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Pricing under Perfect Competition

"A cynic might say of perfect competition what Bernard Shaw once said of Christianity. The only trouble with it is that it has never been tried. Historians quarrel over whether there ever was a golden age of free competition, and certainly competition is not now perfect in the economist's sense."

—Paul A. Samuelson, *Economics*, pp. 35-36.

THE various features of perfect competition[1] are as follows :

(i) *Large Number of Buyers and Sellers*. An important feature of perfect competition is the existence of a very large number of buyers and sellers in the market. Each buyer buys so little and each seller sells so little that none of them is in a position to influence the price in the market. The actions of neither any buyer nor of any seller can have any effect on the market price. It is obvious that when there are millions of buyers and sellers operating in the market, none of them can be strong or powerful enough to influence or alter the price to his advantage. Actually, the price of the commodity is determined by the *combined actions* of all the sellers (or, firms) and buyers in the market. But once the price is determined by the market, each seller and each buyer has to accept it. Each seller adjusts his output (or, sale) and each buyer adjusts his purchases according to the ruling market price.

(ii) *Existence of Homogeneous Product*. The second feature of a perfectly competitive market is that the product being sold by the various firms (or, sellers) must be *homogeneous* or *identical* in the eyes of the buyers. The products are homogeneous in the sense that they are *perfect* substitutes from the buyer's point of view, and their cross elasticity is infinite. Since the product is homogeneous, no seller can charge a price even slightly above the ruling market price, because if he does so, he will lose all his customers.

The above two features of perfect competition, taken together, ensure that the average revenue curve of the firm shall be horizontal in shape. Since there are several firms operating in the market, no one firm is in a position to

1 Though perfect competition is a *rare*, almost a *non-existent* situation, yet we study price-determination under this situation. There are several reasons for this. *Firstly*, as pointed out by Leftwich, the study of perfect competition "furnishes us with a simple and logical starting-point for economic analysis." We start with perfect competition and then gradually introduce other situations, such as, monopoly, imperfect competition, oligopoly, etc., to study their effect on price-determination, in the same manner as we start with the study of mechanics by assuming a *frictionless* universe. A frictionless universe helps in the explanation of the principles of mechanics. Once the frictionless universe is understood, we can gradually introduce 'friction' to observe its effects. *Secondly*, the study of pricing under perfect competition provides us with certain analytical tools which can be used to explain price-determination in other market situations. *Thirdly*, the study of perfect competition provides us with "a norm against which the actual performance of the economy can be checked or evaluated."

exert any influence on price. Further, since the product is homogeneous, the buyers do not consider one firm's product as being superior to another's, and hence, there cannot be price differences in the market.

(iii) *Absence of Artificial Restrictions*. The third condition necessary for the existence of perfect competition is the non-existence of any artificial restrictions on the demands, supplies, prices of goods and factors of production in the market. There must be no governmental or institutional fixation of the prices of goods and factors of production. Nor must there be any restrictions on the supply of goods and factors either by the government or by some organized producer groups. Nor must there be any control of demands of goods through governmental rationing.

(iv) *Free Entry and Free Exit for Firms*. The fourth feature of perfect competition is that there should be complete freedom for firms to enter into or leave the industry whenever they choose to do so. Freedom to enter means that fresh blood shall be allowed in the industry. As such, there shall be many firms in the industry and each firm shall be small in size, producing only a very small portion of the total output. If some firms are incurring losses, they might leave the industry. The point to remember is that, under perfect competition, no firm is in a position to exercise any monopolistic control on the market.

(v) *Perfect Knowledge on the Part of Buyers and Sellers*. The fifth feature of perfect competition is the existence of perfect knowledge on the part of buyers and sellers about market conditions. Since the buyers know everything worth knowing about the product, there is no necessity of incurring any expenditure on publicity or advertisement. Likewise, the sellers also possess perfect information about the conditions prevailing in the market. (For example, the sellers have perfect knowledge about potential sales at various price-levels. This condition also implies that both the buyers and sellers have full knowledge of the price at which the *market demand* is equal to the *market supply*. In technical language, this price is known as the *market-clearing price*. At the market-clearing price, there will be no unsatisfied buyers and sellers.) Those who want to buy at this price can buy as much as they like and those who want to sell can sell as much as they wish. Ignorance of any kind on the part of buyers and sellers, vis-a-vis market conditions, would be considered an obstacle to the free functioning of competition.

