**Maximum-profit equilibrium: monopoly**

1. If an industry is to be classed as one of pure (or perfect) competition, there are said to be two basic requirements.It is argued that when these two conditions are satisfied, the result is, for the individual firm, a demand curve that is virtually horizontal—i.e., perfectly or almost perfectly elastic with respect to price. The firm is free to sell as much or as little as it pleases at a market price over which it has no control.

Very few real-life firms find themselves in this position. This is because (so the present chapter argues) of failure to satisfy one or both of the two basic requirements for perfect competition. In real life, that is, the number of firms may be too (large/small) for perfect competition. In addition, the products sold by the various firms may be (identical among all firms/differentiated from one firm to the next).

(i) many small firms, (ii) all selling identical pro-ducts:

small: differentiated from one firm to the next.

2. These two characteristics—a too-small number of sellers and/or the differentiation of the competing products—are said to have "monopolistic" consequences.

Notice that this word "monopolistic" does not mean that the firms involved are monopolies. The conventional definition of a monopoly situation is this: (i) only one firm in the industry, and (ii) no close substitutes available for the product of that one-firm industry.

Except in a few special areas such as public utilities, cases approximating genuine monopoly are almost as difficult to find as are cases of perfect competition. Monopoly is a kind of extreme instance of competitive imperfection. Economist Edward H. Chamberlin, who did much to develop the ideas set out in the first part of this chapter, argued that the typical real-life situation is one of "monopolistic competition." Each firm finds that it must reckon with the competition of close substitute products (so that it is not a monopoly); and yet its situation is not that of pure or perfect competition.

The word "monopolistic" is used because it is argued that there is one monopoly-like characteristic to be found in all such cases of monopolistic or imperfect competition. less than perfectly elastic with respect to price—i.e., it is "tilted" rather than horizontal.

3. If the number of selling firms is small, the name given to the resulting situation is

If the number of selling firms is large, but competition is not perfect, this must be (in the language of the text) a situation of oligopoly: many differentiated sellers.

In its opening sections, this text chapter describes the circumstances of imperfect or monopolistic competition. But it does not attempt to explore these situations in any real detail. Instead, after its introductory outline, the chapter turns to an examination of the profit-maximizing behavior of a monopoly firm. Analytically, this monopoly case is decidedly easier than the so-called "intermediate" cases—those not perfectly competitive, and yet not completely monopolistic. It would be unwise to tackle these more intricate cases before having mastered the elementary ideas of monopoly pricing.

Even the terms and diagrams involved in a description of monopoly pricing may seem complicated at first. Yet the basic idea involved is simple. The monopoly firm is assumed to behave so as to "maximize its profit"—which is exactly what the firm in pure (or perfect) competition was assumed .The monopoly firm simply operates in rather different circumstances.

To review the basic ideas of "profit maximization":

1. "Maximizing profit" means making as much money as supply conditions will permit.

2. To "maximize profit," there must be something the firm can do that will influence its profit. There must be some variable which changes profit, and which the firm can control.

3. This chapter assumes that the monopoly firm can control the quantity it sells, just as the firm in pure (or perfect) competition can do. (In real life, this control is at best indirect and incomplete; there are other and more complex decisions to be made. But this chapter tackles a simple case.) So the variable which the monopoly firm can control is its sales quantity: it looks for the particular sales quantity that will maximize its profit.

4. The monopoly firm is assumed to have control over its sales quantity because it knows the demand schedule for its product—i.e., it knows the sales quantity that goes with each and any price it might charge.

5. From this demand schedule, it is easy to develop a revenue schedule (Total Revenue being quantity sold multiplied by price per unit)—i.e., a schedule showing revenue associated with each possible quantity sold.

6. The firm must know also the Total Cost of each and any output quantity. By bringing together the revenue and cost schedules, it can then identify that output quantity at which the excess of revenue over cost (profit) is greatest. (And it can tell the price to charge for this Maximum-profit output just by consulting the demand schedule once again.)

To repeat, the essential thing to grasp about this sequence of ideas is that it is simple. It is only when the monopoly firm's profit-maximizing "equilibrium position" (with respect to sales output and price) is outlined in marginal terms that it may seem complicated. But these marginal terms are essential analytic tools when one moves on to more complex situations. Hence the emphasis on Marginal Revenue and Marginal Cost in the text chapter and in the review questions which follow.

