

# Market Structure and Imperfect Competition

## LEARNING OBJECTIVES

By the end of this chapter you should understand:

- How cost and demand affect market structure
- How globalization changes domestic market structure
- Monopolistic competition
- Oligopoly and interdependence
- The kinked demand curve model
- Game theory and strategic behaviour
- Commitment and credibility
- Reaction functions and Nash equilibrium
- Cournot and Bertrand competition
- Stackleberg leadership
- Contestable markets
- Innocent and strategic entry barriers

## Key Learning Blocks

The concept of oligopolistic markets with a small number of large players is readily identifiable in the banking and supermarket industries. The issues for economists are threefold:

- 1 Which factors are likely to lead to a market being oligopolistic?
- 2 Using game theory how can we understand current period strategic interaction between rivals in oligopolistic markets and
- 3 How might long term competition be effected by strategic or natural entry barriers. The textbook covers each of these areas in turn and the questions in this book will help you to explore the important issues.

## Important Concepts and Technical Terms

Match each lettered concept with the appropriate numbered phrase:

- (a) Oligopoly
- (b) Imperfect competition
- (c) Contestable market
- (d) Credible threat
- (e) Dominant strategy
- (f) Product differentiation

- (g) Pre-commitment
- (h) Monopolistic competition
- (i) Predatory pricing
- (j) Game theory
- (k) Kinked demand curve
- (l) Prisoners' Dilemma
- (m) Innocent entry barrier
- (n) Nash equilibrium
- (o) Cournot model
- (p) Bertrand model
- (q) Reaction function

- 1 A market structure in which firms recognize that their demand curves slope downwards and that output price will depend on the quantity of goods produced and sold.
  - 2 An industry with only a few producers, each recognizing that its own price depends not merely on its own output but also on the actions of its important competitors in the industry.
  - 3 A tactic adopted by existing firms when faced by a new entrant, involving deliberately increasing output and forcing down the price, causing all firms to make losses.
  - 4 Hows how a firm's optimal output varies with each possible action by its rival
  - 5 The analysis of the principles behind intelligent interdependent decision-making.
  - 6 The demand curve perceived by an oligopolist who believes that competitors will respond to a decrease in his price but not to an increase.
  - 7 An industry having many sellers producing products that are close substitutes for one another, and in which each firm has only a limited ability to affect its output price.
  - 8 A model of oligopoly where each firm assumes the prices of rivals are given.
  - 9 Actual or perceived differences in a good compared with its substitutes, designed to affect potential buyers.
  - 10 A situation in which a player's best strategy is independent of that adopted by other players.
  - 11 An arrangement entered into voluntarily which restricts one's future options.
  - 12 A game between two players, each of whom has a dominant strategy.
  - 13 A model of oligopoly where firms assume that the output of rivals is a given.
  - 14 A barrier to entry not deliberately erected by firms.
  - 15 The threat of a punishment strategy which, after the fact, a firm would find it optimal to carry out.
  - 16 A situation where each player chooses the best strategy, given the strategies followed by the other players.
  - 17 A market characterized by free entry and free exit.
- (d) A few giant firms supplying the whole of the market for car tyres.
  - (e) A single buyer of coal-cutting equipment.
  - (f) A sole supplier of rail transport.
- 2 Table 9-1 presents some hypothetical concentration ratios and information about scale economies in a number of industries.
    - (a) Which industry is most likely to be operated as a monopoly?
    - (b) Which industry(ies) would you expect to find operating under conditions of perfect competition?
    - (c) In which industry(ies) would conditions be conducive to oligopoly?
    - (d) In which industry(ies) would oligopoly be unlikely to arise? Explain your answer.
  - 3 Which of the following characteristics are typical of an industry operating under monopolistic competition in long-run equilibrium? (Note: there may be more than one valid response.)
    - (a) Individual firms in the industry make only small monopoly profits.
    - (b) Individual firms in the industry would be keen to sell more output at the existing market price.
    - (c) There is product differentiation.
    - (d) Each firm faces a downward-sloping demand curve.
    - (e) Firms operate below full capacity output.
    - (f) Firms maximize profits where marginal cost equals marginal revenue.
    - (g) There is collusion among firms in the industry.
    - (h) The profits accruing to firms are just sufficient to cover the opportunity cost of capital employed.
  - 4 Figure 9-1 shows a profit-maximizing firm in monopolistic competition.
    - (a) How much output will be produced by the firm?
    - (b) At what price will the output be sold?
    - (c) Will the firm make supernormal profits in this situation? If so, identify their extent.
    - (d) Would you consider this to be a long-run or short-run equilibrium for the firm?
    - (e) Explain your answer to (d) and describe how the situation might differ in the 'other run'.

