chapter:

15

>> Oligopoly

Krugman/Wells Economics

WHAT YOU WILL LEARN IN THIS CHAPTER

- The meaning of **oligopoly**, and why it occurs
- Why **oligopolists** have an incentive to act in ways that reduce their combined profit, and why they can benefit from **collusion**
- How our understanding of oligopoly can be enhanced by using **game theory**, especially the concept of the **prisoners' dilemma**
- How repeated interactions among oligopolists can help them achieve **tacit collusion**
- How oligopoly works in practice, under the legal constraints of **antitrust policy**

The Prevalence of Oligopoly

- In addition to perfect competition and monopoly, *oligopoly* and monopolistic competition are also important types of market structure. They are forms of *imperfect competition.*

The Prevalence of Oligopoly

- **Oligopoly** is a common market structure.
- It arises from the same forces that lead to monopoly, except in weaker form.
- It is an industry with only a small number of producers.
- A producer in such an industry is known as an **oligopolist.**

The Prevalence of Oligopoly

- When no one firm has a monopoly, but producers nonetheless realize that they can affect market prices, an industry is characterized by **imperfect competition.**

Some Oligopolistic Industries

The HHI for Some Oligopolistic Industries

Industry	HHI	Largest firms
PC operating systems	9,182	Microsoft, Linux
Wide-body aircraft	5,098	Boeing, Airbus
Diamond mining	2,338	De Beers, Alrosa, Rio Tinto
Automobiles	1,432	GM, Ford, Chrysler, Toyota, Honda, Nissan, VW
Movie distributors	1,096	Buena Vista, Sony Pictures, 20th Century Fox, Warner Bros., Universal, Paramount, Lionsgate
Internet service providers	750	SBC, Comcast, AOL, Verizon, Road Runner, Earthlink, Charter, Qwest
Retail grocers	321	Wal-Mart, Kroger, Sears, Target, Costco, Walgreens, Ahold, Albertsons

Sources: Canadian Government; Diamond Facts 2006; www.w3counter.com; Planet retail; Autodata; Reuters; ISP Planet; Swivel. Data cover 2006–2007.

Understanding Oligopoly

- Some of the key issues in oligopoly can be understood by looking at the simplest case, a *duopoly.*
- An *oligopoly* consisting of only two firms is a duopoly. Each firm is a *duopolist.*
- With only two firms in the industry, each would realize that by producing more, it would drive down the market price. So each firm would, like a monopolist, realize that profits would be higher if it limited its production.

Understanding Oligopoly

- One possibility is that the two companies will engage in **collusion**. Sellers engage in **collusion** when they cooperate to raise each others' profits.
- The strongest form of collusion is a **cartel**, an agreement by several producers to obey output restrictions in order to increase their joint profits.
- They may also engage in **non-cooperative behavior**, ignoring the effects of their actions on each others' profits.

Understanding Oligopoly

- By acting as if they were a single monopolist, oligopolists can maximize their combined profits. So there is an incentive to form a *cartel*.
- However, each firm has an incentive to cheat—to produce more than it is supposed to under the cartel agreement. So there are two principal outcomes: successful *collusion* or behaving *non-cooperatively* by cheating.
- When firms ignore the effects of their actions on each others' profits, they engage in **non-cooperative behavior**. It is likely to be easier to achieve informal collusion when firms in an industry face capacity constraints.

Competing in Prices vs. Competing in Quantities

- Firms may decide to engage in *quantity* or *price competition*.
- The basic insight of the *quantity competition* (or the Cournot model) is that when firms are restricted in how much they can produce, it is easier for them to avoid excessive competition and to "divvy up" the market, thereby pricing above marginal cost and earning profits.
- It is easier for them to achieve an outcome that looks like collusion without a formal agreement.

