

PERFECT COMPETITION

MARKET STRUCTURE: PERFECT COMPETITION

In ordinary speech, the term 'market' refers to a place where buyers and sellers meet for transactions, e.g., Vardaan Market of Calcutta, Palika Bazar of New Delhi, Crawford Market of Mumbai and so on. But in economics it is used in a different sense. In economics, the term 'market' does not mean a particular place, rather it refers to a particular commodity which is bought and sold, e.g., the rice market, the cloth market, the gold market and so on. It is used to indicate a commodity or service as also their buyers and sellers who are in direct competition with one another. So, a market consists of a group of buyers and sellers in sufficiently close contact with one another for exchange to take place among them.

In the above sense there is no restriction of locality. The market may be local, national or international depending on the commodities which are bought and sold. Local markets are found for the local produce or for the perishable commodities (e.g., vegetables, milk, eggs, etc.) or for animals like goats, horses, cows, etc. The market of wheat or cloth or gold is both national and international as these goods are bought and sold widely.

Thus, the essential elements of an economic market are:

- (i) A particular commodity or a factor, and

- (ii) A large number of buyers and sellers in direct contact as also in competition with one another.

The function of a market is to enable an exchange of goods and services to take place a means by which buyers and sellers are brought into contact with one another. The market may be small or large in size. The market of fish or milk or perishable good is small and narrow, as it covers only a small area. But the market of goods like wheat, cement, automobiles, petrol, steel or gold is very wide as these are bought and sold all over the world. In modern times the use of cold storage has widened the market for some commodities (e.g., potatoes, fruits, fishes, eggs, etc.) which had previously very limited markets.

Markets are valuable institutions. They facilitate trade. More trade means more production. More production means more employment and a higher national income. Markets are, therefore, essential for the development of industries and the economic growth of a country. Markets and consumers are never static. They may change because of changes in buyers' incomes, or changes in tastes or preferences, or increasing competition. The changes may be due to changes in population, birth rates, marriage rates, age structure of the population, its geographical distribution and so on.

Functions

Organised markets are concerned with the distribution of goods from the manufacturers via the wholesalers and retailers to the final consumers. These markets are vital to the whole process of production. The functions of markets are:

- (a) Their most obvious function is to bring together buyers and sellers usually in the same place.
- (b) They also reduce price fluctuations due to the seasonal nature of the product. One function of market specialists is to carry stocks of goods in order to prevent prices falling too rapidly in periods of high output, or rising too rapidly in periods of low output. They thus benefit producers in the first case and consumers in the second.
- (c) In this connection speculators, who are often condemned, contribute to stability by buying when prices are low (thus preventing prices falling further) and releasing their stocks as prices rise (thus preventing prices rising too far).
- (d) Finally, the establishment of centralised markets allows both producers and consumers to take advantage of the specialised services which can only be sustained where markets are large enough to lead to economies of scale.

Market structure

The behaviour of individuals, firms, and organizations within a market context is thought to be a function of their objectives and the constraints that exist because of technology, quantity/quality of inputs and market structure. Market structures can be characterized by sellers or buyers or both. Generally, four basic types of markets: (1) pure (or perfect) competition, (2) monopolistic (or imperfect) competition, (3) oligopolistic competition, and (4) monopoly. Pure competition is believed to produce ideal results in the allocation of resources. Monopoly is usually depicted as having less than

optimal outcomes.

The basic market structures based on sellers is as perfect competition, monopolistic competition, oligopoly and monopoly. Pure competition and Monopoly are at each end of the spectrum of markets. In fact, probably neither occurs in market economies. Pure competition and monopoly are the boundaries and the “real world” (wherever that is) lies somewhere between the two extremes. Pure competition provides the benchmark that can be use to evaluate markets.

