N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eight Edition

CHAPTER

17

Oligopoly

PowerPoint Slides prepared by:
V. Andreea CHIRITESCU
Eastern Illinois University

Oligopoly

- Oligopoly
  - Only a few sellers
  - Offer similar or identical products
  - Interdependent
- Game theory
  - How people behave in strategic situations
    - Choose among alternative courses of action
    - Must consider how others might respond to the action he takes

Markets with Only a Few Sellers, Part 1

- A small group of sellers, oligopolists
  - Tension between cooperation and self-interest
  - Best off cooperating, acting like a monopolist
    - Produce a small quantity of output
    - Charge P >MC
  - Each firm cares only about its own profit
    - Powerful incentives not to cooperate

Markets with Only a Few Sellers, Part 2

- Duopoly
  - Oligopoly with only two members
  - Decide what quantity to sell
  - Price is determined on the market by the demand

Table 1 The Demand Schedule for Water

Quantity	Price	Total Revenue (and total profit)
0 gallons	$120	$0
10	110	1,100
20	100	2,000
30	90	2,700
40	80	3,200
50	70	3,500
60	60	3,600
70	50	3,500
80	40	3,200
90	30	2,700
100	20	2,000
110	10	1,100
120	0	0

Markets with Only a Few Sellers, Part 3

- For a perfectly competitive firm
  - Price = marginal cost
  - Quantity is efficient
- For a monopoly
  - Price > marginal cost
  - Quantity is lower than the efficient quantity

Markets with Only a Few Sellers, Part 4

- A duopoly can:
  - Collude and form a cartel, act as a monopoly and agree on:
    - Total level of production
    - Quantity produced by each member
  - Don't collude, act in self-interest
    - Difficult to agree; Antitrust laws
    - Higher quantity; lower price; lower profit
    - Not competitive allocation
    - Nash equilibrium

Markets with Only a Few Sellers, Part 5

- Collusion
  - Agreement among firms in a market
    - Quantities to produce or
    - Prices to charge
- Cartel
  - Group of firms acting in unison

Equilibrium for an Oligopoly, Part 1

- Nash equilibrium
  - Economic actors interacting with one another
  - Each choose their best strategy
  - Given the strategies that all the other actors have chosen

Equilibrium for an Oligopoly, Part 2

- Oligopolists
  - Better off cooperating and reaching the monopoly outcome
  - They pursue their own self-interest
    - Do not end up reaching the monopoly outcome and maximizing their joint profit
    - Each is tempted to raise production and capture a larger share of the market
    - Total production rises and price falls

Equilibrium for an Oligopoly, Part 3

- When firms in an oligopoly individually choose production to maximize profit
  - Produce a quantity of output
    - Greater than the level produced by monopoly
    - Less than the level produced by competition
  - The price is
    - Less than the monopoly price
    - Greater than the competitive price (MC)

Markets with Only a Few Sellers, Part 6

- If oligopolists form a cartel
  - Maximize total profit
  - Produce monopoly quantity
  - Charge monopoly price
  - Difficult to reach and enforce an agreement as the size of the group increases

Markets with Only a Few Sellers, Part 7

- If oligopolists do not form a cartel, each firm has to take into account:
  - The output effect
    - Because P > MC, selling one more unit increases profit
  - The price effect
    - Increasing production increases total amount sold
    - Decrease in price and lower the profit