4. Columns (1) and (2) of Study Guide Table 1 represent a demand schedule. This schedule has been computed or estimated by a firm as indicating the quantities it can sell daily at various prices.

Table 1

This firm must operate under conditions of (perfect/imperfect) competition, since as the output to be sold increases, price (remains constant/must be reduced).

5. We treat the first two columns of Table 1 as representing a monopoly firm's demand schedule. Our task is to determine what price the monopolist will charge, and what output it will produce and sell—if its objective is Maximum-profit.

o. Column (3) of Table 1 shows Total Revenue—price times quantity. Complete the four blanks in this column.

Then use Columns (2) and (3) figures to illustrate Total Revenue on Study Guide Fig. 1—i.e., show Total Revenue associated with various output quantities. Join the points with a smooth curve. Disregard momentarily the TC curve already drawn on Fig. 1.

с. Notice that this demand schedule becomes price-inelastic , when price is sufficiently lowered—specifically, when price reaches $(8/7/6/5/4).

The graph of Columns (1) and (2) of Table 2 is already drawn on Fig.1 as a Total Cost curve (TC). (Mark the curve you drew in question 5 as TR, to distinguish it from the cost curve.)

It is now possible to see at once why the profit-maximizing process outlined here is a simple one. The firm is doing nothing more than to search for the output at which the vertical distance between TR and TC is greatest. This distance, for any output, is (fixed cost/price/profit or loss). (If TR is above TC, it is profit; if TC is above, it is loss.' So it is preferable to look for "greatest vertical distance" with ГД above TC. The greatest distance with ГС on top marks the maximum-possible loss, which is somewhat less desirable as an operating position.)

6. Figure 1 is too small to indicate quickly the precise Maximum-profit position. But even a glance is sufficient to indicate that this best-possible position is approximately i.45/65/85) units of output.

The firm can be thought of as gradually increasing its output and sales, pausing at each increase to see if its profit position is improved. Each extra unit of output brings in

a little more revenue (provided demand has not vet moved to the price-inelastic range); and each extra unit incurs a little more cost. The firm's profit position is improved if this small amount of extra revenue (exceeds/is equal to/is less than) the small amount of extra cost.

More elegantly put, output should be increased, for it will yield an increase in profit, if Marginal Revenue (MR) (exceeds/is equal to/is less than) Marginal Cost (MC). The firm should cut back its output and sales if it finds that MR (exceeds/is equal to/is less than) MC.

And so the "in-balance" position is where MR is (less than/equal to/greater than) MC.

7. A more careful development of the Marginal Revenue idea is needed. Column (4) in Table 1 shows the extra number of units sold if price is reduced. Column (5) shows extra revenue (positive or negative) accruing from that price reduction. Complete the blanks in these two columns to familiarize yourself with the meanings involved.

8. The general profit-maximizing rule is: Expand your output until you reach the output level at which MR = MC—and stop at that point.

The profit-maximizing rule for the firm in pure (or perfect) competition: P = MC. This is nothing but a particular instance of the MR = MC rule. It is assumed in pure (or perfect) competition that the demand curve facing the individual firm is perfectly horizontal, or perfectly price- (elastic/inelastic}. That is, if market price is $2, the firm receives (less than $2 /exactly $2/more than $2) for each extra unit that it sells. In this special case, MR (extra revenue per unit) is (greater than/the same thing as/less than) price per unit (which could be called Average Revenue, or revenue per unit). So in pure (or perfect) competition, P == MC and MR = MC are two ways of saying the same thing.

9. In imperfect competition, the firm's demand curve is—and things are different. From inspection of the figures in Table 1 [compare Columns (1) and (6)], it is evident that with such a demand curve, MR at any particular output is (greater than/the same thing as/less than) price for that output.

Why is this so? Suppose, at price $7, you can sell 4 units; at price $6, 5 units. Revenues associated with these two prices are respectively $28 and $30. Marginal Revenue from selling the fifth unit is accordingly $(2/5/6/7/28/30). It is the difference in revenue obtained as a result of selling the one extra unit. Why only $2—when the price at which that fifth unit sold was 86? Because to sell that fifth unit, price had to be reduced. And that lowered price applies to all 5 units. The first 4, which formerly sold at $7, now bring only $6. On this account, revenue takes a beating of $4. You must subtract tins $4 from the $6 which the fifth unit brings in. This leaves a net gain in revenue of $2—Marginal Revenue.