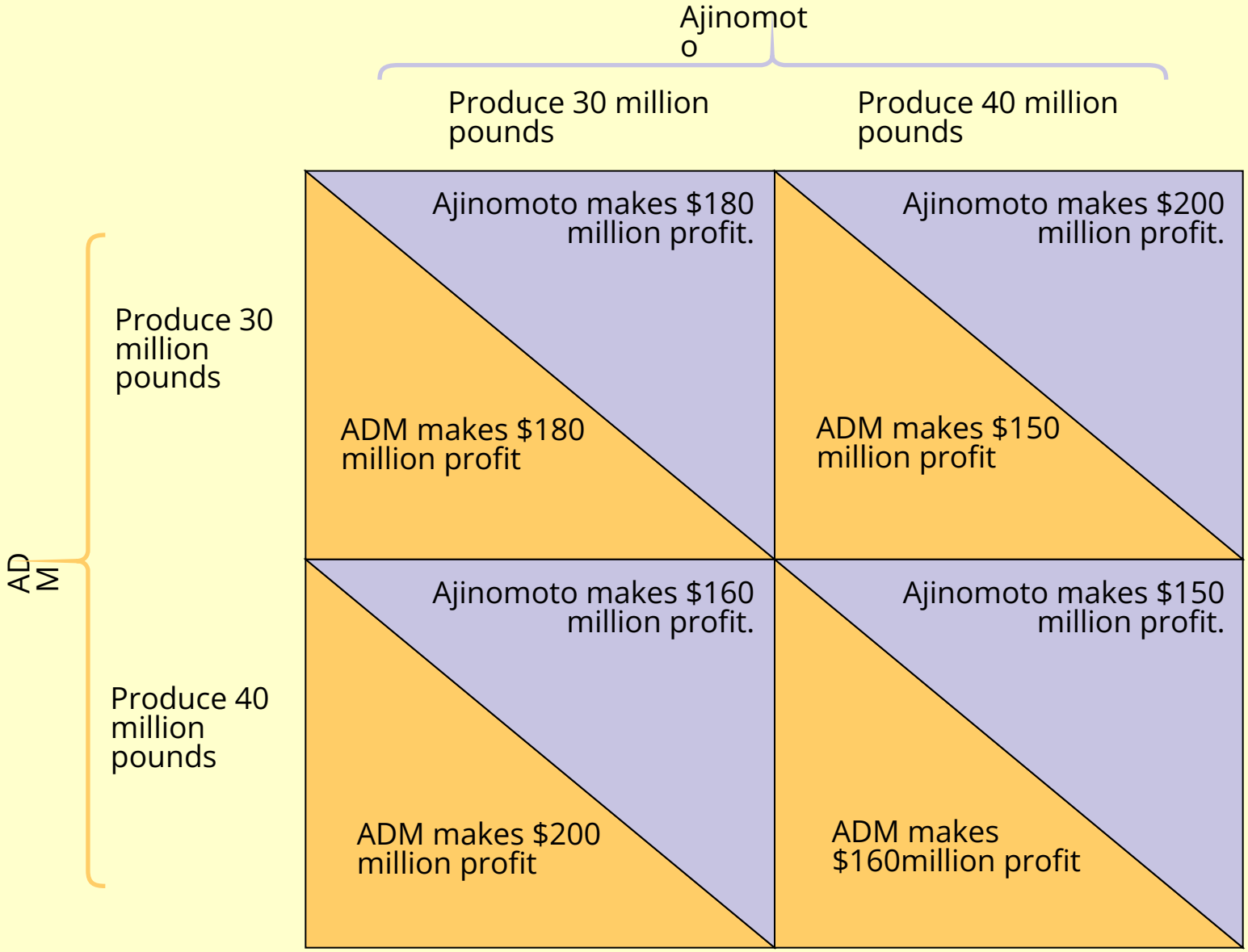
Competing in Prices vs. Competing in Quantities

- The logic behind the *price competition* (or the Bertrand model) is that when firms produce perfect substitutes and have sufficient capacity to satisfy demand when price is equal to marginal cost, then each firm will be compelled to engage in competition by undercutting its rival's price until the price reaches marginal cost—that is, perfect competition.

The Prisoners' Dilemma

- When the decisions of two or more firms significantly affect each others' profits, they are in a situation of **interdependence**.
- The study of behavior in situations of interdependence is known as **game theory**.
- The reward received by a player in a game—such as the profit earned by an oligopolist—is that player's **payoff**.
- A **payoff matrix** shows how the payoff to each of the participants in a two player game depends on the actions of both. Such a matrix helps us analyze interdependence.

