

Subject: Microeconomic Theory I

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Market Structure

There are four basic types of market structures: perfect competition, imperfect competition, oligopoly, and monopoly. ... Meanwhile, monopolistic competition refers to a market structure, where a large number of small firms compete against each other with differentiated products.

Perfect competition

In economics, specifically general equilibrium theory, a perfect market, also known as an atomistic market, is defined by several idealizing conditions, collectively called perfect competition, or atomistic competition. In theoretical models where conditions of perfect competition hold, it has been theoretically demonstrated that a market will reach an equilibrium in which the quantity supplied for every product or service, including labor, equals the quantity demanded at the current price.

Assumptions:

A perfectly competitive market has following assumptions:

1. Large Number of Buyers and Sellers:

It means no single buyer or seller can affect the price. If a firm enters into the market or exit the market, there will be no effect on the supply. Similarly if a buyer enters into the market or exit from the market, demand will not be affected. Thus no individual buyer or seller can affect the price.

2. Homogeneous Products:

The second assumption of perfect competition is that all sellers sell homogeneous product. In such a situation, the buyers have no reason to prefer the product of one seller to another. This condition is present only when the commodity is a substance of definite chemical and physical composition i.e., salt, tin, specified grade of wheat etc.

3. No Discrimination:

Under perfectly competitive market, buyers and sellers must buy and sell freely among themselves. It implies that buyers and sellers must be willing to deal openly with one another to buy and sell at the market price. This may be true of one and all that may wish to do so without offering any special deals, discounts, or favours to selected individuals.

4. Perfect Knowledge:

A competitive market is (one in which the buyers and sellers are in close contact with each other. It means that, there is perfect knowledge of the market on the part of buyers and sellers. It implies that a large number of buyers and sellers in the market exactly know how much is the price of the commodity in different parts of the market

5. Free Entry or Exit of Firms:

In the long run, under perfect competition, firm can enter into or exit from the industry. There is no let or hindrance on firms as far as their entry into or exit from the market. In other words, there are no legal or social restrictions on the firm. Large number of sellers can be possible only if there is free entry of firms.

6. Perfect Mobility:

There must be perfect mobility of factors of production within the country which ensures uniform cost of production in the whole economy. It implies that different factors of production are free to seek employment in any industry that they may like.

7. Profit Maximization:

Under perfect competition, all firms have a common goal of profit maximization. Thus, there is absence of social welfare of the general masses.

8. No Selling Cost:

Under perfect competition, there are no selling costs.

9. No Transport Costs:

There shall not be any cost of transport between sellers. If transport costs exist buyers are prevented from moving from one seller to another to take advantage of price difference. This means that transport cost has no influence on the pricing of a product. In other words, there are always uniform price in the market.

The Equilibrium of the Firm under Perfect Competition – Explained!

The Equilibrium of the Firm under Perfect Competition!

The short run means a period of time within which the firms can alter their level of output only by increasing or decreasing the amounts of variable factors such as labour and raw materials, while fixed factors like capital equipment, machinery etc. remain unchanged.

Moreover, in the short run, new firms can neither enter the industry, nor the existing firms can leave it. Before explaining competitive equilibrium we assume that a firm tries to maximize money profits. We shall explain the equilibrium of a perfectly competitive firm in two stages: firstly, by assuming that all firms are working under identical cost conditions and, secondly, by assuming that they are working under differential cost conditions.

Short-run Equilibrium of the Firm (Identical Cost Conditions:

Identical cost conditions implies that all firms are facing same cost-conditions, that is, their average and marginal cost curves are of the same level and shapes. This would be so if the entrepreneurs of all firms are of equal efficiency and also the other factors of production used by them are perfectly homogeneous and are available to all of them at the same prices.

Under perfect competition, an individual firm is a price taker, that is, it has to accept the prevailing price as a given datum. It cannot influence the price by its individual action. As a result, demand curve or average revenue curve of the firm is a horizontal straight line (i.e., perfectly elastic) at the level of the prevailing price. Since perfectly competitive firm sells additional units of output at the same price, marginal revenue curve coincides with average revenue curve. Marginal cost curve, as usual, is U-shaped.

