Chapter 16: Oligopoly

- Imperfect competition refers to those market structures that fall between perfect competition and pure monopoly and do not face so much competition that they are price takers.

- Types of Imperfectly Competitive Markets
  - Oligopoly
    - Only a few sellers, each offering a similar or identical product to the others (Brands of tennis balls: Wilson, Penn, Dunlop or Spalding).
  - Monopolistic Competition
    - Many firms selling products that are similar but not identical (Novels & Movies).

Quick Review

- Chapter 14:
  - In perfectly competitive markets, P=MR. Profit max MR=MC.
  - In the long-run, entry and exit drives the economic profit for the market down to zero making price equaling Average Total Cost (ATC).
- Chapter 15:
  - With market power, the firm can set the price higher than the marginal cost leading to positive economic profit.
  - Because of this power of prices, it creates a deadweight loss for society.

MARKETS WITH ONLY A FEW SELLERS: Oligopoly

- Because of the few sellers, the key feature of oligopoly is the tension between cooperation and self-interest.

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

<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>
</tr>
<tr>
<td>10</td>
<td>110</td>
<td>1,100</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
<td>2,000</td>
</tr>
<tr>
<td>30</td>
<td>90</td>
<td>2,700</td>
</tr>
<tr>
<td>40</td>
<td>80</td>
<td>3,200</td>
</tr>
<tr>
<td>50</td>
<td>70</td>
<td>3,500</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>3,600</td>
</tr>
<tr>
<td>70</td>
<td>50</td>
<td>3,500</td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>3,200</td>
</tr>
<tr>
<td>90</td>
<td>30</td>
<td>2,700</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
<td>2,000</td>
</tr>
<tr>
<td>110</td>
<td>10</td>
<td>1,100</td>
</tr>
<tr>
<td>120</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

A Duopoly Example

• Before considering the price and quantity of water, let’s discuss the two previous market structures.

• Price and Quantity Supplied
  • The price of water in a perfectly competitive market would be driven to where the marginal cost is zero:
    
    \[ P = MR = MC = 0 \]

  • \( Q = 120 \) gallons

  • The price and quantity in a monopoly market would be where total profit is maximized:
    
    \[ P = \$60 \]
    
    \[ Q = 60 \text{ gallons} \]

• 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. For example, oil cartels agree on total production and on the amount produced by each member.
- 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.

**Back to Jack & Jill...**

- Let’s say, Jack & Jill agree to the monopoly price of $60 per gallon.
- The profit of $3600 will be divided between the two.
- However, without a binding agreement with punishment, let’s say that Jack sells an extra 10 gallons priced at $50, which adds an extra $200. 40 gallons at $50 dollars.
- Somehow, Jill doesn’t believe Jack and she starts selling more 10 gallons. As they sell more, the profit shrinks, thus forcing Jack & Jill to rethink their strategy.

**Jack & Jill cont...**

- If both sell 40 gallons each, then profits shrinks to 1,600 each.
- They try it one more time… Adding 10 gallon. If so, 1,500 each…
- Eventually, they reach a strategy given the strategy the others have chosen. Since both suspect each other of cheating, they will always push it. This is a Nash Equilibrium.

**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.
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.

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.

GAME THEORY

- Game theory is the study of how people behave in strategic situations.
- Strategic decisions are those in which each person, in deciding what actions to take, must consider how others might respond to that action.
- Because the number of firms in an oligopolistic market is small, each firm must act strategically.
- Each firm knows that its profit depends not only on how much it produces but also on how much the other firms produce.

The Prisoners' Dilemma

- The prisoners’ dilemma provides insight into the difficulty in maintaining cooperation.
- Often people (firms) fail to cooperate with one another even when cooperation would make them better off.
- The prisoners’ dilemma is a particular “game” between two captured prisoners that illustrates why cooperation is difficult to maintain even when it is mutually beneficial.
**Figure 2 The Prisoners’ Dilemma**

<table>
<thead>
<tr>
<th>Bonnie’s Decision</th>
<th>Clyde’s Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confess</td>
<td>Confess</td>
</tr>
<tr>
<td>Bonnie gets 8 years</td>
<td>Clyde gets 8 years</td>
</tr>
<tr>
<td>Clyde gets 8 years</td>
<td>Clyde goes free</td>
</tr>
<tr>
<td>Confess</td>
<td>Remain Silent</td>
</tr>
<tr>
<td>Bonnie gets 20 years</td>
<td>Clyde goes free</td>
</tr>
<tr>
<td>Clyde gets 20 years</td>
<td>Clyde goes free</td>
</tr>
<tr>
<td>Remain Silent</td>
<td>Confess</td>
</tr>
<tr>
<td>Bonnie goes free</td>
<td>Clyde gets 1 year</td>
</tr>
<tr>
<td>Clyde gets 1 year</td>
<td>Clyde goes free</td>
</tr>
<tr>
<td>Remain Silent</td>
<td>Remain Silent</td>
</tr>
<tr>
<td>Clyde goes free</td>
<td>Clyde goes free</td>
</tr>
<tr>
<td>Bonnie goes free</td>
<td>Clyde goes free</td>
</tr>
</tbody>
</table>

**Figure 3 Jack and Jill’s Oligopoly Game**

<table>
<thead>
<tr>
<th>Jack’s Decision</th>
<th>Jill’s Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Production: 40 gal.</td>
<td>Low Production: 30 gal.</td>
</tr>
<tr>
<td>Jack gets $1,600 profit</td>
<td>Jill gets $1,500 profit</td>
</tr>
<tr>
<td>Jill gets $1,600 profit</td>
<td>Jack gets $2,000 profit</td>
</tr>
<tr>
<td>Jack gets $2,000 profit</td>
<td>Jill gets $1,800 profit</td>
</tr>
<tr>
<td>Jill gets $1,500 profit</td>
<td>Jack gets $1,800 profit</td>
</tr>
</tbody>
</table>

**Oligopolies as a Prisoners’ Dilemma**

- The dominant strategy is the best strategy for a player to follow regardless of the strategies chosen by the other players.
- Cooperation is difficult to maintain, because cooperation is not in the best interest of the individual player.

- Self-interest makes it difficult for the oligopoly to maintain a cooperative outcome with low production, high prices, and monopoly profits.
Figure 4 An Arms-Race Game

Decision of the United States (U.S.)

Arm | Disarm
---|---
U.S. at risk | U.S. at risk and weak
USSR at risk | USSR safe and powerful
U.S. safe and powerful | U.S. safe
USSR at risk and weak | USSR safe

Decision of the Soviet Union (USSR)

Figure 5 A Common-Resource Game

Exxon’s Decision

Drill Two Wells | Drill One Well
---|---
Exxon gets $4 million profit | Exxon gets $3 million profit
Chevron gets $4 million profit | Exxon gets $6 million profit
Exxon gets $3 million profit | Exxon gets $5 million profit
Chevron gets $3 million profit | Chevron gets $6 million profit
Chevron gets $5 million profit | Chevron gets $5 million profit

Why People Sometimes Cooperate

- Firms that care about future profits will cooperate in repeated games rather than cheating in a single game to achieve a one-time gain.
- Skip Chapter 17, start reading 18.