Chapter 14
Oligopoly: Firms in Less Competitive Markets
3) Under monopolistic competition, any firm with the ability to affect the price of its product will have a marginal cost curve that is below its demand curve.

**False → marginal revenue curve is below demand curve**

7) Under monopolistic competition, excess capacity results over the long run because the firms produce quantity that is not allocatively efficient.
3) Under monopolistic competition, any firm with the ability to affect the price of its product will have a marginal cost curve that is below its demand curve.

7) Under monopolistic competition, excess capacity results over the long run because the firms produce quantity that is not allocatively efficient.

False ➔ not productively efficient
Figure 13.6 Comparing Long-Run Equilibrium under Perfect Competition and Monopolistic Competition (2 of 2)

Monopolistically competitive firms in panel (b) produce the quantity where $MC=MR$. The marginal benefit to consumers is given by the demand curve, so $MC\neq MB$: not allocatively efficient.

And average cost is above its minimum point: not productively efficient.
Chapter Outline

14.1 Oligopoly and Barriers to Entry
14.2 Game Theory and Oligopoly
14.3 Sequential Games and Business Strategy
14.4 The Five Competitive Forces Model
Oligopoly: a Very Different Market Structure

In the previous chapters, we examined perfect and monopolistic competition. Similarities include:

- firms produce until their MC = MR
- the low barriers to entry would result in profit being competed away in the long run.

Oligopoly, a market structure in which a small number of interdependent firms compete, will require completely different tools to analyze. Why?

1. Oligopolists are large and know that their actions have an effect on one another.
2. Barriers to entry exist, preventing firms from competing away profits.
Table 12.1 The Four Market Structures

<table>
<thead>
<tr>
<th></th>
<th>Perfect Competition</th>
<th>Monopolistic Competition</th>
<th>Oligopoly</th>
<th>Monopoly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of product</strong></td>
<td>Identical</td>
<td>Differentiated</td>
<td>Identical or differentiated</td>
<td>Unique</td>
</tr>
<tr>
<td><strong>Ease of entry</strong></td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Entry blocked</td>
</tr>
<tr>
<td><strong>Examples of industries</strong></td>
<td>Growing wheat</td>
<td>Clothing stores</td>
<td>Manufacturing computers</td>
<td>First-class mail delivery</td>
</tr>
<tr>
<td></td>
<td>Poultry farming</td>
<td>Restaurants</td>
<td>Manufacturing automobiles</td>
<td>Providing tap water</td>
</tr>
</tbody>
</table>

Copyright © 2017 Pearson Education, Inc. All Rights Reserved
14.1 Oligopoly and Barriers to Entry

Show how barriers to entry explain the existence of oligopolies.

Before we analyze how oligopolists behave, it is useful to know which firms/markets we are discussing.

A useful tool for identifying the type of market structure is the four-firm concentration ratio: the fraction of an industry’s sales accounted for by its four largest firms.

- Ratio larger than 40 percent tends to indicate an oligopoly.

Although somewhat limited, the ratios are a useful tool in discussing the concentration of market power within an industry.
<table>
<thead>
<tr>
<th>Retail Trade</th>
<th>FFCR</th>
<th>Manufacturing</th>
<th>FFCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount department stores (Walmart and Target)</td>
<td>97%</td>
<td>Cigarettes (Phillip Morris &amp; R.J. Reynolds)</td>
<td>98%</td>
</tr>
<tr>
<td>Warehouse clubs &amp; supercenters (Sam’s Club and BJ’s Wholesale Club)</td>
<td>94%</td>
<td>Beer (Anheuser-Busch &amp; MillerCoors)</td>
<td>90%</td>
</tr>
<tr>
<td>College bookstores (Barnes &amp; Noble and Follett)</td>
<td>75%</td>
<td>Computers (Hewlett-Packard &amp; Dell)</td>
<td>87%</td>
</tr>
<tr>
<td>Hobby, toy, and game stores (Toys“R”Us and Michael’s)</td>
<td>72%</td>
<td>Aircraft (Boeing &amp; Lockheed Martin)</td>
<td>81%</td>
</tr>
<tr>
<td>Radio, television, &amp; other electronic stores (Best Buy &amp; Apple)</td>
<td>70%</td>
<td>Breakfast cereal (Kellogg’s &amp; General Mills)</td>
<td>80%</td>
</tr>
<tr>
<td>Athletic footwear stores (Footlocker and Champs)</td>
<td>68%</td>
<td>Dog and cat food (Mars &amp; Procter &amp; Gamble)</td>
<td>71%</td>
</tr>
<tr>
<td>Pharmacies and drugstores (Walgreens and CVS Caremark)</td>
<td>63%</td>
<td>Automobiles (General Motors and Ford)</td>
<td>68%</td>
</tr>
</tbody>
</table>
Limitations of Four-Firm Concentration Ratios