Perfect Competition

Perfect competition a market structure characterized by a large number of small firms such that no single firm can affect the market price or quantity exchanged. Perfectly competitive firms are price takers. They set a production level based on the price determined in the market. If the market price changes, then the firm re-evaluates its production decision. The idealized purely competitive market insures that no buyer or seller has any market power or ability to influence the price. The sellers in a purely competitive market are *price takers*. The market sets the price and each seller reacts to that price by altering the variable input and output in the short run. In the long rung they can alter the scale of plant (size of the fixed input in each short run period). The conditions that ensure no seller has any marketpose are:

- Large number of sellers (and buyers), no one of which can influence the market. Homogeneous output, buyers see goods as perfect substitutes.

- Relatively “free” entry and exit to and from the market.
- Sellers cannot charge a price above the market price because sellers see all other goods in the market as perfect substitutes. They can buy those goods at the market price.

In a perfectly competitive market, the price of the commodity is determined exclusively by the intersection of the market demand curve and the market supply curve for the commodity. The perfectly competitive firm is then a “price taker” and can sell any amount of the commodity at the established price.

Characteristics

1. **Large Number of Small Firms:** A perfectly competitive industry contains a large number of small firms, each of which is relatively small compared to the overall size of the market. This ensures that no single firm can influence market price or quantity. If one firm decides to double its output or stop producing entirely, the market is unaffected. The price does not change and there is no remarkable change in the quantity exchanged in the market.
2. **Price Taker:** No single firm can influence the market price, or market conditions. The single firm is said to be a price taker, taking its price from the whole industry.
3. **Identical Products (Homogenous product):** Each firm in a perfectly competitive market sells an identical product, what is often termed “homogeneous goods.” The essential result of this feature is that the buyers are unable to identify any difference among them. There are no brand

names or distinguishing features that differentiate products.

4. **Perfect Mobility of Factors and Products:** Under perfect competition, products as well as resources are freely mobile within the market. It normally results in the existence of same price for same products throughout the market.
5. **Freedom to Entry and Exit of firms:** Perfectly competitive firms are free to enter and exit an industry. They are not restricted by government rules and regulations, start up cost, or other entry. Likewise, a perfectly competitive firm is not prevented from leaving an industry as is the case for government-regulated public utilities. This ultimately results in the existence of normal profit in the long run.
6. **Perfect Knowledge:** There exists perfect knowledge in the market. Buyers are completely aware of sellers' prices, such that one firm cannot sell its good at a higher price than other firms. Each seller also has complete information about the prices charged by other sellers. Perfect knowledge also extends to technology. No firm can produce its good faster, better, or cheaper because of special knowledge of information.
7. **No Externalities:** There are assumed to be no externalities so there are no external costs or benefits.
8. **Normal profits in the long run:** Firms can only make normal profits in the long run, but they can make abnormal profits in the short run.

Demand AR and MR curves

A firm under perfect competition is price-taker. This simply means it can alter its volume of output and sales level without significantly affecting the market price of its product. This explains why a firm operating in a perfectly competitive market has no power to influence that market through its own individual actions. It must passively accept whatever price happens to prevail in the market.

At the prevailing market (ruling) price it can sell as much as it likes. This means that the demand for its product is completely elastic at a particular (market determined) price. As R.G. Lipsey put it, **“The demand curve facing each firm in perfect competition is horizontal, because variations in the firm’s output over the range that it needs to consider have no noticeable effect on price”**.

Lipsey has also clarified an important point accepted by economists for a long time. As he put it, “The horizontal (perfectly elastic) demand curve does not mean that the firm could actually sell an infinite amount at the given price. It means, rather, that the variations in production that will normally be possible for the firm to make will leave price virtually unchanged because their effect on total industry output will be negligible.”

1. The Revenue Concepts:

To study the nature of a firm’s demand curve as also the revenues that firms receive from the sales of their products, economists define 3 concepts, viz., TR, AR and MR. TR is the total amount received by the firm from the sale of a product. If

q units are sold at price of p rupees, $TR = pq$. AR is the amount of revenue per unit sold.