Now, in order to decide about its equilibrium output, the firm will compare marginal cost with marginal revenue. It will be in equilibrium at the level of output at which marginal cost equals marginal revenue and marginal cost curve is cutting marginal revenue curve from below.

At this level it will be maximising its profits. Since marginal revenue is the same as price (or average revenue) under perfect competition, the firm will equalise marginal cost with price to attain equilibrium output.

Consider Fig. 23.2 in which price OP is prevailing in the market. PL would then be the demand curve or the average and marginal revenue curve of the firm. It will be seen from Fig. 23.2 that marginal cost curve cuts average and marginal revenue curve at two different points, F and E .

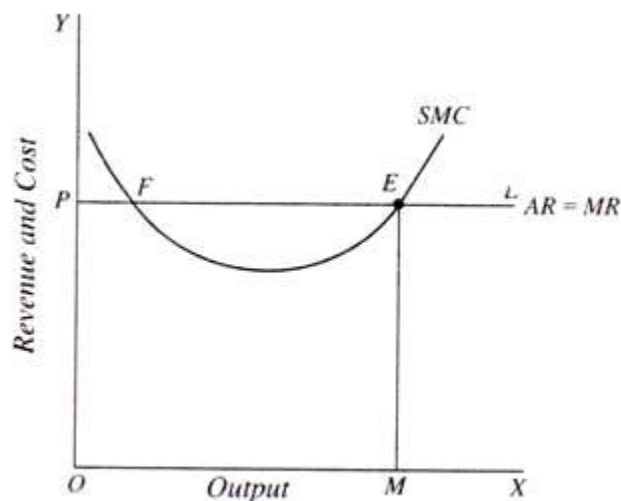


Fig. 23.2. Firm's Equilibrium under Perfect Competition

F cannot be the position of equilibrium, since at F second order condition of firm's equilibrium, namely, that marginal cost curve must cut marginal revenue curve from below at the point of equilibrium, is not satisfied. The firm will be increasing its profits by increasing production beyond F because marginal revenue is greater than marginal cost.

The firm will be in equilibrium at point E or output OM since at E marginal cost equals marginal revenue (or price) as well as marginal cost curve is cutting marginal revenue curve from below. As under perfect competition marginal revenue curve is a horizontal straight line, the marginal cost curve must be rising so as to cut the marginal revenue curve from below. Therefore, in case of perfect competition the second order condition of firm's equilibrium requires that marginal cost curve must be rising at the point of equilibrium.

Hence the twin conditions of firm's equilibrium under perfect competition are:

- (1) $MC=MR = \text{Price}$
- (2) MC curve must be rising at the point of equilibrium.

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But the fulfillment of the above two conditions does not guarantee that the profits will be earned by the firm. In order to know whether the firm is making profits or losses and how much of them, average cost curve must be introduced in the figure. This has been done in Fig. 23.3 where SAC and SMC curves are short-run average cost and short-run marginal cost curves respectively.

Profit per unit of output is the difference between average revenue (price) and average cost. In Fig. 23.3, at the equilibrium output OM, average revenue is equal to ME, and average cost is equal to MF. Therefore, the profit per unit of output is EF the difference between ME and MF.

The total profits earned by the firm will be equal to EF (profit per unit) multiplied by OM or HF (total output). Thus, the total profits will be equal to the area HFEP. Because normal profits are included in average cost, the area HFEP indicates super-normal profits.

