and self-interest.
MARKETS WITH ONLY A FEW SELLERS

• Characteristics of an Oligopoly Market
  • Few sellers offering similar or identical products
  • Interdependent firms
  • Best off cooperating and acting like a monopolist by producing a small quantity of output and charging a price above marginal cost
A Duopoly Example

- A duopoly is an oligopoly with only two members. It is the simplest type of oligopoly.
Table 1: The Demand Schedule for Water

<table>
<thead>
<tr>
<th>Quantity (in gallons)</th>
<th>Price</th>
<th>Total Revenue (and total profit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$120</td>
<td>$0</td>
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<tr>
<td>10</td>
<td>110</td>
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<td>120</td>
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<td>0</td>
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A Duopoly Example

- Price and Quantity Supplied
  - The price of water in a perfectly competitive market would be driven to where the marginal cost is zero:
    - \( P = MC = 0 \)
    - \( Q = 120 \) gallons
  - The price and quantity in a monopoly market would be where total profit is maximized:
    - \( P = 60 \)
    - \( Q = 60 \) gallons
A Duopoly Example

• Price and Quantity Supplied
  • The socially efficient quantity of water is 120 gallons, but a monopolist would produce only 60 gallons of water.
  • So what outcome then could be expected from duopolists?
Competition, Monopolies, and Cartels

- The duopolists may agree on a monopoly outcome.
  - **Collusion**
    - An agreement among firms in a market about quantities to produce or prices to charge.
  - **Cartel**
    - A group of firms acting in unison.
Although oligopolists would like to form cartels and earn monopoly profits, often that is not possible. Antitrust laws prohibit explicit agreements among oligopolists as a matter of public policy.
The Equilibrium for an Oligopoly

- A *Nash equilibrium* is a situation in which economic actors interacting with one another each choose their best strategy given the strategies that all the others have chosen.
The Equilibrium for an Oligopoly

• When firms in an oligopoly individually choose production to maximize profit, they produce quantity of output greater than the level produced by monopoly and less than the level produced by competition.
The Equilibrium for an Oligopoly

- The oligopoly price is less than the monopoly price but greater than the competitive price (which equals marginal cost).
Equilibrium for an Oligopoly

• Summary
  • Possible outcome if oligopoly firms pursue their own self-interests:
    • Joint output is greater than the monopoly quantity but less than the competitive industry quantity.
    • Market prices are lower than monopoly price but greater than competitive price.
    • Total profits are less than the monopoly profit.
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How the Size of an Oligopoly Affects the Market Outcome

• How increasing the number of sellers affects the price and quantity:
  • The output effect: Because price is above marginal cost, selling more at the going price raises profits.
  • The price effect: Raising production will increase the amount sold, which will lower the price and the profit per unit on all units sold.
How the Size of an Oligopoly Affects the Market Outcome

• As the number of sellers in an oligopoly grows larger, an oligopolistic market looks more and more like a competitive market.
• The price approaches marginal cost, and the quantity produced approaches the socially efficient level.
Cooperation among oligopolists is undesirable from the standpoint of society as a whole because it leads to production that is too low and prices that are too high.
Summary

• A monopoly is a firm that is the sole seller in its market.
• It faces a downward-sloping demand curve for its product.
• A monopoly’s marginal revenue is always below the price of its good.
Summary

• Like a competitive firm, a monopoly maximizes profit by producing the quantity at which marginal cost and marginal revenue are equal.

• Unlike a competitive firm, its price exceeds its marginal revenue, so its price exceeds marginal cost.
Summary

• A monopolist’s profit-maximizing level of output is below the level that maximizes the sum of consumer and producer surplus.

• A monopoly causes deadweight losses similar to the deadweight losses caused by taxes.
Summary

- Oligopolists maximize their total profits by forming a cartel and acting like a monopolist.
- If oligopolists make decisions about production levels individually, the result is a greater quantity and a lower price than under the monopoly outcome.
Summary

- Policymakers can respond to the inefficiencies of monopoly behavior with antitrust laws, regulation of prices, or by turning the monopoly into a government-run enterprise.
- If the market failure is deemed small, policymakers may decide to do nothing at all.