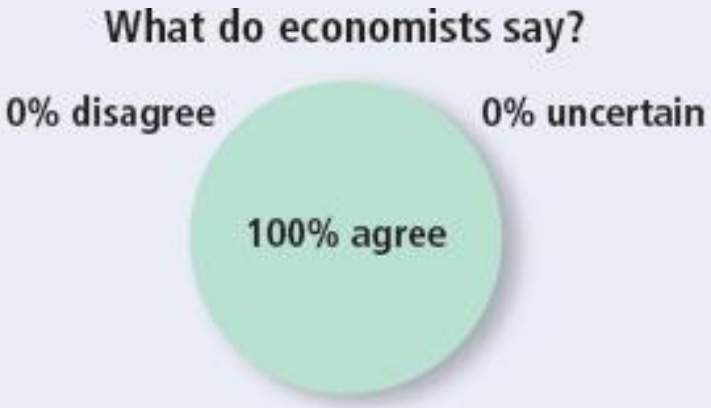
Markets with Only a Few Sellers, Part 8

- The size of an oligopoly affects the market outcome
  - As the number of sellers in an oligopoly grows larger
    - Oligopolistic market looks more like a competitive market
    - Price approaches marginal cost
    - Quantity produced approaches socially efficient level

ASK THE EXPERTS

Nash Equilibrium

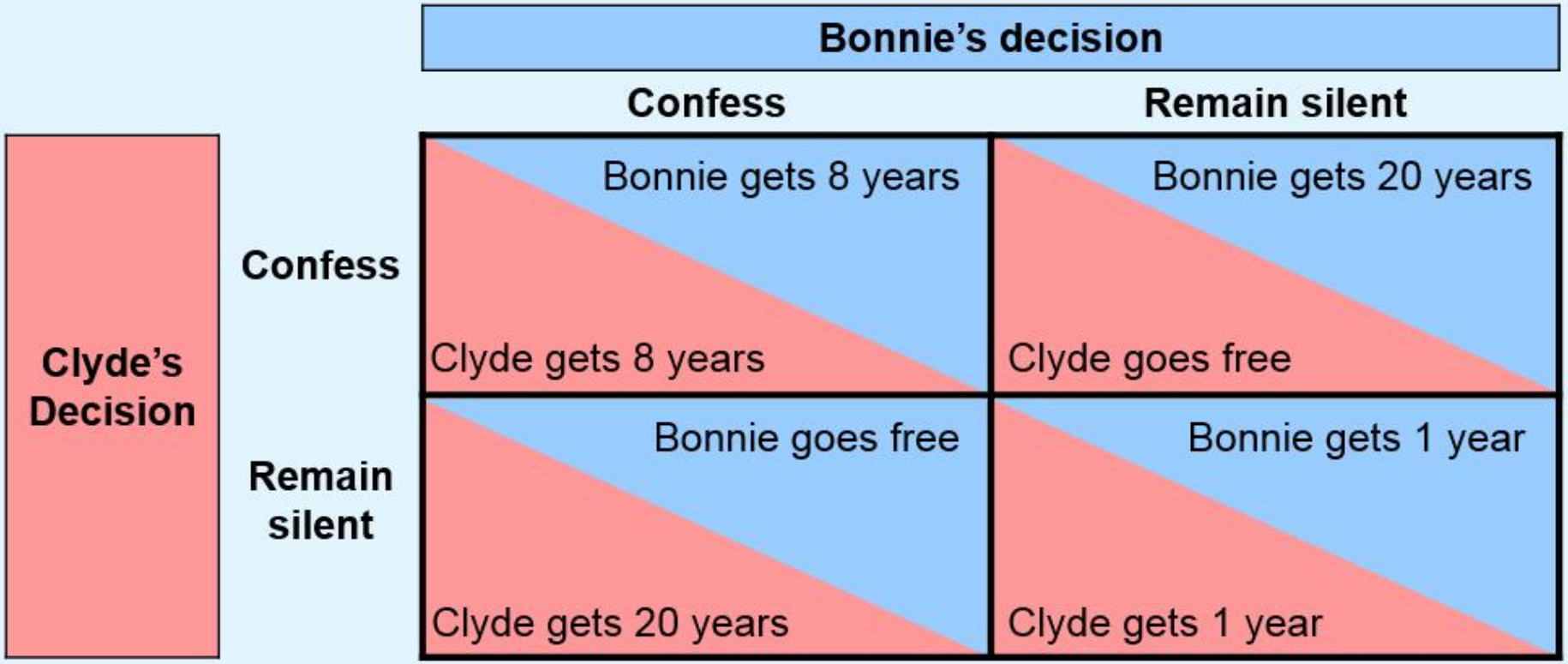
"Behavior in many complex and seemingly intractable strategic settings can be understood more clearly by working out what each party in the game will choose to do if they realize that the other parties will be solving the same problem. This insight has helped us understand behavior as diverse as military conflicts, price setting by competing firms and penalty kicking in soccer."