### Exercises

- 1 For each of the situations listed below, select the market form in the list which offers the best description.

<i>Market forms</i>	A Perfect competition
	B Monopoly
	C Oligopoly
	D Monopolistic competition
	E Monopsony

- (a) A fairly large number of firms, each supplying branded footwear at very similar prices.
- (b) A sole supplier of telecommunication services.
- (c) A large number of farmers supplying carrots at identical prices.

**Table 9-1 Concentration and scale economies in Hypotheticals**

Industry	3-firm concentration ratio (CR)	Number of plants at min. efficient scale allowed by market size (NP)
A	100	1
B	11	221
C	81	3
D	49	5
E	21	195

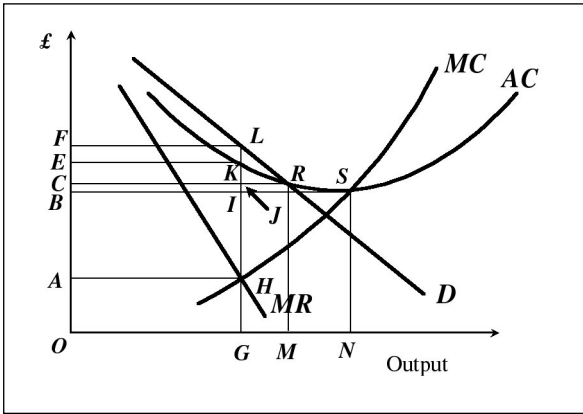


Figure 9-1 A firm in monopolistic competition

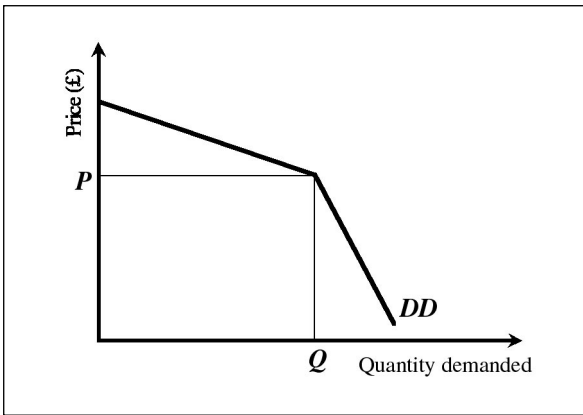


Figure 9-2 A firm's perceived demand curve

5 In an oligopolistic market, which of the following conditions tend to favour collusion and which are more likely to encourage non-cooperation?

Figure 9-3 The Prisoners' Dilemma game

Profits	Firm Y chooses:			
	Low output		High output	
	X	Y	X	Y
Firm X chooses:				
Low output	15	15	2	20
High output	20	2	8	8

- 6 Figure 9-2 shows the demand curve (DD) for the output of an individual firm, as perceived by that firm. The firm is currently producing the amount OQ at a price OP. Assess the likely validity of each of the following inferences that may be drawn concerning conditions in the industry of which this firm is a part:
- (a) The firm may be slow to change price, even if faced by a change in cost conditions.
  - (b) The firm is a discriminating monopolist, charging different prices in two separated markets.
  - (c) The industry is a non-cooperative oligopoly in which the individual firm must take into consideration the likely behaviour of the few rival firms.
  - (d) The firm faces production difficulties at levels of output above OQ as a result of labour shortages.
- 7 Suppose that there are two firms (X and Y) operating in a market, each of which can choose to produce either 'high' or 'low' output. Figure 10-3 summarizes the range of possible outcomes of the firms' decisions in a single time period. Imagine that you are taking the decisions for firm X.
- (a) If firm Y produces 'low', what level of output would maximize your profit in this time period?
  - (b) If you (X) produce 'high', what level of output would maximize profits for firm Y?