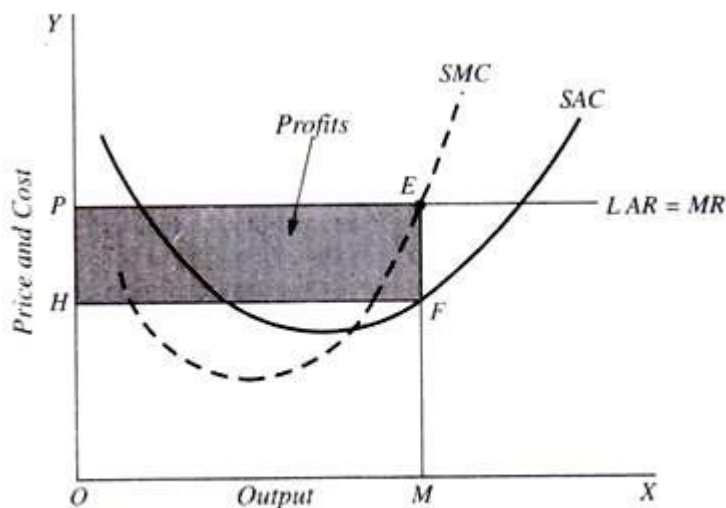


Fig. 23.3, Short-Run Equilibrium with Profits

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Since we are assuming that all firms in the industry are working under same cost conditions and also for all of them price is OP , all will be earning super-normal profits equal to the area $HFEP$. Thus, while all firms in the industry will be in short-run equilibrium, but the industry will not be in equilibrium since there will be a tendency for the new firms to enter the industry to complete away the super-normal profits. But the short run is not a period long enough for the new firms to enter the industry.

The existing firms will therefore continue earning super-normal profits equal to $HEFP$ in the short period. It is evident that in the situation depicted in Fig. 23.3 all firms will be in equilibrium at E and each will be producing OM output, but the tendency for the new firms to enter the industry will be present, though they cannot enter during the short period.

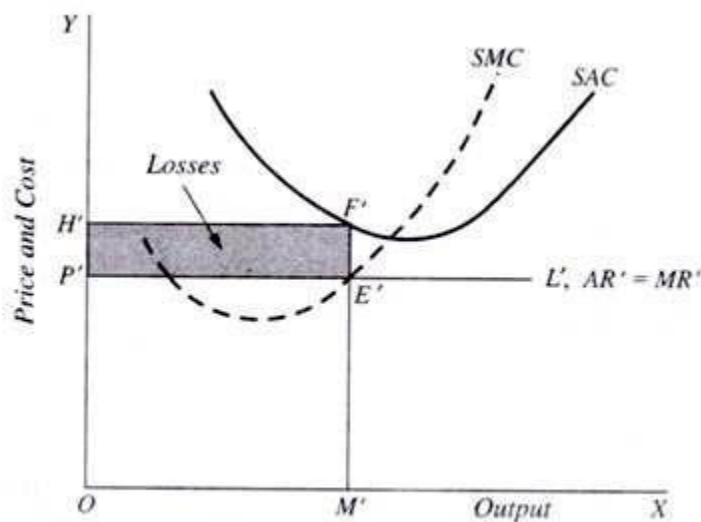


Fig. 23.4. Short-Run Equilibrium with Losses

Now suppose that the prevailing market price of the product is such that the price line or average and marginal revenue curve lies below average cost curve throughout. This case is illustrated in Fig. 23.4 where the ruling price is OP' which is taken as given by the firm.

$P' L'$ is the price line which lies below AC curve at all levels of output. The firm will be in equilibrium at point E at which marginal cost is equal to price (or marginal revenue) and marginal cost curve is rising. Firm would be producing OM' output but would be making losses, since average revenue (or price) which is equal to ME' is less than average cost which is equal to MF.

The loss per unit of output is equal to $E'F'$ and total loss will be equal to $P'E'F'FT$ which is the minimum loss that a firm can make under the given price-cost situation. Since all the firms are working under the same cost conditions, all would be in equilibrium at point E' or output OM' and every one will be making losses equal to $P'E'F'H$.

As a result, the firms will have a tendency to quit the industry in order to search for earning at least normal profits elsewhere. We thus see that at price OP' the firms will be in equilibrium at E' but there will be a tendency for firms to leave it through they cannot do so in the short period.

Deciding to Shut Down:

Now, an important question is why a firm should continue operating when it is incurring losses. The answer lies in the concept of fixed costs which have to be borne by the firm even if it stops production in the short run.

Therefore, in the analysis of firm's decision to continue operating or to shut down in the short run, the difference between variable costs and fixed costs is important. It will be remembered that variable costs are costs incurred on factors such as labour, raw materials, fuel or electricity which can be easily varied in the short run.

When a firm shuts down in the short run and stops producing the commodity, the variable costs also fall to zero. On the other hand, a firm cannot escape from fixed costs even if it ceases production in the short run. It should be noted that fixed costs are costs incurred on those factors which cannot be varied in the short run.