The Economics of Cooperation, Part 1

- The prisoners' dilemma
  - Particular "game" between two captured prisoners
  - Illustrates why cooperation is difficult to maintain even when it is mutually beneficial
- Dominant strategy
  - Strategy that is best for a player in a game
    - Regardless of the strategies chosen by the other players

Figure 1 The Prisoners' Dilemma



In this game between two criminals suspected of committing a crime, the sentence that each receives depends both on his or her decision whether to confess or remain silent and on the decision made by the other.

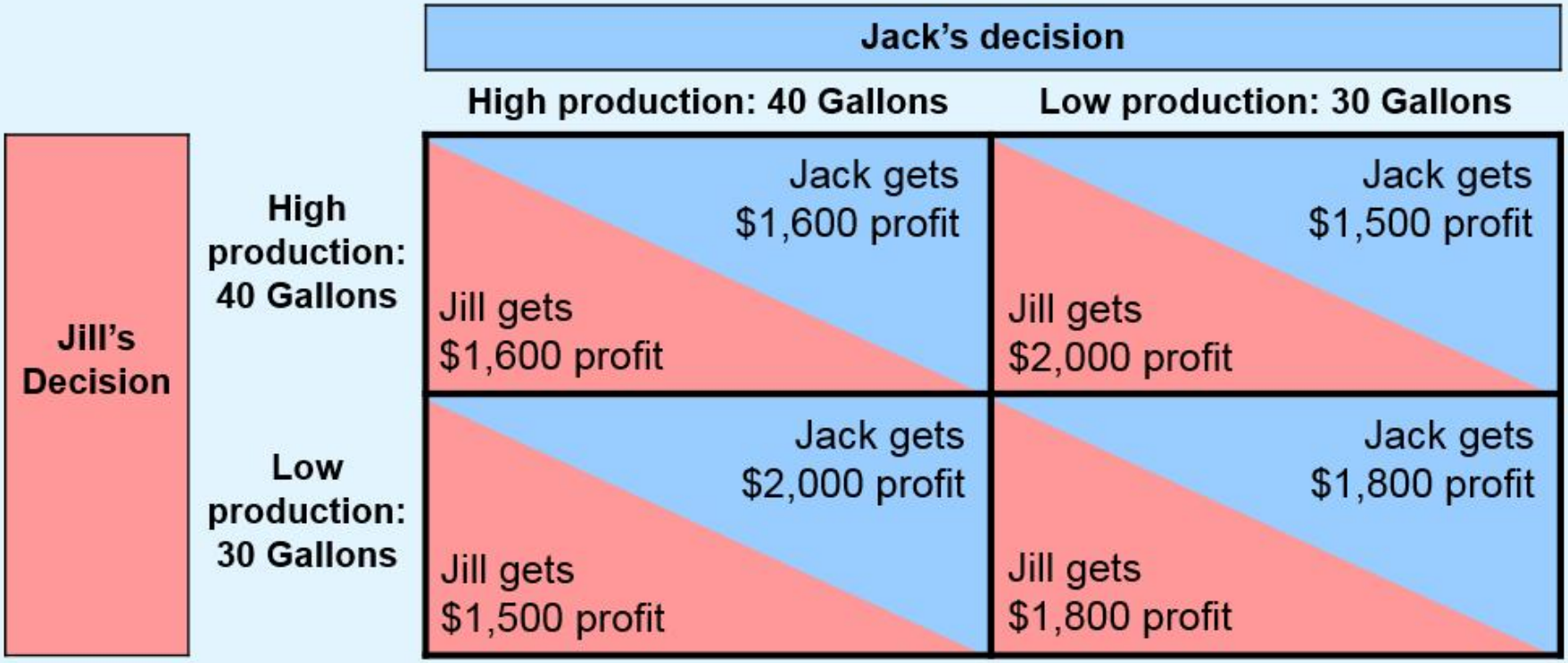
The Economics of Cooperation, Part 2

- The prisoners' dilemma
  - Because each pursues his or her own interests
    - The two prisoners together reach an outcome that is worse for each of them
  - Cooperation between the two prisoners is difficult to maintain
    - Because cooperation is individually irrational

The Economics of Cooperation, Part 3

- Game oligopolists play
  - In trying to reach the monopoly outcome
  - Similar to the game that the two prisoners play in the prisoners' dilemma
- Firms are self-interested
  - And do not cooperate
    - Even though cooperation (cartel) would increase profits
  - Each firm has incentive to cheat

Figure 2 Jack and Jill's Oligopoly Game



In this game between Jack and Jill, the profit that each earns from selling water depends on both the quantity he or she chooses to sell and the quantity the other chooses to sell.

CASE STUDY

OPEC and the world oil market, Part 1

- Organization of Petroleum Exporting Countries (OPEC) is a cartel
  - Formed in 1960: Iran, Iraq, Kuwait, Saudi Arabia, Venezuela
  - By 1973: Qatar, Indonesia, Libya, the United Arab Emirates, Algeria, Nigeria, Ecuador, Gabon
  - Control about three-fourths of the world's oil reserves

CASE STUDY

OPEC and the world oil market, Part 2

- OPEC
  - Tries to raise the price of its product
    - Coordinated reduction in quantity produced
  - Tries to set production levels for each of the member countries
- Problem
  - The countries want to maintain a high price of oil

CASE STUDY

OPEC and the world oil market, Part 3

- Problem
  - Each member of the cartel
    - Tempted to increase its production
    - Get a larger share of the total profit
    - Cheat on agreement
- OPEC – successful at maintaining cooperation and high prices
  - From 1973 to 1985: increase in price

