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Oligopoly 14



CHAPTER OUTLINE

Market Structure in an Oligopoly

Oligopoly Models
 The Collusion Model
 The Price-Leadership Model
 The Cournot Model

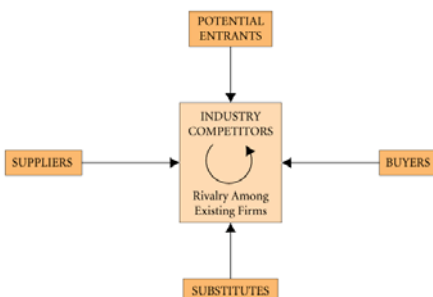
Game Theory
 Repeated Games
 A Game with Many Players: Collective Action Can Be Blocked by a Prisoner's Dilemma

Oligopoly and Economic Performance
 Industrial Concentration and Technological Change

The Role of Government
 Regulation of Mergers
 A Proper Role?

Market Structure in an Oligopoly

Five Forces model A model developed by Michael Porter that helps us understand the five competitive forces that determine the level of competition and profitability in an industry.



▲ FIGURE 14.1 Forces Driving Industry Competition

oligopoly A form of industry (market) structure characterized by a few dominant firms. Products may be homogenous or differentiated.

Oligopolists compete with one another not only in price but also in developing new products, marketing and advertising those products, and developing complements to use with the products.

TABLE 14.1 Percentage of Value of Shipments Accounted for by the Largest Firms in High-Concentration Industries, 2002

Industry Designation	Four Largest Firms	Eight Largest Firms	Number of Firms
Primary copper	99	100	10
Cigarettes	95	99	15
Household laundry equipment	93	100	13
Cellulosic man-made fiber	93	100	8
Breweries	90	94	344
Electric lamp bulbs	89	94	57
Household refrigerators and freezers	85	95	18
Small arms ammunition	83	89	109
Cereal breakfast foods	82	93	45
Motor vehicles	81	91	308

concentration ratio The share of industry output in sales or employment accounted for by the top firms.

contestable markets Markets in which entry and exit are easy enough to hold prices to a competitive level even if no entry actually occurs.

Price-Fixing Can Send You to Jail!

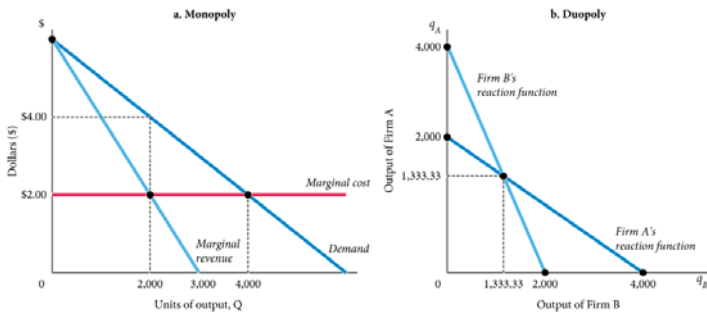
Price-fixing is a criminal offense, vigorously attacked by the Department of Justice. Economists across the board support vigorous prosecution of price fixers.

All firms who do business on U.S. soil are subject to U.S. antitrust laws, regardless of where their owners live.

In September 2012, executive officers of a Taiwanese firm, AU Optronics, were accused of price-fixing in the LCD screen business. The company paid \$500 million in fines to the government and its chief executive was sentenced to three years in jail.

THINKING PRACTICALLY

- Suppose you believed that the size of the fine levied in price-fixing cases was an important deterrent to price-fixing. What market factors would you want to look at to figure out what fine to charge?



▲ FIGURE 14.2 Graphical Depiction of the Cournot Model

The left graph shows a profit-maximizing output of 2,000 units for a monopolist with marginal cost of \$2.00.

The right graph shows output of 1,333.33 units each for two duopolists with the same marginal cost of \$2.00, facing the same demand curve.

Total industry output increases as we go from the monopolist to the Cournot duopolists, but it does not rise as high as the competitive output (here 4,000 units).

Oligopoly Models

The Collusion Model

cartel A group of firms that gets together and makes joint price and output decisions to maximize joint profits.

tacit collusion Collusion occurs when price- and quantity-fixing agreements among producers are explicit. *Tacit collusion* occurs when such agreements are implicit.

The Price-Leadership Model

price leadership A form of oligopoly in which one dominant firm sets prices and all the smaller firms in the industry follow its pricing policy.

The Cournot Model

duopoly A two-firm oligopoly.



When a group of profit-maximizing oligopolists colludes on price and output, the result is exactly the same as:

- The perfectly competitive case.
- The monopolistically competitive case.
- The monopoly case.
- None of the above. The collusion model yields results unlike any other market structure.

