Chapter 15 in Economics and Microeconomics **Oligopoly**

Chapter Objectives: In this chapter, students will learn:
- 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 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

Chapter Outline Opening Ex: collusion between Archer Daniels Midland and Ajinomoto to carve up the market for lysine additive in animal feed. Collusion is illegal in the U.S. and these companies were caught red-handed

A. The Prevalence of Oligopoly
- an oligopoly is an industry with only a small number of producers (producer in such an industry is an oligopolist)
- the number of firms determines whether or not a specific market is an oligopoly, not the size of each firm
- product that may or may not be differentiated
  - -differentiated products (e.g., autos, detergents)
  - -undifferentiated products (e.g.,steel, cement)

- firms are mutually interdependent (each firm is large enough that its actions influence other firms)
- each oligopolist has some market power
  - no one firm has monopoly, but producers realize that they can affect market prices => imperfect competition
- most imp. source of oligopoly is existence of economies of scale => gives bigger producers a cost advantage over smaller ones

some other sources of market power are similar to that contribute to monopoly:
- patents
- high levels of capital investment
- control of important raw materials

some sources of market power differ from the monopoly situation:
- advertising
- brand loyalty

-Concentration ratios - a means of measuring the market power within an industry
- e.g., the four (4) firm concentration ratio takes the market share of the 4 largest firms in an industry (as a %) and adds them
  other numbers of firms are also used (5-firm conc. ratio, 8-firm conc. ratio)
- the higher the concentration ratio, the more market power present in the industry
  e.g, in 1947, 5 largest brewing companies had 19% of U.S. market
  in 1990, 5 largest brewing companies had 93% of U.S. market => so industry was more conc. in 1990 than in 1947

-Concentration ratio is not a perfect measure of competitiveness
- -some markets are local/regional rather than national (firm could be significant influence regionally w/o being imp. nationally)
- -inter-industry competition: dominance in one area may not mean there is a shortage of substitutes (e.g., tin cans & glass jars)
- -world trade has increased competition in some industries despite high concentration ratios (e.g., auto industry)

-concentration ratio doesn t measure distribution of power
- -e.g., 1 firm w/ 65% of mkt & 3 firms each w/ 5% of mkt. is **not** the same as 4 firms each w/ 20% market share
- -Herfindahl index attempts to provide an indication of the distribution of market power within an industry

-concentration ratio tells us nothing about the actual nature of competition in an industry
- -firms in a highly concentrated industry can compete like crazy or could collude like crazy

Understanding Oligopoly
- duopoly - an oligopoly consisting of only two firms (each firm is known as a duopolist)
- sellers can engage in collusion (they cooperate) to raise profits
- a cartel is an agreement by several producers that increases
  their combined profits by allocating production among producers (overall supply is restricted)
  - OPEC is the most famous of the world s cartels
  - cartels among firms are illegal in the U.S. and many other jurisdictions
  - individual firms in a cartel have an incentive to cheat

B. Collusion and competition
- in a duopoly, firms choose a level of output and sell that output at the market price
- individual firms have an incentive to produce more than the quantity that would maximize the combined profits of the firms
  - because neither firm has as strong an incentive to limit its output as a true monopolist would

- while oligopolists have an incentive to collude, companies often cheat on any cartel-like agreement
  - non-cooperative behavior => when firms ignore the effects of their actions on each others profits
- when only a small number of firms exist, collusion is possible => but, is hard to determine whether collusion will actually occur

Competing in prices versus competing in quantities
- one important factor in determining how hard it is to achieve collusion is how easy it is for a firm to quickly increase its output in order to capture sales from its rivals
- under duopoly, firms can more easily restrict how much they can produce by divvying up the market
  - when firms divide up market & restrict their individual output (i.e., choose a quantity) => the price will be above marginal cost (MC), and profits rise - this is referred to as Cournot behavior or quantity competition

  - in some inductries, firms choose a price (not a quantity) and sell as much as they can at that price
    - if firms are not constrained by limited production capacity => this may lead to a price war
  - this price war behavior is known as price competition or Bertrand behavior:
    - when firms produce perfect substitutes & have sufficient capacity to satisfy demand when price (P) is equal to MC, each firm will be compelled to engage in competition => undercutting its rivals price until the P = MC

C. Games Oligopolists Play
- interdependent firm - the decisions of two or more firms affect each others profits
- game theory is used to study of behavior of interdependent firms (game theory has other applications as well)
- the prisoners dilemma
  - the reward received by a player in a game, such as the profits earned by an oligopolist, is that player s payoff
  - payoff matrix shows that payoff to each player in a 2-player game depends on the actions of both players see text Fig 15-1
  - in a prisoners dilemma game, each player has an incentive, regardless of what the other player does, to cheat that is, to take an action that benefits one player at the other player s expense
    - when both players cheat, both are worse off than they would have been if neither had cheated
    - an action is a dominant strategy when it is a player s best action regardless of the action taken by the other player

- a Nash equilibrium (also known as a non-cooperative equilibrium) is the result when each player chooses the action that maximizes his payoff given the actions of other players, ignoring the effects of that action on the payoffs of other players