CASE STUDY

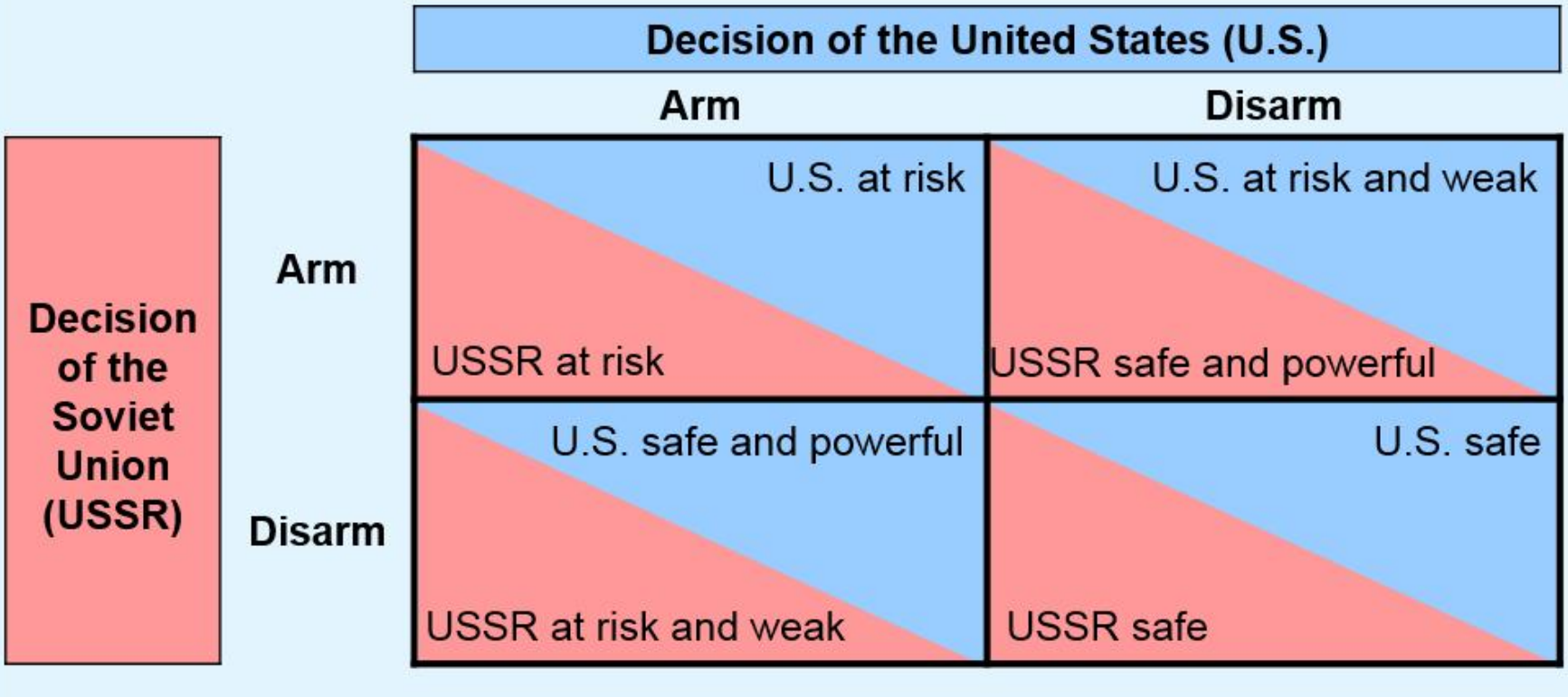
OPEC and the world oil market, Part 4

- Mid-1980s — member countries began arguing about production levels
  - OPEC — ineffective at maintaining cooperation
  - Decrease in price
  - Recent years: less successful at reaching and enforcing agreements
- Fluctuations in oil prices
  - Driven by supply and demand

The Economics of Cooperation, Part 4

- Arms races
  - After World War II, United States and the Soviet Union
    - Engaged in a prolonged competition over military power
  - Strategies
    - Build new weapons
    - Disarm
  - Dominant strategy: Arm