Game Theory

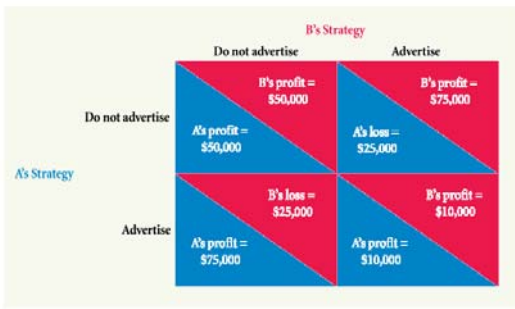
game theory Analyzes the choices made by rival firms, people, and even governments when they are trying to maximize their own well-being while anticipating and reacting to the actions of others in their environment.

dominant strategy In game theory, a strategy that is best no matter what the opposition does.

prisoners' dilemma A game in which the players are prevented from cooperating and in which each has a dominant strategy that leaves them both worse off than if they could cooperate.

Nash equilibrium In game theory, the result of all players' playing their best strategy given what their competitors are doing.

maximin strategy In game theory, a strategy chosen to maximize the minimum gain that can be earned.



▲ FIGURE 14.3 Payoff Matrix for Advertising Game

Both players have a dominant strategy.

If B does not advertise, A will because \$75,000 beats \$50,000.

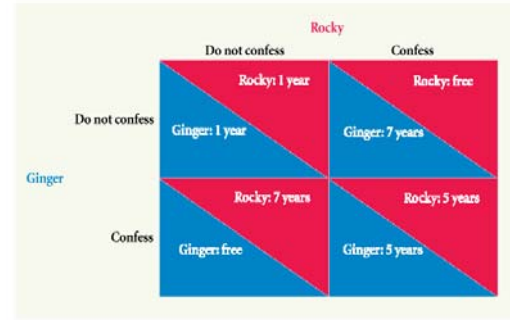
If B does advertise, A will also advertise because a profit of \$10,000 beats a loss of \$25,000.

A will advertise regardless of what B does.

Similarly, B will advertise regardless of what A does.

If A does not advertise, B will because \$75,000 beats \$50,000.

If A does advertise, B will too because a \$10,000 profit beats a loss of \$25,000.



▲ FIGURE 14.4 The Prisoners' Dilemma

Both players have a dominant strategy and will confess.

If Rocky does *not* confess, Ginger will because going free beats a year in jail.

Similarly, if Rocky *does* confess, Ginger will confess because 5 years in the slammer is better than 7.

Rocky has the same set of choices. If Ginger does *not* confess, Rocky will because going free beats a year in jail.

Similarly, if Ginger *does* confess, Rocky also will confess because 5 years in the slammer is better than 7. Both will confess *regardless* of what the other does.



The prisoners' dilemma yields the following outcome:

- Both criminals would be better off confessing, but they choose not to confess.
- Both criminals would be better off not confessing, but they choose to confess.
- If both criminals confess, they both get the most lenient sentence possible.
- When both criminals confess, they get the maximum sentence.
- Whether the criminals confess or not, they get the maximum sentence.

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▲ FIGURE 14.5 Payoff Matrixes for Left/Right-Top/Bottom Strategies

In the original game (a), C does not have a dominant strategy.

If D plays left, C plays top; if D plays right, C plays bottom.

D, on the other hand, *does* have a dominant strategy: D will play right regardless of what C does.

If C believes that D is rational, C will predict that D will play right.

If C concludes that D will play right, C will play bottom.

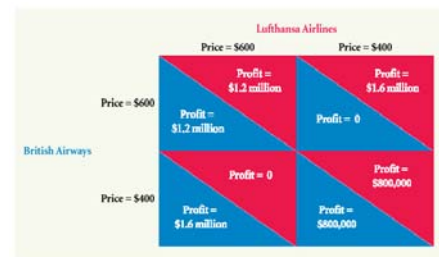
The result is a Nash equilibrium because each player is doing the best that it can *given* what the other is doing.

In the new game (b), C had better be very sure that D will play right because if D plays left and C plays bottom, C is in big trouble, losing \$10,000.

C will probably play top to minimize the potential loss if the probability of D's choosing left is at all significant.

Repeated Games

tit-for-tat strategy A repeated game strategy in which a player responds in kind to an opponent's play.



▲ FIGURE 14.6 Payoff Matrix for Airline Game

In a single play, both British Airways (BA) and Lufthansa Airlines (LA) have dominant strategies.

If LA prices at \$600, BA will price at \$400 because \$1.6 million beats \$1.2 million.

If, on the other hand, LA prices at \$400, BA will again choose to price at \$400 because \$800,000 beats zero.

Similarly, LA will choose to price at \$400 regardless of which strategy BA chooses.

A Game with Many Players: Collective Action Can Be Blocked by a Prisoner's Dilemma

Coordinated collective action in everybody's interest can be blocked under some circumstances.