(vi) *Perfect Mobility of Factors of Production*. The existence of perfect mobility of the factors of production is another condition for ensuring the smooth functioning of perfect competition. What it implies is that the various factors of production should be free to move into any use or industry which they consider profitable for themselves. They are also free to come out of any use or industry if they consider their remuneration in that use or industry inadequate. The existence of perfect mobility of factors is essential for the fulfilment of the first condition of perfect competition, namely, the existence of a large number of firms in the market.

(vii) *Non-existence of Transport Costs*. A perfectly competitive market also assumes the non-existence of transport costs. It assumes that the various firms work so close to each other that there are no transport costs. Strictly speaking, two similar products are not considered homogeneous unless they happen to be in the same place. If two similar products happen to be at two different places, their prices will also differ because of transport costs. As pointed out above, the existence of a single, uniform price is an essential feature of a perfectly competitive market, and a single, uniform price for the same product cannot exist in the market if transport costs are taken into account.

Sometimes a distinction is observed between *pure competition* and *perfect competition*. The term "pure competition" was introduced by E.H. Chamberlin into the theory of pricing. The American economists are particularly fond of using the term 'pure competition' in preference to the term 'perfect competition', which seems to be popular with the British economists. What exactly is the

EQUILIBRIUM OF DEMAND AND SUPPLY

We have now studied the demand and supply curves for a commodity produced by a perfectly competitive industry. We will now make use of these curves to study in detail how equilibrium between demand and supply is brought about.

In this Diagram 18.3, we have drawn the usual demand and supply curves of an industry. The equilibrium price of a commodity is determined by the intersection of these curves. *PM* is the equilibrium price shown in this diagram. The amount demanded at this price is equal to the amount supplied, and the market is in equilibrium. The market is cleared, there being no surplus and no shortage at this price. As is well-known, demand and supply are like two forces pulling in opposite directions. Marshall has compared them with the two blades of a pair of scissors (the upper blade representing demand and the lower blade indicating supply). They are balanced or in equilibrium at that market price at which the quantity demanded equals the quantity supplied. That market price is called equilibrium price.

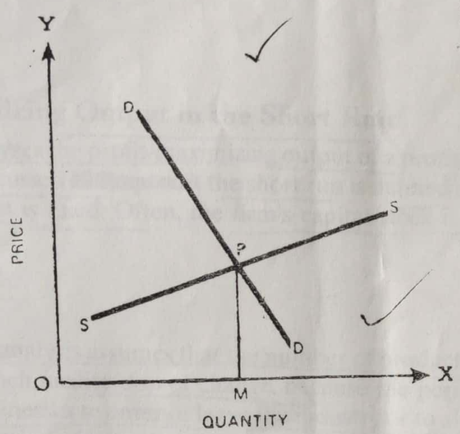


Diagram 18.3

One important thing should be noted about these demand and supply curves. They are of such a nature that any disturbance of the original equilibrium situation will set in motion certain forces which will cause a return to the old equilibrium. This has been shown in the diagram alongside.

In this Diagram 18.4, the market is in equilibrium when *OM* output is sold at *PM* (or, *ON*) price. At this price, the quantity demanded is equal to the quantity supplied. Now, suppose that this equilibrium is disturbed and the price rises to ON_1. At this price, the quantity supplied (*i.e.*, OM_1) exceeds the quantity demanded (*i.e.*, OM_2). The sellers are supplying more of the commodity at ON_1 price than the buyers are prepared to buy at that price. The sellers will, therefore, be forced to reduce their price. As the price is reduced, the quantity demanded will rise while the quantity supplied will fall, until the two quantities are once again equal at *ON* price. Likewise, if the price falls to ON_2, the quantity demanded (*i.e.*, OM_1) exceeds the quantity supplied (*i.e.*, OM_2). The free competition between buyers and sellers will force the price up till the old equilibrium price *ON* is re-attained. The original equilibrium is, thus, a *stable* equilibrium. An equilibrium is said to be stable when any disturbance in it releases certain forces which automatically call a return to the original situation.