Figure 3 An Arms-Race Game

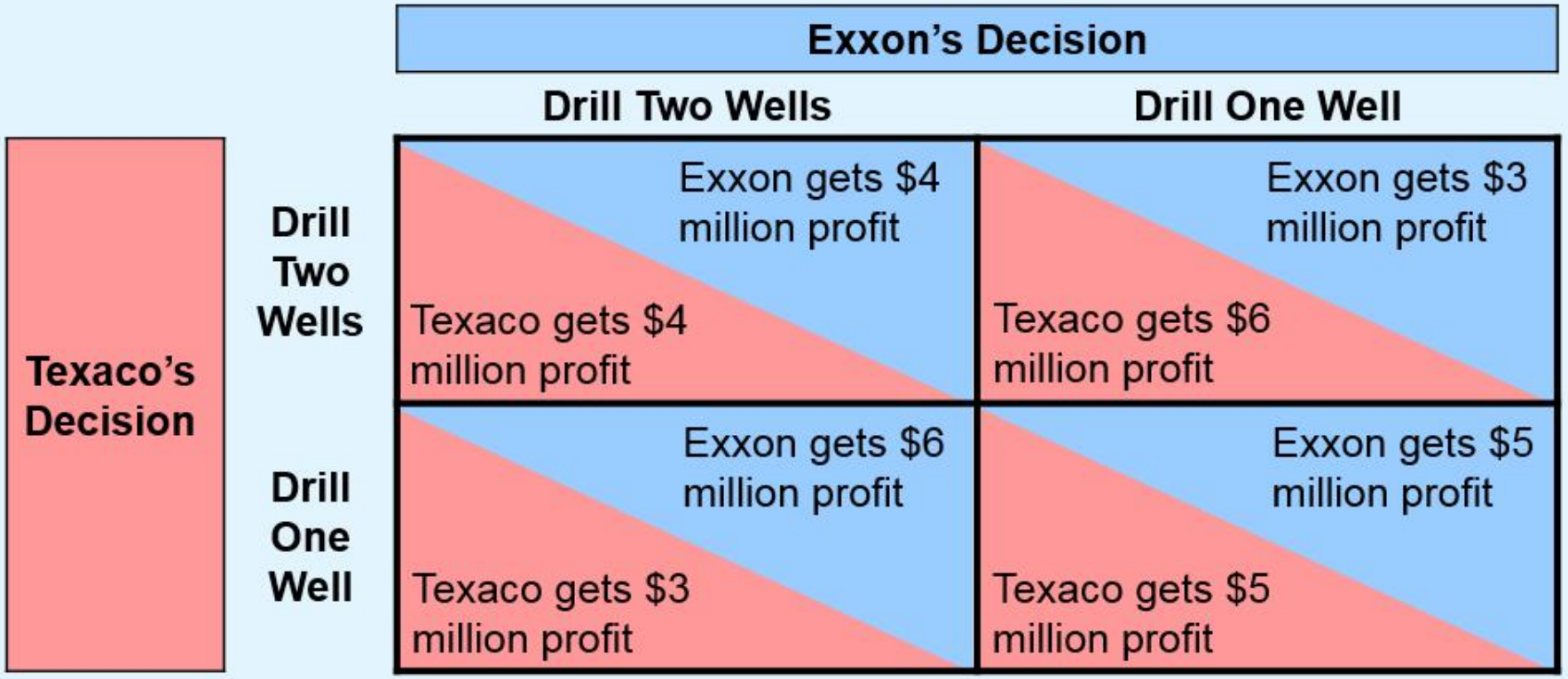


In this game between two countries, the safety and power of each country depend on both its decision whether to arm and the decision made by the other country

The Economics of Cooperation, Part 5

- Common resources
  - Two companies own a common pool of oil
  - Strategies
    - Each company drills one well
    - Each company drills a second well and get more oil
  - Dominant strategy
    - Each company drills two wells: lower profit

Figure 4 A Common-Resources Game



In this game between firms pumping oil from a common pool, the profit that each earns depends on both the number of wells it drills and the number of wells drilled by the other firm.

Welfare of Society

- Dominant strategy
  - Noncooperative equilibrium may be bad for society and the players
    - Examples: Arms race game, Common resource game
  - Noncooperative equilibrium may be good for society
    - Oligopolists trying to obtain monopoly profits
    - Quantity and price – closer to optimal level

Why People Sometimes Cooperate

- Game of repeated prisoners' dilemma
  - Repeat the game
  - Agree on penalties if one cheats
  - Both have incentive to cooperate
  - As long as the players care enough about future profits, they will choose to forgo the one-time gain from defection

CASE STUDY

The prisoners' dilemma tournament, Part 1

- Repeated prisoners' dilemma
  - The score at the end of the game is the total number of years in jail
  - Encourage cooperation
    - Penalty for not cooperating
  - Better strategy
    - Return to cooperative outcome after a period of noncooperation

CASE STUDY

The prisoners' dilemma tournament, Part 2

- Repeated prisoners' dilemma
  - Best strategy: tit-for-tat
  - Player starts by cooperating, then do whatever the other player did last time
  - Starts out friendly
  - Penalizes unfriendly players
  - Forgives them if warranted

Public Policy Toward Oligopolies, Part 1

- Governments
  - Can sometimes improve market outcomes
- Policymakers
  - Try to induce firms in an oligopoly to compete rather than cooperate
  - Move the allocation of resources closer to the social optimum