Four-firm concentration ratios are a good first look at competition in an industry (>40% indicates an oligopoly to many economists)

But FFCRs have some weaknesses:

1. They do not include the goods and services that foreign firms export to the United States.

2. They are calculated for national markets, even if the market is really local (like the college bookstore market).

3. The definition of the market is tricky: Walmart and BJ’s are in different markets but probably compete against one another to some extent.
Why Do Oligopolies Exist?

Oligopolies often exist because of **barriers to entry**—anything that keeps new firms from entering an industry in which firms are earning economic profits.

One example of a barrier to entry is **economies of scale**: the situation when a firm’s long-run average costs fall as the firm increases output.

- This can make it difficult for new firms to enter a market, because new firms usually have to start small and will hence have substantially higher average costs than established firms.
If long-run average cost is minimized at a small fraction of industry output, as on $LRAC_1$, there is room in the industry for many firms.

But if it takes a large (relative to industry size) firm to achieve economies of scale, the market is more likely to be an oligopoly.
Other Reasons for Oligopolies
Existing (1 of 2)

Ownership of a key input

- If control of a key input is held by one or a small number of firms, it will be difficult for additional firms to enter.
- *Examples:* Alcoa—bauxite for aluminum production
  De Beers—diamonds
  Ocean Spray—cranberries
Other Reasons for Oligopolies

Existing (2 of 2)

**Government-imposed barriers**

- Governments might grant exclusive rights to some industry to one or a small number of firms.
- **Examples:** Occupational licensing for dentists and doctors
  - Patents
  - Tariffs and quotas imposed on foreign companies importing goods

**Patent:** The exclusive right to a product for a period of 20 years from the date the patent is filed with the government.
Atlantic City, NJ became a casino gambling hotspot in the 1970s, protected from competition by laws against casino gambling in neighboring states.

By 2014, many neighboring states (PA, CT) changed to allowing casino gambling. Atlantic City casino profitability fell without the government protections, and many AC casinos went bankrupt.

Ironic – in rhetoric, Trump anti-govt regulations
Which of the following is *not* part of an oligopolist's business strategy?

A) meeting worker health and safety standards required of all firms

B) deciding the level of total output of a new product

C) determining the amount of advertising a new product needs

D) setting the product's price after considering what rivals will do

A
14.2 Using Game Theory to Analyze Oligopoly

Use game theory to analyze the strategies of oligopolistic firms.

Unlike perfect and monopolistic competitors, oligopolists are large relative to the market, and the actions of one oligopolist make large differences in the profits of another.

• So graphical analysis of one firm’s actions will not capture the nuances of an oligopolistic market.

→ best analyzed using a specialized field called *game theory*.

**Game theory**: The study of how people make decisions in situations in which attaining their goals depends on their interactions with others;

• in economics, the study of the decisions of firms in industries where the profits of a firm depend on its interactions with other firms.
Game Theory

Game theory was developed during the 1940s and advanced by mathematicians and social scientists like economists.

All “games” share certain characteristics:

1. *Rules* that determine what actions are allowable
2. *Strategies* that players employ to attain their objectives in the game
3. *Payoffs* that are the results of the interactions among the players’ strategies

For example, we can model firm production as a “game”:

- Rules: the production functions and market demand curve
- Strategies: firms’ production decisions
- Payoffs: firms’ profits
Each must choose their **business strategy**: actions that a firm takes to achieve a goal, such as maximizing profits.