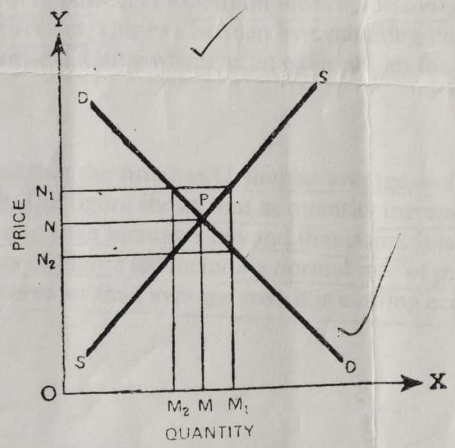


Diagram 18.4

Profit-Maximizing Output in the Short Run

This section analyzes the profit-maximizing output of a profitable competitive firm in the short run. As discussed [redacted], the short run is defined as a period of time in which at least one input is fixed. Often, the firm's capital stock is viewed as the fixed input.

Accordingly, this analysis assumes that the number of production facilities in the industry and the size of each facility do not change, because the period being considered is too short to allow businesses to enter or leave the industry or to alter the basic nature of their operations. The period of time that can properly be designated as the short run depends on the characteristics of the industry. For production of electric power, it may take as much as ten years to bring a new generating plant on line. In contrast, economic profits in service industries may attract new entrants in a matter of weeks.

Demand The firm in perfect competition faces a horizontal demand curve at the market price for its product. This can be seen by evaluating the effect of the firm's decisions on market demand. Using wheat as an example, let the market demand equation be given by

Costs It is assumed that the firm has U-shaped average and marginal cost curves, as shown in Figure [redacted]. The figure shows that as quantity increases from 0 to q_m units, average cost declines and then increases beyond that point. It is important to remember that the cost curves of Figure [redacted] include a normal rate of profit. Thus, any time that the firm's price is greater than average cost, it is earning economic profit.

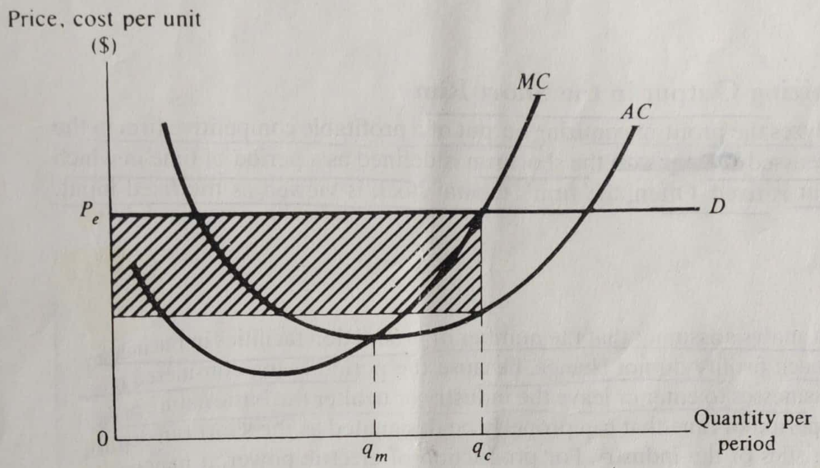


FIGURE 2 Short-Run Profit-Maximizing Output in Perfect Competition

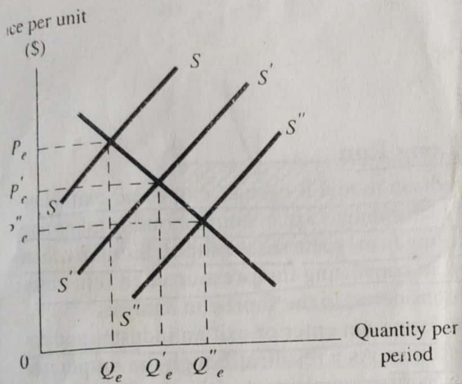
Equilibrium Output Because price is determined in the market and the product is homogeneous, the only decision left to the manager of a firm in a perfectly competitive market is how much output to produce. The profit-maximizing output is determined where the extra revenue generated by selling the last unit (i.e., the market price) just equals the marginal cost of producing that unit. For a horizontal demand curve such as that of Figure 2, this condition is met by increasing the rate of production to q_c where price equals marginal cost. If the firm increases output beyond this point, the additional revenue, P_e, is less than the extra costs as shown by the marginal cost curve. In contrast, if production is reduced below q_c, the loss of revenues is greater than the reduction in costs, and profits decrease. The output rate, q_c, represents the short-run equilibrium for the competitive firm in the sense that a profit-maximizing manager has no incentive to alter output as long as the demand and cost curves remain unchanged.