Thus rent of factory building, costs on machinery purchased, wages of a certain minimum managerial staff are some examples of fixed costs. When a firm stops production, that is, shuts down in the short run, it will have to bear losses equal to the fixed costs. Therefore, it will be wise to continue operating in the short run when firm's total revenue exceeds total fixed costs because in that case firm's losses will be less than the fixed costs.

To make our analysis simple, we examine the question in two parts:

1. Situation when a firm decides to continue operating in the short run even when incurring losses.
2. Situation when a firm decides to shut down in the short run.

1. Situation when a firm decides to continue operating when incurring losses:

A firm working under conditions of perfect competition has no control over the price of the product. It takes the prevailing price in the market as given and decides what level of output it should produce. When price in the market falls below average total cost, it will suffer losses. To avoid losses if it shuts down and stops producing the commodity in the short run its total revenue as well as variable costs will fall to zero. But it will have to bear losses equal to the total fixed costs.

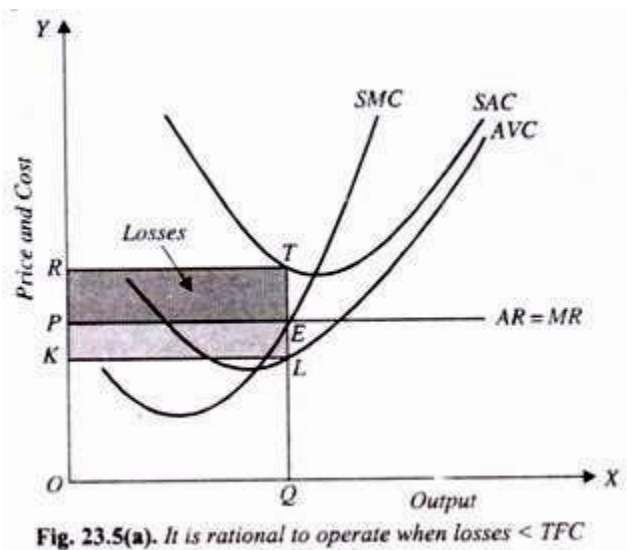
Therefore, it is prudent on the part of the firm to continue producing in this situation when losses are less than total fixed costs. That is, it is quite rational for a firm to continue producing the commodity in the short run, if it is recovering its variable costs fully plus a part of the fixed costs. But it will minimise losses by producing a level of output at which price equals marginal cost ($P = MC$).

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This situation is illustrated in Fig. 23.5(a) where the various short run cost curves SAC, AFC and SMC are shown. Price of the product prevailing in the product is OP which is taken as given by

the firm. The firm is in equilibrium at point E where it produces OQ output at which the given price OP is equal to marginal cost of production (SMC).

It will be seen from Fig, 23.5(a) that at the equilibrium output OQ, average variable cost is QL, which is less than the price OP (=QE) or $\text{Price} > \text{AVC}$. This means the firm is recovering variable costs plus a part of the fixed cost. Total revenue (TR) earned by producing output OQ is equal to the area OPEQ, while the total costs are equal to the area ORTQ.



It is evident from Fig. 23.5(a) that when price is OP total revenue is less than the total costs and the firm is making losses equal to the area RTEP. It should be noted that average fixed cost at output level OQ is given by the vertical distance TL between short-run average total cost (SAC) and the average variable cost (AVC).

Multiplying this average fixed cost by output OQ (= KL) we get the total fixed costs being equal to the area RTLK. It is thus clear by working at point E and producing output OQ, the firm is recovering the entire variable costs equal to the area OQLK and a part of the fixed cost equal to the area KLEP.

Thus losses made equal to the area RTEP are less than the total fixed cost equal to the shaded area RTLK. If a firm shuts down in the short run and ceases to produce the product, its losses will be equal to the total fixed cost RTLK. It will therefore be a rational decision on the part of the firm to continue operating as shutting down in this situation will mean greater losses equal to the entire total fixed cost. To conclude, the firm will continue operating in the short run at a loss when total revenue exceeds total variable costs. This enables the firm to earn revenue to recover a part of the fixed costs.