Assume each firm can charge either $14.99 or $9.99. The combination of strategies chosen determines profit.

**Payoff matrix**: a table that shows the payoffs that each firm earns from every combination of strategies by the firms.
Suppose you are Spotify in this game. How would you play?


Charging $9.99 is a **dominant strategy** for Spotify: a strategy that is the best for a firm, no matter what strategies other firms use.
Now suppose you are Apple. How would you play?


Charging $9.99 is a dominant strategy for Apple also.
Both firms charging $9.99 is a **Nash equilibrium**: a situation in which each firm chooses the best strategy, given the strategies chosen by the other firm.

The firms don’t have to have dominant strategies in order for there to be a Nash equilibrium; their strategies just have to be *best responses* to one another’s strategies.
Notice that both firms could do better via **collusion**: an agreement among firms to charge the same price or otherwise not to compete.

- If both firms charge $14.99, they achieve more profit than by acting independently.

Collusion is against the law in the United States, but you can see why firms might be tempted to collude: their profits could be substantially higher.
Cooperative Equilibrium vs. Noncooperative Equilibrium

Nash equilibrium is an example of a noncooperative equilibrium: an equilibrium in a game in which players do not cooperate but pursue their own self-interest.

• Many game theorists concentrate on noncooperative equilibrium, particularly because of laws against cooperation among firms.

If we allowed players to coordinate their actions in a game, by forming alliances etc., we would be looking for a cooperative equilibrium: an equilibrium in a game in which players cooperate to increase their mutual payoff.

• This might make sense for many social interactions: groups of people often try to cooperate rather than work independently.

→ Example in “A Beautiful Mind”?
Prisoner’s Dilemma

Economists and other social scientists refer to the situation with Spotify and Apple as a **prisoner’s dilemma**: a game in which pursuing dominant strategies results in noncooperation that leaves everyone worse off.

The name comes from a problem faced by two suspects the police arrest for a crime.

- The police may lack evidence and thus separate the suspects and offer each a suspended prison sentence in exchange for confessing to the crime and testifying against the other suspect.

- Each suspect has a dominant strategy to confess. If both confess, they both go to jail for a long time, while they both could have gone to jail for a short time if they had both remained silent.
Figure 14.3 Changing the Payoff Matrix in a Repeated Game

Suppose Domino’s and Pizza Hut are deciding how to price a pizza: $12 or $10.

- This game gets played not once but every day.

If Domino's and Pizza Hut each advertise that they will match their competitor's price, the payoff matrix changes as shown in the diagram. The equilibrium changes from one outcome to another.
Suppose Domino’s and Pizza Hut are deciding how to price a pizza: $12 or $10.

- This game gets played not once but every day.

A clever way to avoid the low-profit Nash equilibrium is to advertise a price match guarantee. Then if either firm cuts prices, the other has guaranteed to do so as well.

- Now neither firm will have an incentive to cut prices.
- *Do price match guarantees really benefit consumers?*
Other Methods for Avoiding Price Competition

A price match guarantee is an *enforcement mechanism*, making automatic the decision about whether to *punish* a competing firm for charging a low price.

Another method is *price leadership*, a form of *implicit* collusion in which one firm in an oligopoly announces a price change and the other firms in the industry match the change.

- **Example:** In the 1970s, General Motors would announce a *price change at the beginning of a model year*, and Ford and Chrysler would match GM’s *price change*.

- *Explicit* collusion is illegal, but managers could potentially get away with implicit collusion if they find a way to signal to each other.
Mergers in the airline industry have increased the possibility of implicit collusion.

Decreasing fuel costs in 2014 made flights more profitable, but top airline managers all announced they would undertake only modest increases in capacity.

In July 2015, the Department of Justice began investigating the airlines to determine whether they were colluding.
A cartel is a group of firms that collude by agreeing to restrict output to increase prices and profits.

The Organization of Petroleum Exporting Countries is the best known cartel. OPEC colluded to restrict output and raise prices in the 1970s and 1980s.