Influence	Encourages collusion	Favours non-cooperation
Barriers to entry		
Product is non-standard		
Demand and costs are stable		
Collusion is legal		
Secrecy about price and output		
Collusion is illegal		
Easy communication of price and output		
Standard product		

- (c) If firm Y produces 'high', what level of output would maximize your profit in this time period?
- (d) Under what circumstances would you decide to produce 'low'?
- (e) Suppose you enter into an agreement with firm Y that you both will produce 'low': what measures could you adopt to ensure that Y keeps to the agreement?
- (f) What measures could you adopt to convince Y that you will keep to the agreement?
- (g) Suppose that the profit combinations are the same as in Figure 10-3 except that if both firms produce 'high' each firm makes a loss of 8. Does this affect the analysis?

8 Which of the following entry barriers are 'innocent', and which are strategic?

- (a) Exploiting the benefits of large-scale production.
- (b) Undertaking a research and development (R&D) project to develop new techniques and products.
- (c) Holding a patent on a particular product.
- (d) Producing a range of similar products under different brand-names.
- (e) Extensive multi-media advertising.
- (f) Installing more machinery than is required for normal (or current) levels of production.
- (g) Holding an absolute cost advantage.

9 A crucial characteristic of a monopoly is the existence of barriers to entry. One type of such barrier is patent protection. Suppose the monopolist's patent on a good expires. How is the market likely to adjust?

10 Think about some of the firms that operate in your own neighbourhood. Classify them according to market structure – i.e. as perfect competition, monopoly, oligopoly, or monopolistic competition.

11 Figure 9-4 shows the reaction functions for a Cournot Oligopoly

- (a) The reaction function of firm A,  $R_A$ , indicates that there is **what type** of relationship between the output of firm B and the output of firm A?

- (b) Is the relationship between firm A's and firm B's output one for one?

- (c) Which point on the diagram depicts a Nash Equilibrium?

- (d) If firm A suddenly acquired new productive technology, how would the diagram above change?

- (e) What would a reaction function look like for a perfectly competitive firm?

12 Can you think of any examples in your own lives where first mover advantages might apply?

### True/False

- 1 The firm under imperfect competition has some influence over price, evidenced by the downward-sloping demand curve for its product.
- 2 A key aspect of an oligopolistic market is that firms cannot act independently of each other.
- 3 An industry where diseconomies of scale set in at a low level of output is likely to be a monopoly.
- 4 A firm in long-run equilibrium under monopolistic competition produces at an output below the technically optimum point of production.
- 5 A feature of the kinked oligopoly demand curve model is that price may be stable when costs for a single firm change, but may change rapidly when the whole industry is faced with a change in cost conditions.
- 6 Firms under oligopoly face kinked demand curves.
- 7 A player holding a dominant strategy always wins.
- 8 Cartels may be made workable if their members are prepared to enter into binding pre-commitments.
- 9 A cartel member's announcement of intent to adopt a punishment strategy will maintain a cartel.
- 10 A monopolist always maximizes profits by setting marginal cost equal to marginal revenue.
- 11 Free exit from a market implies that there are no sunk or irrecoverable costs.
- 12 Fixed costs may artificially increase scale economies and help to deter entry by firms new to the industry.
- 13 The equilibrium under a Bertrand type oligopoly is identical to that under perfect competition.
- 14 In a Cournot type model the two players will share the market equally.
- 15 A firm's reaction function is based on the potential actions of its rivals, not its own costs.

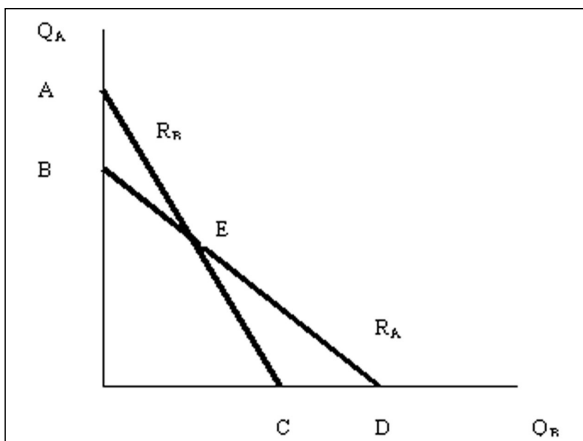


Figure 9-4

### Questions for Thought

- 1 Exercise 8 listed various sorts of entry barriers. Can you think of examples of British industries in which they appear to be operative?
- 2 Figure 9-4 shows the trading conditions for a two-firm cartel. Panels (a) and (b) show respectively the conditions facing the two firms A and B; panel (c) shows the combined cartel position.  $D=ARC$  in panel