We state below the condition when it is rational for the firm to continue production in the short run even when it is incurring losses:

$$TR > TVC$$

$$\text{Since } TR = P.Q, \text{ and } TVC = AVC.Q$$

$$\text{Therefore, } P.Q > AVC.Q$$

$$P > AVC$$

2. Situation when a firm decides to shut down in the short run:

This situation is depicted in Fig. 23.5(b) where it will be seen that price has fallen to the level OP_1 . With price OP_1 , equilibrium is attained at point D corresponding to output OQ_1 at which price is equal to both marginal cost (MC) and minimum average variable cost. By producing OQ_1 output and selling it at price OP_1 , the firm earns total revenue equal to the area $OQ_1 DP_1$.

The total cost of producing OQ_1 output is equal to the area $O0, HB$. Thus with price OP , the firm is incurring losses equal to the area $P_1 DHB$. It should be noted that average fixed cost is DH at OQ_1 output, that is, the vertical distance between SAC and AVC .

The total fixed cost is then given by the area P, DHB . Thus when price falls to OP_1 , firm's losses are equal to the total fixed cost. Even when the firm closes down, its losses will be equal to the total fixed cost. Therefore, if price falls below OP , which is equal to the minimum possible average

variable cost (AVC), the losses will become greater than the fixed costs and the firm will shut down. Point D which indicates the minimum possible average variable cost represents the shut-down point. The situation when firm actually shuts down when price falls below average variable cost is explained below.

3. Situation when firm actually shuts down and does not operate:

When price of the commodity falls below minimum possible average variable cost, the losses would exceed total fixed cost at the output for which price equals marginal cost. This means that the firm will not fully recover even variable costs which can be avoided by stopping operations.

From the above analysis of equilibrium of the competitive firm in the short run, it follows that the firm in the short run may earn supernormal profits or losses or normal profits depending upon the price in the market. Firm's short-run equilibrium is possible in all these three situations.

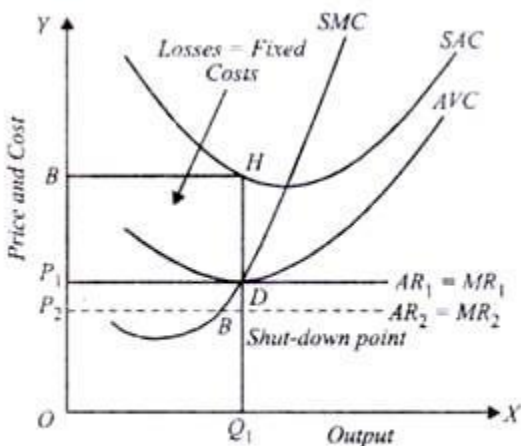


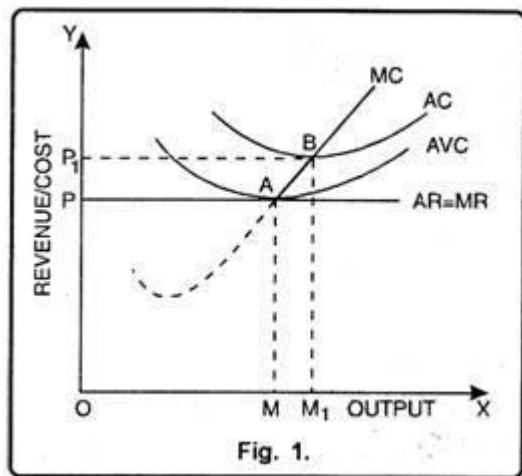
Fig. 23.5(b). When Price (P) = minimum AVC , losses are equal to total fixed costs. If price falls below it, the firm will shut down.