- But collusion has proved difficult to maintain over time.
Because Saudi Arabia can produce much more oil than Nigeria, its output decisions have a much larger effect on the price of oil.

- Saudi Arabia has a dominant strategy to cooperate and produce a low output.

Nigeria, however, has a dominant strategy not to cooperate and instead produce a high output.

- In order to punish Nigeria for defecting, Saudi Arabia would have to hurt itself substantially. Would it be worth it to you?
In which of the following cartels is total cartel profit likely to be the highest?

A) a cartel made up of equal sized firms each producing different quantities of a differentiated product

B) a cartel made up of firms of various sizes each producing different quantities of a homogeneous product

C) a cartel made up of firms of various sizes each producing the same quantity of a differentiated product

D) a cartel made up of identical firms each producing the same quantity of a homogeneous product
14.3 Sequential Games and Business Strategy

Use sequential games to analyze business strategies.

The game theory models we have analyzed so far have been *simultaneous*: the players have made their decisions at the same time.

But some games are *sequential* in nature: one firm makes a decision, and the other makes its decision having observed the first firm’s decision.

- We analyze such games using a *decision tree*, indicating who gets to make a decision at what point, and what the consequences of their decision will be.
1. Apple decides whether to charge $1,000 or $800 for a new laptop.

2. Then Dell decides to enter the market or not, needing a 15 percent return.

If Apple charges $1,000, Dell will want to enter; its return exceeds 15 percent.

If Apple charges the low price, Dell will not want to enter. → So Apple can deter Dell from entering the market by charging $800.
1. Dell can offer $20 or $30 per copy for TruImage’s software.
2. Then TruImage can accept or reject the offer.

Dell will look ahead and realize that TruImage is better off accepting Dell’s offer, no matter what price Dell offers.

Therefore Dell should offer the low price, anticipating that TruImage will accept the offer.
Notice that TrulImage would like to threaten to reject an offer of $20.

- If Dell believed the threat, its best action would be to offer $30.

But Dell shouldn’t believe the threat; it is not *credible*.

- Only the original outcome is a *subgame-perfect equilibrium*: where no player can improve their outcome by changing their decision at any decision node.
14.4 The Five Forces Competitive Model

Use the five competitive forces model to analyze competition in an industry.

Michael Porter of Harvard Business School identifies five separate competitive forces that determine the overall level of competition in an industry:

1. **Existing firms**

   *Example: Educational Testing Service administers the ($52.50) SAT and ($195) GRE tests. The SAT has competition from the ACT, helping keep its price low. The GRE has no competitor.*

2. **Threat from new entrants**

   *Example: In the previous section, Apple charged a low price to deter Dell from entering its market.*
The Five Forces Competitive Model (cont.)

3. **Competition from substitutes**

   Example: *Printed encyclopedia sets used to cost well over $1000, but parents would buy them because there were no good substitutes. But the advent of cheap computer-based encyclopedias helped drive printed encyclopedia producers out of business.*

4. **Bargaining power of buyers**

   Example: *Large companies like Wal-Mart can threaten to buy goods from competitors, forcing suppliers to keep their prices low.*

5. **Bargaining power of suppliers**

   Example: *As a start-up, Microsoft couldn’t force IBM to pay a high price for its operating system. But as Microsoft became the dominant player in operating systems, it could charge much more to computer manufacturers.*
It is generally very difficult to predict which companies will be successful long term.

Example: In 2002, a best-selling business book identified Circuit City as a company that might “achieve enduring greatness”.

- But in 2009, Circuit City filed for bankruptcy.

“Enduring greatness” and continued economic profits require a firm to constantly work to maintain its advantage.

- A good dose of luck goes a long way, too.
The bargaining power of buyers increases if
A) there are many large buyers.
B) the input in question has few substitutes.
C) the input in question is not a critical component of production.
D) there are wide variations in the quality of inputs from supplier to supplier.

C
The bargaining power of suppliers increases if

A) the cost of switching suppliers is relatively low.
B) there are only a few competitors to the supplier.
C) the input in question is not a critical component of production.
D) the input supplied is relatively standardized.

B