Public Policy Toward Oligopolies, Part 2

- Antitrust laws
  - The Sherman Antitrust Act, 1890
    - Elevated agreements among oligopolists from an unenforceable contract to a criminal conspiracy
  - The Clayton Act, 1914
    - Further strengthened the antitrust laws
  - Used to prevent mergers
  - Used to prevent oligopolists from colluding

CASE STUDY

An illegal phone call, Part 1

- Robert Crandall — president of American Airlines
- Howard Putnam — president of Braniff Airways
  - Crandall: I think it's dumb as hell . . . to sit here and pound the @#$% out of each other and neither one of us making a #$%& dime.
  - Putnam: Do you have a suggestion for me?
  - Crandall: Yes, I have a suggestion for you. Raise your $%*& fares 20 percent. I'll raise mine the next morning.

CASE STUDY

An illegal phone call, Part 2

- Putnam: Robert, we . . .
- Crandall: You'll make more money, and I will, too.
- Putnam: We can't talk about pricing!
- Crandall: Oh @#$%, Howard. We can talk about any &*#@ thing we want to talk about.

- The Sherman Antitrust Act
  - Prohibits competing executives from even talking about fixing prices

Public Policy Toward Oligopolies, Part 3

- Controversies over antitrust policies
  - Used to condemn some business practices whose effects are not obvious
  - Resale price maintenance
  - Predatory pricing
  - Tying

Public Policy Toward Oligopolies, Part 4

- Resale price maintenance (fair trade)
  - Require retailers to charge customers a given price
  - Might seem anticompetitive
    - Prevents the retailers from competing on price
  - Defenders:
    - Not aimed at reducing competition
    - Legitimate goal: some retailers offer service

Public Policy Toward Oligopolies, Part 5

- Predatory pricing
  - Charge prices that are too low
    - Anticompetitive
    - Price cuts may be intended to drive other firms out of the market
  - Skeptics
    - Predatory pricing — not a profitable strategy
    - Price war — to drive out a rival' prices are driven below cost

Public Policy Toward Oligopolies, Part 6

- Tying
  - Offer two goods together at a single price
    - Expand market power
  - Skeptics
    - Cannot increase market power by binding two goods together
  - Form of price discrimination
    - Tying may increase profit

CASE STUDY

The Microsoft case, Part 1

- U.S. government's suit against the Microsoft Corporation, 1998
  - Central issue: tying
    - Should Microsoft be allowed to integrate its Internet browser into its Windows operating system
  - Bundling to expand market power into the market of Internet browsers
    - Would deter other software companies from entering the market and offering new products

CASE STUDY

The Microsoft case, Part 2

- Microsoft responded
  - New features into old products - natural part of technological progress
    - Cars — include CD players, air conditioners
    - Cameras — built-in flashes
    - Operating systems — added many features to Windows
      - Previously stand-alone products
      - Computers - more reliable and easier to use
  - Integration of Internet technology
    - The next natural next step

CASE STUDY

The Microsoft case, Part 3

- Disagreement
  - Extent of Microsoft's market power
- The government
  - More than 80% of new personal computers
    - Used a Microsoft operating system
    - Substantial monopoly power

AP Photo/Laura Rauch

"Me? A monopolist? Now just wait a minute . . ."

CASE STUDY

The Microsoft case, Part 4

- Microsoft
  - Software market is always changing
  - Competitors: Apple Mac & Linux operating systems
  - Low price – limited market power
- November 1999 ruling
  - Microsoft — great monopoly power
  - Illegally abused that power

CASE STUDY

The Microsoft case, Part 5

- June 2000
  - Microsoft – to be broken up into two companies
    - Operating system & Applications software
- 2001, appeals court
  - Overturned the breakup order
- September 2001
  - Justice Department — wanted to settle the case quickly

CASE STUDY

The Microsoft case, Part 6

- Settlement: November 2002
  - Microsoft – some restrictions
  - Government – browser would remain part of the Windows operating system
- Private antitrust suits
- Suits brought by the European Union
  - Alleging a variety of anticompetitive behaviors