10. To return to the fortunes of the firm in Tables 1 and 2: The tables do not provide sufficient unit-by-unit detail to show the exact Maximum-profit output level. But Table 1 indicates that between sales outputs of 63 and 71, MR is $1.63. The MR figures fall as sales are expanded, so that the $1.63 would apply near the midpoint of this range, say at output 67. It would be somewhat higher between 63 and 66; somewhat lower between 68 and 71.

Similarly, MC (Table 2) would be SI.60 at output of about 67 units. So the Maximum-profit position would fall very close to 67 units produced and sold per period.

To sell this output, the firm would charge a price (see Table 1) of about 8(7 '5.75/4/1.60). Its Total Revenue [look for nearby figures in Column (3)] would be roughly $(380/580/780). Its Total Cost (Table 2) would be roughly ^(310/510/710), leaving profit per period of about $70.

$5.75; $380; $310.

The text notes that in geometric terms Marginal Revenue can be depicted as the slope of the Total Revenue curve.

Tills can be illustrated by looking more carefully at the Total Revenue curve you have drawn in Study Guide Fig. 1. Study Guide Fig. 2 shows an enlargement of a small segment of that curve: that part of the curve between output quantities of 25 and 31. If 25 units are sold, the price is 810 and Total Revenue is $250. This is point A on Fig. 2. If price is reduced to $9, that increases sales by 6 units, from 25 units to 31 units. Thus Total Revenue becomes $279 (31 multiplied by $9). So, if the firm reduces price from $10 to $9, in effect it moves from point A to point B.

Figure 2's heavier, curved line is the smooth curve used to join points A and B. It is an approximation of the points that would be obtained if we had quantity and revenue information on prices such as '59.90, S9.SO, and so on.

There is also a straight line (the thin line) joining A and B. It is close to the probable true Total Revenue curve although it is not likely to be the exact curve.

Instead of dropping from price $10 all the way to $9, suppose we had moved only to (say) $9.60. That would have produced (roughly) a 2-unit increase in quantity demanded. In this way, we would move closer to the true MR figure than our previous 6-unit approximation supplied. In Fig. 2 terms, we would be moving from A only to

D, not from A to B. Notice carefully that the straight line (the thin line) joining A to D becomes a (better/poorer) approximation of the presumed true Total Revenue curve than was the case when the points involved were A and B.

In sum, the closer we move point B to point A (for example, if we make it D rather than B), the closer the slope figure comes to being a measure of the true MR figure. Strictly speaking, we have true MR (the rate of change in revenue as measured in terms of 1-unit output changes) only when the line whose slope is being measured and used to indicate MR is actually tangent to the Total Revenue curve.

In its near-closing section Bygones and Margins, the text chapter emphasizes that if a firm is setting its price and output according to MR = MC principles, it will disregard Fixed Cost.

QUIZ: Multiple Choice

1. If a firm's Marginal Revenue exceeds its Marginal Cost, Maximum-profit rules require that firm to (1) increase its output in both perfect and imperfect competition; (2) increase its output in perfect but not necessarily in imperfect competition; (3) increase its output in imperfect but not necessarily in perfect competition; (4) decrease its output in both perfect and imperfect competition; (5) increase price, not output, in both perfect and imperfect competition.

2. Whenever a firm's demand curve is horizontal or "perfectly elastic," then (1) the firm cannot be operating under conditions of perfect competition; (2) the profit-maximizing rule of MR-equal-to-MC does not apply; (3) price and Marginal Revenue-must be one and the same; (4) price and Marginal Cost must be one and the same; (5) none of the above is necessarily correct.

3. A basic difference between the firm in perfect (or pure) competition and the monopoly firm, according to economic analysis, is this: (1) The perfect competitor can sell as much as he wishes at some given price, whereas the monopolist must lower his price whenever he wishes to increase the amount of his sales by any significant amount;

(2) the monopolist can always charge a price that brings him a substantial profit, whereas the perfect competitor can never earn such a profit; (3) the elasticity of demand facing the monopolist is a higher figure than the elasticity of demand facing the perfect competitor; (4) the monopolist seeks to maximize profit, whereas the perfect competitor's rule is to equate price and Average Cost; (5) none of the above.