Short Run Supply Curve

(i) Short Run Supply Curve of a Firm:

Short run is a period in which supply can be changed by changing only the variable factors, fixed factors remaining the same. That way, if the firm shuts down, it has to bear fixed costs. That is why in the short run, the firm will supply commodity till price is either greater or equal to average variable cost. Thus a firm will continue supplying the commodity till marginal cost is equal to

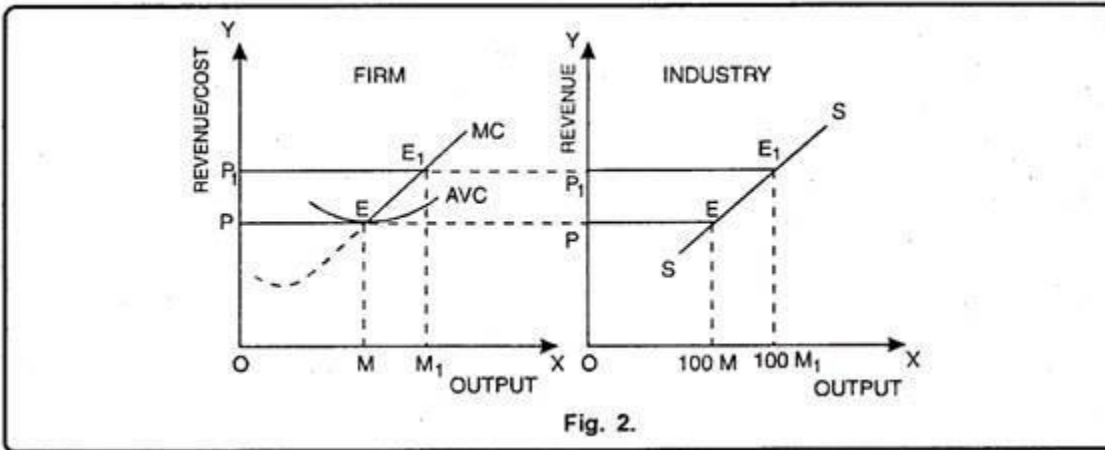
price or average revenue. Under perfect competition average revenue is equal to marginal revenue, so the firm will produce up to that point where marginal revenue and marginal cost are equal. Short run supply curve of a perfectly competitive firm is that portion of marginal cost curve which is above average variable cost curve. According to C.E. Ferguson, "The short run supply curve of a firm in perfect competition is precisely its Marginal Cost Curve for all rates of output equal to or greater than the rate of output associated with minimum average variable cost."



Prof. Bilas has defined it in simple words, "The Firm's short period supply curve is that portion of its marginal cost curve that lies above the minimum point of the average variable cost curve." However, short run supply curve of a firm can be shown with the help of fig. 1. From fig. 1 it is clear that there is no supply if price is below OP . At price less than OP , the firm will not be covering its average variable cost. At OP price, OM is the supply. In this case, firms' marginal revenue and marginal cost cut each other at A , OM is equilibrium output. If price goes up to OP_1 , the firm will produce OM_1 output. This firm's short run supply curve starts from A upwards i.e., thick line AB .

(ii) Short Run Supply Curve of an Industry:

An industry is a blend of firms producing homogeneous goods. That way, supply curve of an industry is a lateral summation of all firms. This can be made clear with the help of a Fig. 2.



Here, we have assumed that different firms in the industry are producing identical products. Each firm at OP price is producing OM output. It is because all firms have identical costs. At OP price, supply of industry is $100 \times M = 100M$. Similarly at OP_1 price, all the firms of industry are producing $100 \times M_1 = 100M_1$ quantity of output. These quantities will be called supply or output of industry. SS is the supply curve of industry. Point E shows that at OP price firm's supply is OM and an industry's total supply is $100 \times M = 100M$. At OP_1 price, firm's supply is OM_1 and industry's supply is $100M_1$. We get industry's supply curve by joining points E and E_1 . Thus, under perfect competition, lateral summation of that part of short run marginal cost curves of the firms which lie above the average variable cost constitutes the supply curve of the industry. According to Stonier and Hague, "short run supply curve of a competitive industry will always slope upwards since the short run marginal cost curve of the industrial firms always slope upward."

Books

1. Pindyck and Rubinfeld with Mehta (2005), Microeconomics- latest available Edition in market.
2. D.N Dwivedi (2016), Microeconomics Theory and Application-- latest available Edition in market.
3. Walter Nicholson, Microeconomic Theory, Tenth Edition, Thomas Learning Newyork
4. Koutsoyiannis, A., Modern Microeconomics, Macmillan, London.