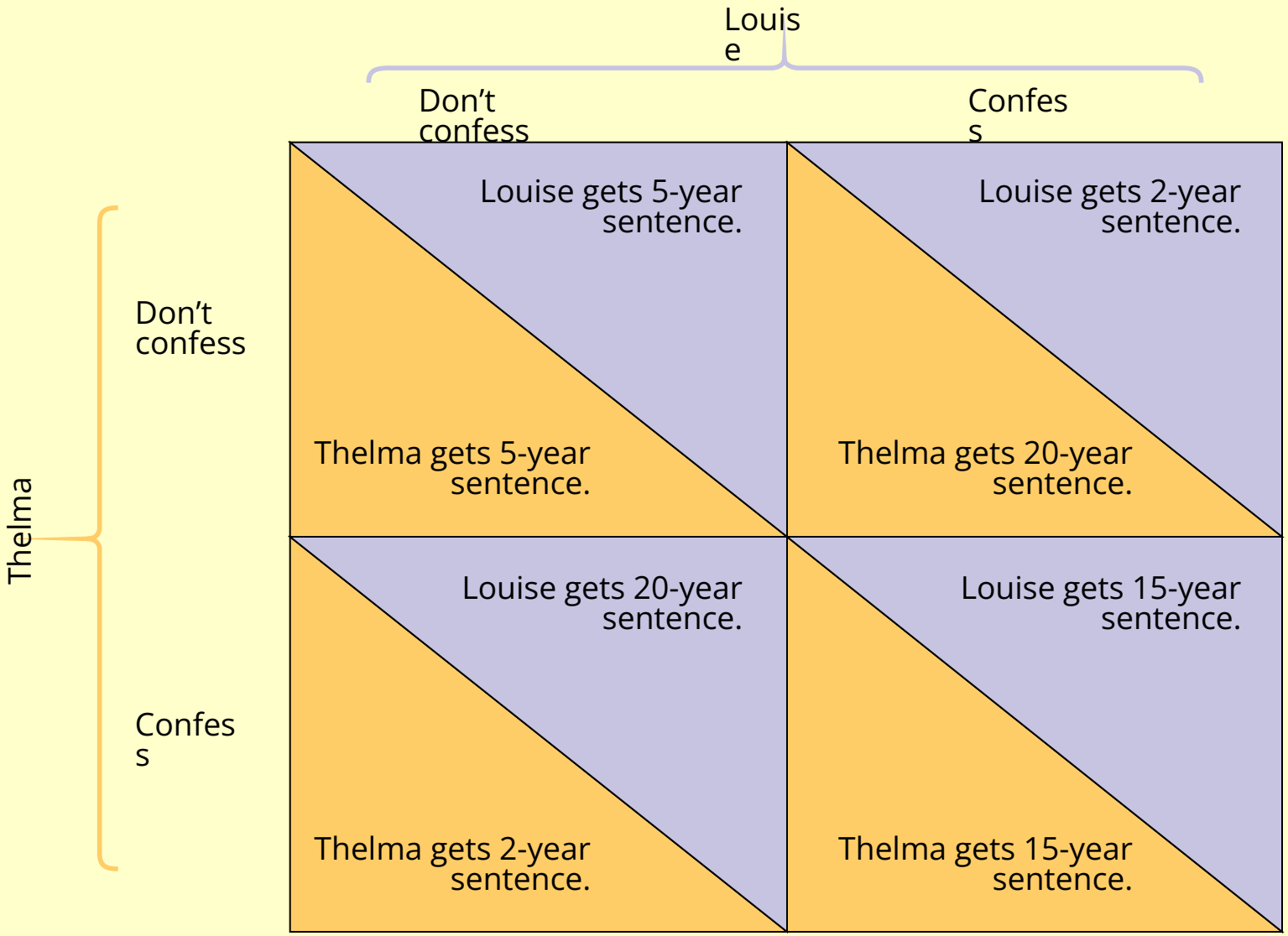
A Payoff Matrix



The Prisoners' Dilemma

- Economists use *game theory* to study firms' behavior when there is *interdependence* between their *payoffs*. The game can be represented with a *payoff matrix*. Depending on the payoffs, a player may or may not have a *dominant strategy*.
- When each firm has an incentive to cheat, but both are worse off if both cheat, the situation is known as a *prisoners' dilemma*.
- The game based on two premises: (1) Each player has an incentive to choose an action that benefits itself at the other player's expense. (2) When both players act in this way, both are worse off than if they had acted cooperatively.