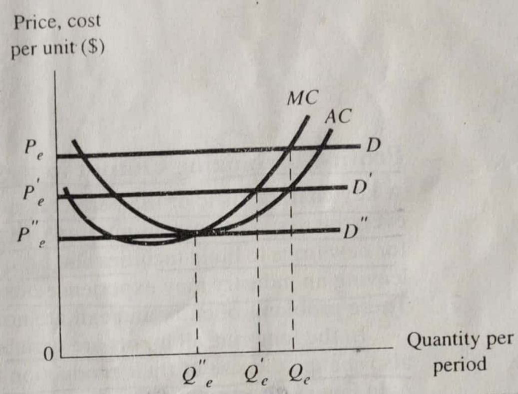
Profit-Maximizing Output in the Long Run

A key characteristic of the perfect competition model is ease of entry and exit. However, this assumption does not imply that such changes are instantaneous. It takes time for new firms to build facilities and for existing firms to increase output. Similarly, firms leaving an industry may experience delays in converting their resources to other uses. These problems of entry and exit are not considered in the short-run analysis.

In the long run, all inputs are variable. Firms can enter or exit an industry and can also change the size of their production facilities. As a result, although the output rate q_c in Figure [redacted] represents the profit-maximizing decision in the short run, it may not be the optimal choice in the long run. Producing at q_c, the firm is earning economic profit. In the figure, per-unit economic profits are given by the vertical distance between the average cost curve and the demand curve at the output rate q_c. Total economic profit is shown by the shaded area. Because the average cost curve already includes a normal profit rate, the implication is that capital invested in the firm is earning substantially more than capital used in other sectors of the economy. Thus, owners of capital have an incentive to withdraw their capital from those sectors yielding only a normal return and to employ it in this industry where greater profits can be earned.

As additional capital flows into the industry, more output will be produced at each price. Thus the market supply curve, SS, shifts to the right to $S'S'$, as shown in Figure [redacted]. This shift may result from more firms operating in the industry or the facilities of existing firms being expanded. It is useful to think of the supply shift as indicating that more of the product will be produced at any given price than before the inflow of capital. As the supply curve shifts to the right, the intersection of supply and demand causes a new





GURE Long-Run Profit-Maximizing Output

equilibrium price, P'_e. This result is shown in Figure . At the lower price, the individual firm now faces a new horizontal demand curve, D'. But at the price, P'_e, the output rate Q_c no longer maximizes profit. At Q_c marginal cost is greater than incremental revenue. Now the firm maximizes profits by reducing the rate of output to Q'_c, where price again is equal to marginal cost.

Producing Q'_c units per period and selling at P'_e, the firm is less profitable than before, but it is still earning economic profit. This can be seen by observing that the firm's average revenue, P'_e, is greater than average cost at the output rate Q'_c. Thus, there is an incentive for additional capital to flow into the industry. This additional capital expands capacity and causes further rightward shifts of the industry supply curve. The inflow of capital will continue until the supply curve is shifted to $S''S''$ and the equilibrium price is reduced to P''_e. Hence, the demand curve faced by the individual firm is shown by curve P''_eD'' in Figure . In this situation, profit is maximized by producing Q''_c. Notice that at Q''_c, price is equal to marginal cost, but price is also equal to average cost. Thus the firm's average revenue just equals average cost. Hence, the firm is earning a normal rate of profit, but there is no economic profit.

Because the return to capital in the industry is no higher than the return earned in other segments of the economy, there is no further incentive for capital to flow into the industry. However, because capital earns at least a normal return, there is no reason for owners to withdraw capital from the industry. Hence the output rate Q''_c, where price equals average cost, is the long-run equilibrium for the representative firm in this perfectly competitive industry.