4. "Oligopoly" means (1) the same thing as imperfect competition; (2) a situation in which the number of competing firms is large but the products differ slightly; (3) a situation in which the number of competing firms is small;

(4) that particular condition of imperfect competition which is just removed from monopoly, regardless of the number of firms or type of product: (5) none of these.

5. When a monopoly firm seeking to maximize its profits has reached its "equilibrium position," then (1) price must be less than Marginal Cost; (2) price must be equal to Marginal Cost; (3) price must he greater than Marginal Cost; (4) price may be equal to or below Marginal Cost, but not above it; (5) none of the above is necessarily correct since equilibrium does not require any particular relation between price and Marginal Cost.

6. To explain why imperfect competition is far more prevalent than perfect competition, the text lays considerable emphasis upon the following: (1) the fact that Marginal Revenue is less than price; (2) the tendency of Marginal Cost to continue to fall over substantial levels of output produced; (() the disposition of firms to try to maximize the profit they can gain from sales; (4) the tendency of Marginal Cost to rise after some particular level of output produced has been reached; (5) the fact that large firms now typically produce many different products, thus squeezing smaller firms out of their markets.

7. Among the five statements below, one must be false with respect to any firm operating under conditions of imperfect competition. Which one? (1) The number of competing sellers offering similar (although differentiated) products can be large. (2) Other firms may sell products

which are identical or almost identical with this firm's product. (3) The number of competing sellers offering similar (although differentiated) products can be small. (4) The firm's Marginal Revenue will be less than the price it obtains. (5) The demand curve facing the firm can be perfectly horizontal.

8. A level of output for a firm at which Marginal Cost had risen to equality with price would (1) be a profit-maximizing output level in both pure (or perfect) competition and imperfect competition; (2) be a profit-maximizing output level in pure (or perfect) competition but not in imperfect competition; (3) not be a profit-maximizing output level either in perfect or in imperfect competition; (4) be a profit-maximizing output level in imperfect competition but not in pure (or perfect) competition; (5) definitely be a profit-maximizing output level in imperfect competition, but might or might not be in pure (or perfect) competition.

9. A firm in conditions of imperfect competition which finds itself at an output level where Marginal Cost has risen to equality with price, and which wants to maximize its profit, ought to (1) increase its output; (2) change (either increase or decrease) its price but not its output; (3) maintain both price and output at their present levels; (4) increase its price; (5) perhaps do any of the above—information furnished is insufficient to tell.

10. The essence of the general rule for maximizing profits given in the text chapter is that a firm should set its price, or its output, as follows: set its (1) price at a level where the excess over the minimum-possible level of Average Cost is at its maximum; (2) output at a level where the extra production cost resulting from the last unit produced just equals the extra revenue brought in by that last unit; (3) price at the highest level which the traffic will bear; (4) price at a level just equal to Marginal Cost (assuming that Marginal Cost would rise with any increase in output); (5) output at a level where Average Cost is at a minimum.

11. A firm would be designated as a monopoly, according to the definition conventionally used by economists, in any situation where (1) the firm's Marginal Revenue exceeds the price it charges at all levels of output (other than the first unit sold); (2) the firm's Marginal Revenue is less than the price it charges at all levels of output (other than the first unit sold); (3) the firm has at least some degree of control over the price that it can charge; (4) the profit earned by the .firm significantly exceeds the competitive rate of return, after proper allowance has been made for risk undertaken; (5) there is no other firm selling a close substitute for the product of this firm.

12. The Marginal Revenue (MR) associated with any given point on a firm's demand curve will be related to the elasticity of demand at that point (with respect to price) as follows:

(1) When demand is inelastic, MR will be negative in value;

(2) when demand is elastic, MR will be negative in value;

(3) when demand is inelastic, MR will be zero in value; (4)

when demand is elastic, MR will be zero in value; (5) .VR of monopoly or imperfect competition. The AR line is Aver-is always positive in value (although below price) regardless age Revenue—in other words, it is price obtainable per unit. of elasticity, except at the point or region of unit elasticity.