The Prisoners' Dilemma



The Prisoners' Dilemma

- An action is a **dominant strategy** when it is a player's best action regardless of the action taken by the other player. Depending on the payoffs, a player may or may not have a *dominant strategy*.

- A **Nash equilibrium**, also known as a **non-cooperative equilibrium**, is the result when each player in a game chooses the action that maximizes his or her payoff given the actions of other players, ignoring the effects of his or her action on the payoffs received by those other players.

Overcoming the Prisoners' Dilemma

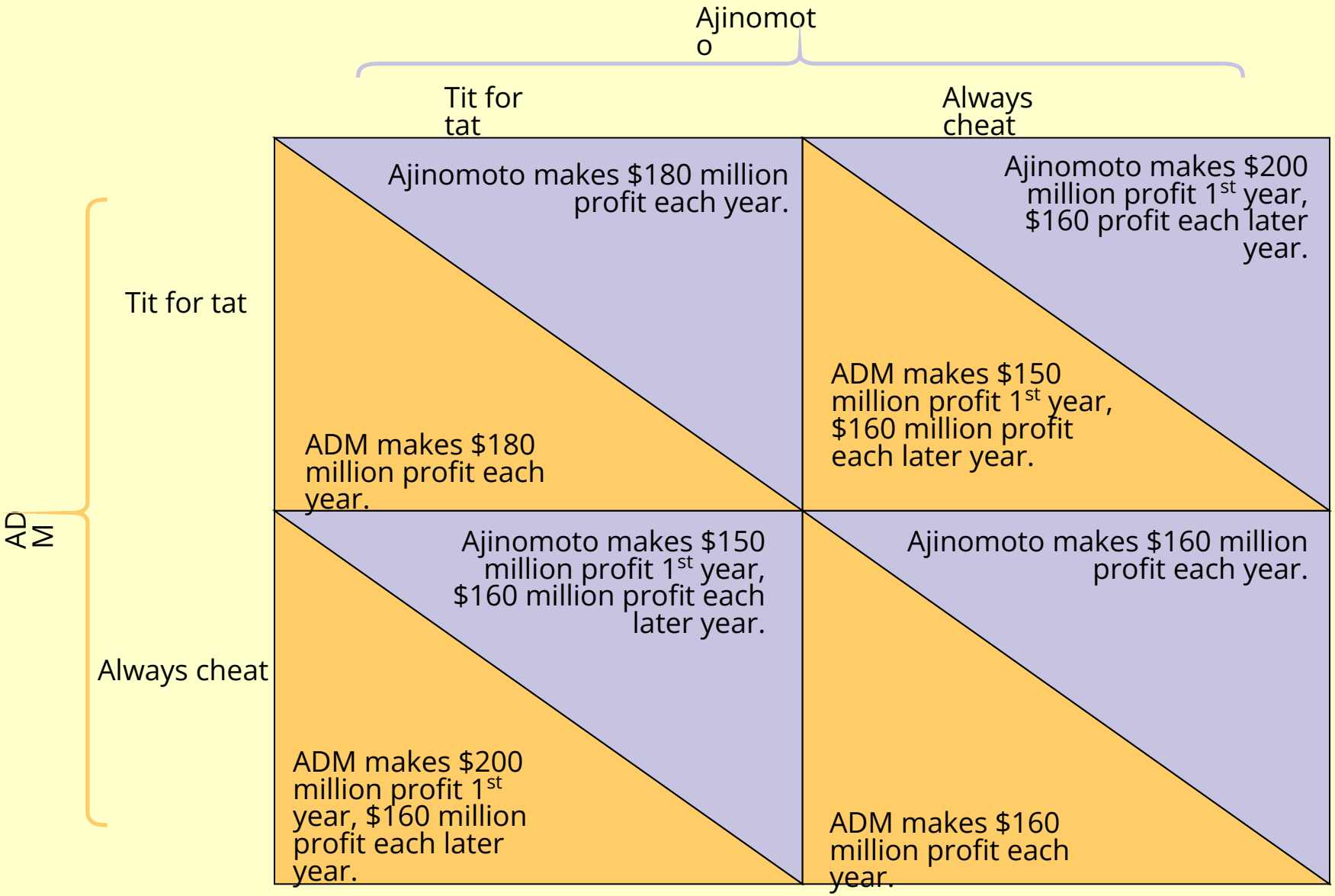
Repeated Interaction and Tacit Collusion