Since this is equal to the price at which the product is sold ($AR = TR/q = pq/q = p$) it is called the seller's demand curve or the demand curve for the product of an individual seller. MR is the change in a seller's TR resulting from a change in its sales level by one unit. In economics, the word 'margin' always refers to anything extra. This means at the existing level of sales, MR shows what revenue the firm could gain by selling one unit more and what revenue it would lose by selling one unit less.

2. Industry Demand and Firm Demand:

Figure 1.1 shows both the demand curve for the product of a single firm under perfect competition.

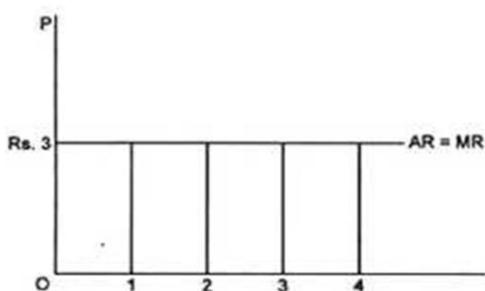


Figure 1.1: AR Curve and MR Curve

The industry demand curve slopes downward from left to right, but the firm's demand curve horizontal because the firm's output variation (measured in thousands of tonnes) has hardly as percentage effect so an industry output (measured in millions of tonnes). At the prevailing market price (Rs. 3),

industry output is 200 million tonne. At this price, the firm considers producing a maximum output of 60,000 tonne.

Table 1.1: Revenue Schedule of a Firm under Perfect Competition

Quantity	Price	TR	AR	MR
10	3	30	3	-
11	3	33	3	3
12	3	36	3	3
13	3	39	3	3

To illustrate these three revenue concepts, let us consider a firm which is selling an agricultural product in a perfectly competitive market (such as wheat) at a price of Rs. 3 per tonne. Since price remains fixed, TR rises by Rs. 3 for every tonne sold. Since every unit brings in Rs. 3, the AR per unit sold is surely Rs. 3. Moreover; since each additional unit sold brings in Rs. 3, the MR of an extra unit sold is also Rs. 3.

3. Table 1.1 shows revenue figures for certain range of output (between 10 and 13 units). Figure 1.2 illustrates the corresponding total revenue (TR) curve.

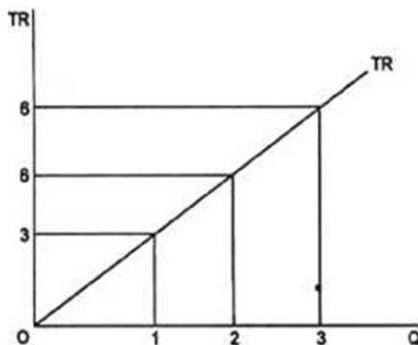


Figure 1.2: TR Curve

The most important point to note here is that, as long as the volume of the firm's output does not significantly affect the price at which that output sells, $MR = AR$ (which is always equal to p which is Rs. 3). We see that AR and MR are the same horizontal line (drawn at the level of market price) and parallel to the x -axis. In short if the market price is unaffected by variations in the firm's output, then the firm's demand curve, its AR curve and MR curve will coincide in the same horizontal line. This means that for a firm in perfect competition, $p = MR$. For such firm TR increases in direct proportion to output.

Price Determination in the Market Period

The market period, or the very short run, refers to the period of time in which the market supply of the commodity is completely fixed. When dealing with perishable commodities in the market period, costs of production are irrelevant in the determination of the market price and the entire supply of the commodity is offered for sale at whatever price it can fetch. In the figure 1.3, S represents the fixed market supply of a commodity in the market period. If the market demand curve for the commodity is given by D , the equilibrium market price is \$8 per unit in the market period. If we had D' instead, the equilibrium price, would be \$24.