Overcoming the prisoners dilemma: Repeated interaction and tacit collusion
- oligopolists in the real world play do not interact only one time (repeated games or interactions)
- a firm engages in strategic behavior when it attempts to influence the future behavior of other firms
- a strategy of tit for tat involves playing cooperatively at first, then doing whatever the other player did in the previous period
  - doing this, a firm can punish another firm for cheating

D. Oligopoly Models #1 - Collusion and cartel agreements
- collusion: - is beneficial to participating firms - thru collusion firms attempt to achieve the outcome realized in a monopoly
  - reduces uncertainty for firms, increases profits, and may make entry of new rivals more difficult
  - however, requires firms to agree on a formula to reduce the quantity of output

Obstacles to Collusion
- in the U.S., it is illegal not illegal everywhere
- member of the group has an incentive to cheat (i.e., can maximize profits by cheating)
- more firms in industry, more difficult to reach an agreement on restricting output (more likely some firm won t like its deal) any firm in cartel may quit at anytime - when that occurs it tends to undermine the entire effort (could start price war)
- allocating output reductions becomes still more difficult if market demand declines (e.g., if there is a recession)
- if successful, the high price achieved by collusion may encourage users to find substitutes for the product
- if successful, the high price achieved by collusion may encourage new firms to enter the market

Oligopoly Models #2 - The kinked demand curve (non-colluding oligopoly firms)
- if firm believes that rivals will match any price cuts (i.e., firm views its demand curve as inelastic for price cuts), then firm will not want to lower price since total revenue (TR) will decline w/ a price cut under conditions of inelastic demand
- if firm believes that rivals will not match any price increases because they may gain mkt. share by leaving price unchanged (i.e., firm views its demand curve as elastic for price increases), then firm will not want to raise price since TR will decline w/ a price increase under conditions of elastic demand
- in such a market, prices will tend to be inflexible because firms have little incentive to raise or lower price

Oligopoly Models #3 - Tacit Collusion and Price Wars

- oligopolists do succeed in keeping prices above their non-cooperative level
- tacit collusion is a normal state for an oligopoly
- however, four major factors make it hard for an industry to coordinate on high prices
  - large numbers: the more firms in an oligopoly, the less incentive (& more difficult) for firms to behave cooperatively
  - complex products & pricing schemes: in the real world, oligopolists produce many products, which makes it difficult for a firm to track what its competitors are doing
  - difference interests: firms differ in what they perceive as fair and what strategies are in their real interests
  - bargaining power of buyers: often, oligopolists sell to large buyers who can bargain for lower prices
- a price war occurs when tacit collusion breaks down and prices collapse
  - this happened in 1996 in breakfast cereal industry
  - has also occurred in the airline industry

Product differentiation

- product differentiation lessens the competitiveness between firms in an oligopoly
- firms engage in product differentiation by trying to convince buyers that their product is different from products of other firms
- firms that have a tacit understanding not to compete on price often engage in intense non-price competition, using advertising and other means to try to increase their sales

Price leadership - one firm sets the price and the other firms follow
- effort to coordinate prices in a legal manner (no formal agreements or secret meetings)

- one firm (often the largest in the industry) will change prices and the others will quickly follow that firm's lead
  - before price change, the adjustment may be communicated thru speeches etc. that publicize the need to raise prices

E. How Important Is Oligopoly?

- important parts of the economy are fairly well described by perfect competition
- even in oligopolies, the limits to cooperation keep prices fairly close to MC
- predictions from supply and demand analysis are often accurate for oligopolies
- it is difficult to model oligopolies

Oligopoly and Advertising

- it can be more difficult for other firms to match product developments and effective advertising than it is to match price cuts
- advertising can affect prices, competition and efficiency - both positively and negatively

Advantages of advertising for seller:

- to the extent that it increases demand, advertising may permit the seller to charge a higher price
- if it boosts demand, advertising may allow firm to increase output, capture economies of scale & reduce LRAC
  - this allows firm to increase profits, or reduce price and capture market share or both

Advantages of advertising for consumer:

- if it boosts demand and allows producer to lower the LRAC, advertising may reduce prices for consumer
- by reducing the buyer's search time, advertising may minimize the costs associated with product searches
- by providing information about alternative goods, advertising may reduce market power
  - this may reduce costs & increase market efficiency
- by facilitating the introduction of new products, advertising may encourage technological progress

Disadvantages of advertising:

- when advertising attempts to manipulate buyers rather than inform them (e.g., most cellphone or home long distance plans) then it fails to reduce buyer search costs or increase market efficiency (i.e., it may contribute to increased mkt power)
- when advertising is self cancelling (e.g., if advertising efforts of Coke & Pepsi result in the same demand for each product that would have been achieved w/o advertising or w/ substantially less advertising)
  - then result of advertising is increased costs without benefit (i.e., it increases inefficiency)

Oligopoly and Economic Efficiency

- criteria for technological efficiency: production occurs where price = min ATC -not met under oligopoly
- criteria for allocative efficiency: production occurs where price = MC -not met under oligopoly

- overall picture is complicated, however, because oligopoly may encourage more technological advancement than would be the case under P.C., and tech. advancement may have significant positive impacts on efficiency and cost