- Players who don't take their interdependence into account arrive at a *Nash*, or *non-cooperative*, *equilibrium*. But if a game is played repeatedly, players may engage in *strategic behavior*, sacrificing short-run profit to influence future behavior. In repeated prisoners' dilemma games, *tit for tat* is often a good strategy, leading to successful *tacit collusion.*

- *Tit for tat* involves playing cooperatively at first, then doing whatever the other player did in the previous period.

- When firms limit production and raise prices in a way that raises each others' profits, even though they have not made any formal agreement, they are engaged in **tacit collusion.**

How Repeated Interaction Can Support Collusion

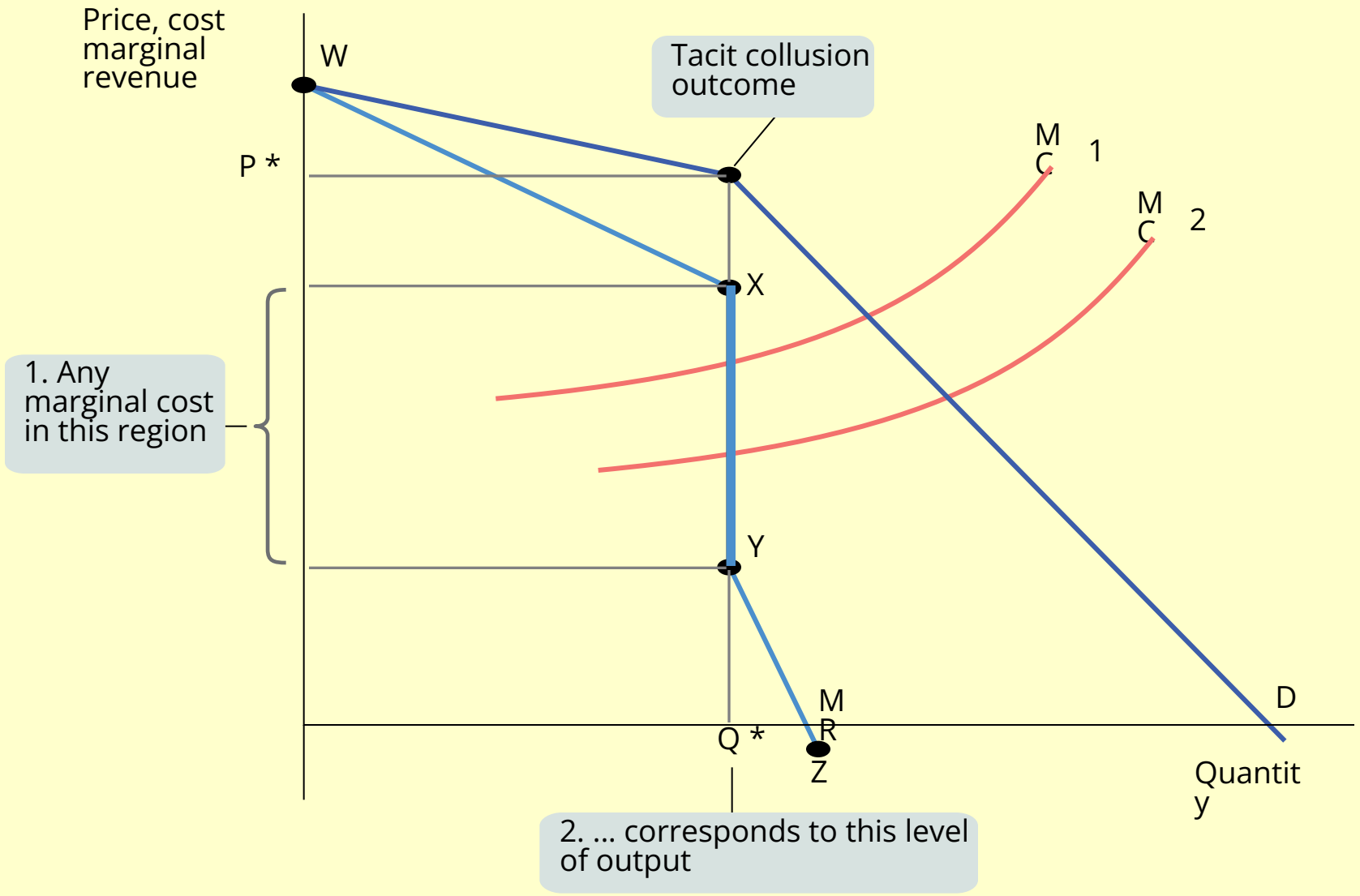


The Kinked Demand Curve

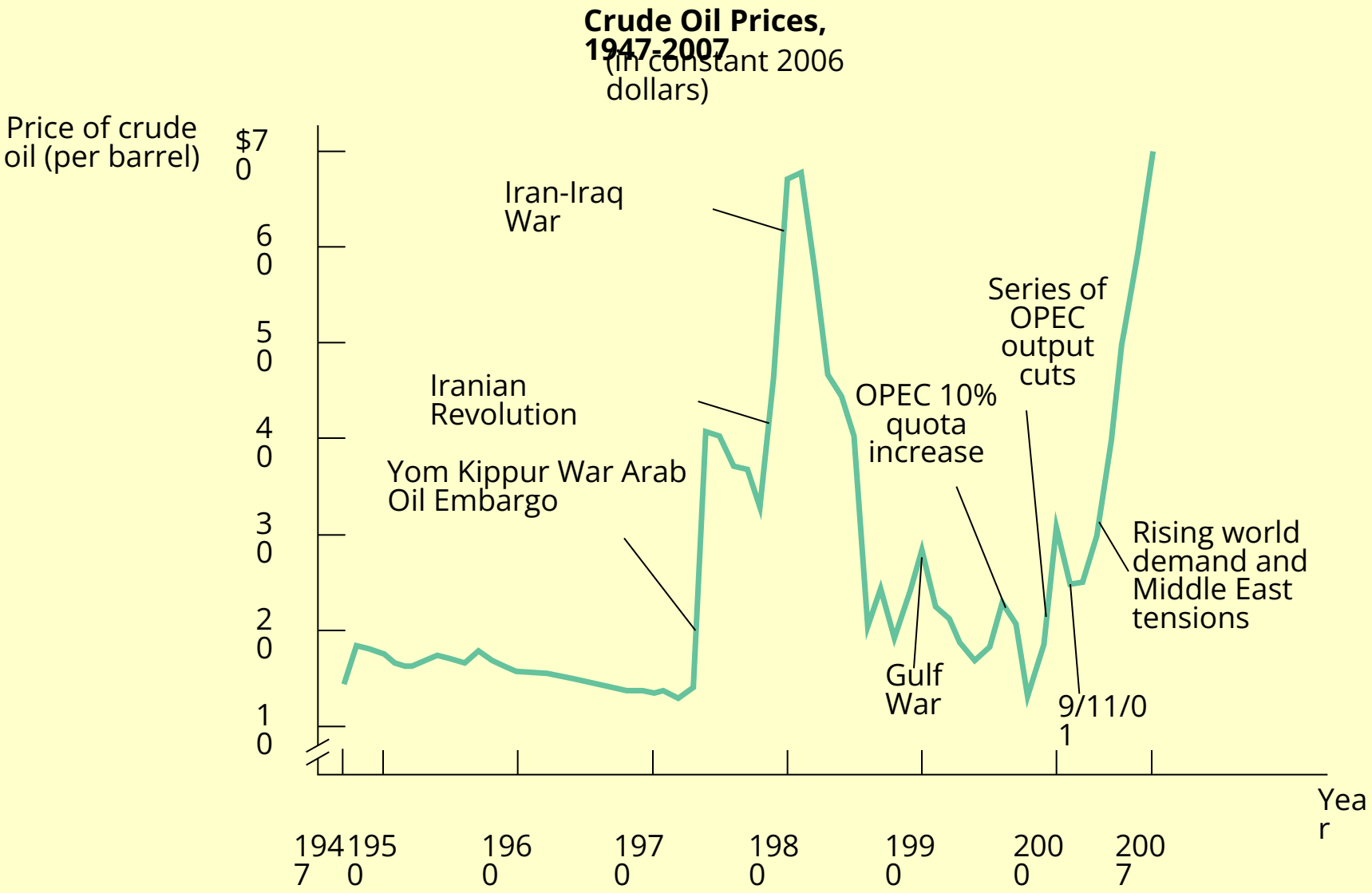
- An oligopolist who believes she will lose a substantial number of sales if she reduces output and increases her price, but will gain only a few additional sales if she increases output and lowers her price away from the tacit collusion outcome, faces a **kinked demand curve**—very flat above the kink and very steep below the kink.