## Economics in Action

### Stock Options and share prices

(Adapted from Powerweb Weekly Report, 24 June 2002)

To understand why stocks are coming down so fast, we need to understand why they went up so fast. Basically, the price of a company's stock reflects investors' beliefs in the current and/or future profits of the company. During the Go-Go days of the 1990's the economy was expanding at a record pace and corporate profits and stock prices were going up with it. But company earning reports are not too optimistic these days, and these negative forecasts are factored into the price that big and small investors are willing to pay for a piece of the firm.

A second reason for the current stock slump is that investors are afraid that the information that they are getting about corporate profits might not be too accurate. The media is filled these days with news about more and more firms having contracted a bad case of "Enronitis." The head of Tyco International was charged with tax evasion, Rite-Aid execs were charged with fraudulently inflating the value of their stock, and the Adelphi Cable owners have been

accused of using the company as a source of huge personal loans.

A major form of executive compensation during the 1990s was *stock options*, the right to buy company stock at a pre-determined, below market price. For example, if the stock is selling at \$50 per share the CEO might be given the option to buy it at \$45, meaning that he or she could make an immediate \$5 per share profit on every share for which they have an option. This gives the executive a big incentive to get the stock price even higher. The basic idea was to reward the executive proportionately to the profits that he or she was generating for the firm. But it boomeranged when some unscrupulous execs fudged the profit numbers to make the stock price (and their personal payoffs) go higher than it should have.

### Questions

- 1 How would game theory be used to explain the unscrupulous behavior of some CEO's?
- 2 Using game theory and the idea of credible commitments can the use of stock options be improved.

(c) shows the market demand curve, and  $MRC$  is the associated marginal revenue curve. Notice that firm A has a cost advantage over firm B.

- (a) If the two firms collude to maximize profits in the combined market, what joint output level will they choose?
- (b) At what price will the cartel sell the good?
- (c) If each firm accepts the cartel  $MR$  level, how much output will each produce?
- (d) Identify profit levels in each of the firms.
- (e) Suppose that firm B imagined that it was a price-taker at the price set by the cartel. What

would be its perceived profit-maximizing output level?

- (f) If firm B were to set output at this level, what would be the effect on market price?

- 3 For many years the only information that tobacco manufacturers were allowed to include in their advertising was that smoking is harmful. Why should they bother?
- 4 If oligopoly is so common in the real world, and perfect competition is so rare, why do we bother with the theory of perfect competition?

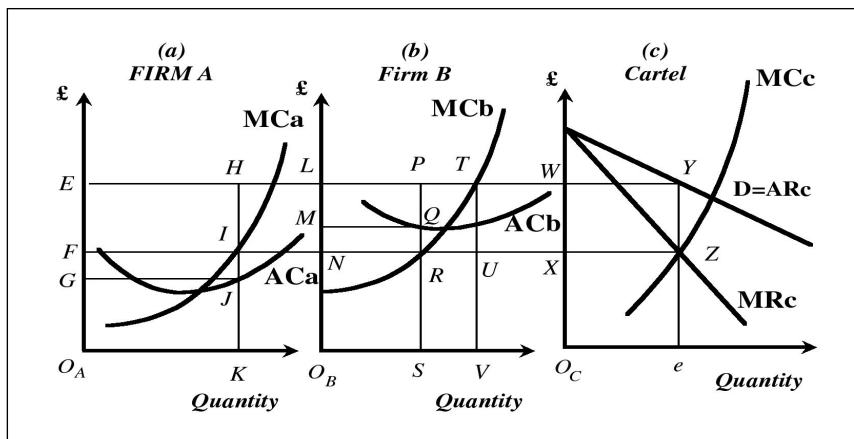


Figure 9-4 A two-firm cartel