A multiple-player game can result in a classic prisoners' dilemma, where collusion if it could be enforced would result in an optimal outcome but where dominant strategies result in a suboptimal outcome.

To break this dilemma, we pass laws that require us to contribute to the production of public goods by paying taxes, thereby allowing government to become a player.

The only necessary condition of oligopoly, a market structure that is consistent with a variety of behaviors, is that firms are large enough to have some control over price.

Oligopoly and Economic Performance

With the exception of the contestable-markets model, we can conclude that concentration in a market leads to pricing above marginal cost and output below the efficient level.

On the other hand, vigorous product competition among oligopolistic competitors may produce variety and lead to innovation.

Industrial Concentration and Technological Change

One of the major sources of economic growth and progress throughout history has been technological advance.

Several economists, notably Joseph Schumpeter and John Kenneth Galbraith, argued in works now considered classics that industrial concentration, where a relatively small number of firms control the marketplace, actually increases the rate of technological advance.



In *contestable markets*, large oligopolistic firms tend to behave like:

- Cartels.
- Duopolies.
- Monopolies.
- Perfectly competitive firms.
- Monopolistically competitive firms.

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The Role of Government

Regulation of Mergers

Celler-Kefauver Act Extended the government's authority to control mergers.

Herfindahl-Hirschman Index (HHI) An index of market concentration found by summing the square of percentage shares of firms in the market.

TABLE 14.2 Calculation of a Simple Herfindahl-Hirschman Index for Four Hypothetical Industries, Each with No More than Four Firms

	Percentage Share of:				Herfindahl-Hirschman Index
	Firm 1	Firm 2	Firm 3	Firm 4	
Industry A	50	50	–	–	$50^2 + 50^2 = 5,000$
Industry B	80	10	10	–	$80^2 + 10^2 + 10^2 = 6,600$
Industry C	25	25	25	25	$25^2 + 25^2 + 25^2 + 25^2 = 2,500$
Industry D	40	20	20	20	$40^2 + 20^2 + 20^2 + 20^2 = 2,800$



What is the Herfindahl-Hirschman Index (HHI) for an industry in which five firms each control 20% of the market?

- 20
- 100
- 2,000
- 5,000

What is the Herfindahl-Hirschman Index (HHI) for an industry in which five firms each control 20% of the market?

- a. 20
- b. 100
- c. **2,000**
- d. 5,000

▼ FIGURE 14.7 Department of Justice Merger Guidelines (revised 1984)

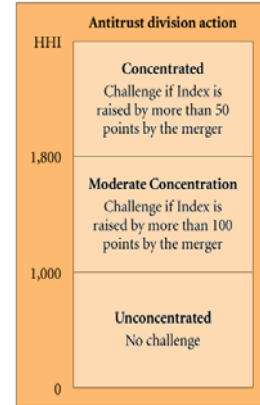


TABLE 14.3

Industry Definition	Some Sample HHIs
Beer	3,525
Ethanol	326
Las Vegas gaming	1,497
Critical care patient monitors	2,661

ECONOMICS IN PRACTICE

Blocking the AT&T Merger with T-Mobile

In mid-2011, AT&T announced its intent to buy T-Mobile, which would make it the largest wireless company in the United States. Such a merger would also leave the top two rival firms with 70% of the wireless market.

AT&T argued that to compete well and better serve customers, it needed to have the added spectrum controlled by T-Mobile.

The Department of Justice worried about the effects of the increased concentration on prices. In the end the merger was challenged by both the Department of Justice and the Federal Communications Commission and could not proceed.

THINKING PRACTICALLY

1. T-Mobile had historically been one of the low-price firms in the wireless market. Do you think this should matter in considering the merger?

In 1997, the Department of Justice and the FTC issued joint *Horizontal Merger Guidelines*, updating and expanding the 1984 guidelines. In the new provisions, the government examines each potential merger to determine whether it enhances the firms' power to engage in "coordinated interaction" with other firms in the industry, defining "coordinated interaction" as

actions by a group of firms that are profitable for each of them only as the result of the accommodating reactions of others. This behavior includes tacit or express collusion, and may or may not be lawful in and of itself.

A Proper Role?

One view concerning the role of government in regulating markets is that high levels of concentration lead to inefficiency and that government should act to improve the allocation of resources—to help the market work more efficiently.

An opposing view holds that the clearest examples of effective barriers to entry are those created by government.

Further complicating the debate, firms that dominate a domestic market may be fierce competitors in the international arena.

REVIEW TERMS AND CONCEPTS

- | | |
|---------------------|----------------------------------|
| cartel | Herfindahl-Hirschman Index (HHI) |
| Celler-Kefauver Act | maximin strategy |
| concentration ratio | Nash equilibrium |
| contestable markets | oligopoly |
| dominant strategy | price leadership |
| duopoly | prisoners' dilemma |
| Five Forces model | tacit collusion |
| game theory | tit-for-tat strategy |