- It illustrates how tacit collusion can make an oligopolist unresponsive to changes in marginal cost within a certain range when those changes are unique to her.

The Kinked Demand Curve



The Ups and Downs of the Oil Cartel



Oligopoly in Practice

- Oligopolies operate under legal restrictions in the form of *antitrust policy.* **Antitrust policies** are efforts undertaken by the government to prevent oligopolistic industries from becoming or behaving like monopolies. But many succeed in achieving tacit collusion.

- Tacit collusion is limited by a number of factors, including:
  - large numbers of firms
  - complex products and pricing scheme
  - bargaining power of buyers
  - conflicts of interest among firms

Product Differentiation and Price Leadership

- When collusion breaks down, there is a *price war*.
- To limit competition, oligopolists often engage in *product differentiation* which is an attempt by a firm to convince buyers that its product is different from the products of other firms in the industry.
- When products are differentiated, it is sometimes possible for an industry to achieve tacit collusion through *price leadership*.
- Oligopolists often avoid competing directly on price, engaging in *non-price competition* through advertising and other means instead.

Product Differentiation and Price Leadership, cont'd

- In **price leadership**, one firm sets its price first, and other firms then follow.
- Firms that have a tacit understanding not to compete on price often engage in intense **nonprice competition**, using advertising and other means to try to increase their sales.

SUMMARY

1. Many industries are **oligopolies**: there are only a few sellers. In particular, a **duopoly** has only two sellers. Oligopolies exist for more or less the same reasons that monopolies exist, but in weaker form. They are characterized by **imperfect competition**: firms compete but possess market power.
2. Predicting the behavior of **oligopolists** poses something of a puzzle. The firms in an oligopoly could maximize their combined profits by acting as a **cartel**, setting output levels for each firm as if they were a single monopolist; to the extent that firms manage to do this, they engage in **collusion**. But each individual firm has an incentive to produce more than it would in such an arrangement—to engage in **noncooperative behavior**.

SUMMARY

3. The situation of **interdependence**, in which each firm's profit depends noticeably on what other firms do, is the subject of **game theory**. In the case of a game with two players, the **payoff** of each player depends both on its own actions and on the actions of the other; this interdependence can be represented as a **payoff matrix**. Depending on the structure of payoffs in the payoff matrix, a player may have a **dominant strategy**—an action that is always the best regardless of the other player's actions.

SUMMARY

4. **Duopolists** face a particular type of game known as a **prisoners' dilemma**; if each acts independently in its own interest, the resulting **Nash equilibrium** or **Noncooperative equilibrium** will be bad for both. However, firms that expect to play a game repeatedly tend to engage in **strategic behavior**, trying to influence each other's future actions. A particular strategy that seems to work well in such situations is **tit for tat**, which often leads to **tacit collusion**.
5. The **kinked demand curve** illustrates how an oligopolist that faces unique changes in its marginal cost within a certain range may choose not to adjust its output and price in order to avoid a breakdown in tacit collusion.

SUMMARY

6. In order to limit the ability of oligopolists to collude and act like monopolists, most governments pursue an **antitrust policy** designed to make collusion more difficult. In practice, however, tacit collusion is widespread.
7. A variety of factors make tacit collusion difficult: large numbers of firms, complex products and pricing, differences in interests, and bargaining power of buyers. When tacit collusion breaks down, there is a **price war**. Oligopolists try to avoid price wars in various ways, such as through **product differentiation** and through **price leadership**, in which one firm sets prices for the industry. Another is through **nonprice competition**, like advertising.