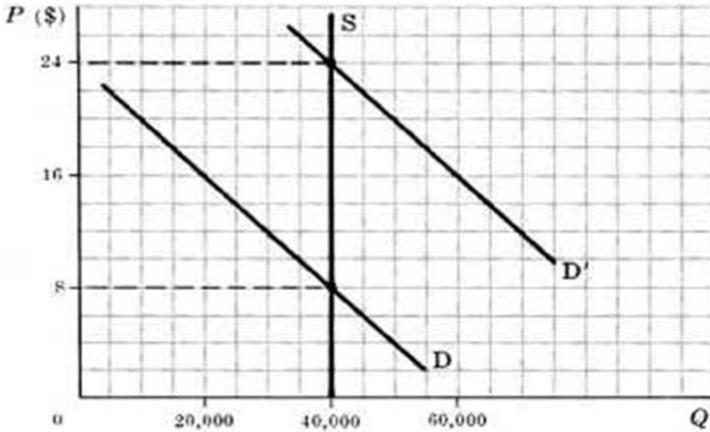


Figure 1.3: Fixed Market Supply

Short-Run Equilibrium of the Firm

A firm is in equilibrium in the short-run when it has no tendency to expand or contract its output and wants to earn maximum profit or to incur minimum losses. The short-run is a period of time in which the firm can vary its output by changing the variable factors of production. The number of firms in the industry is fixed because neither the existing firms can leave nor new firms can enter it. The short-run equilibrium of the firm can be explained with the help of marginal analysis and total cost-total revenue analysis.

1) Total Approach

Total profits equal total revenue (TR) minus total costs (TC). Thus, total profits are maximized when the positive difference between TR and TC is greatest. The equilibrium output of the firm is the output at which total profits are maximized.

[Type here]

[Type here]

[Type here]

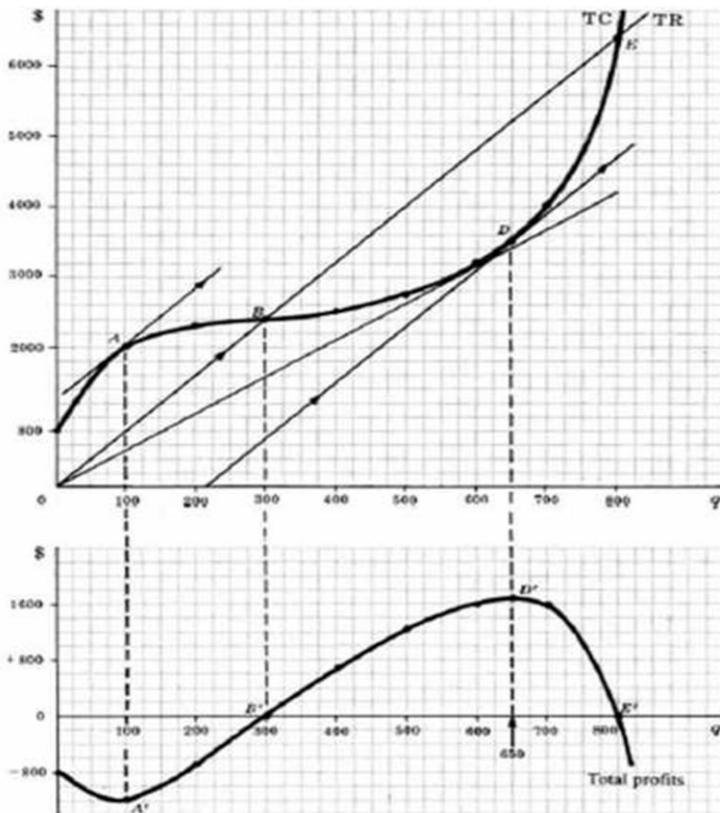
In the table 1.2, quantity [column (1)] times price [column (2)] gives us TR [column (3)]. TR minus TC [column (4)] gives us total profits [column (5)]. Total profits are maximized (at \$1690) when the firm produces and sells 650 units of the commodity per time period.

Table 1.2: Short Run Equilibrium

Q	P	TR	TC	Total Profits
0	8	0	800	-800
100	8	800	2000	-1200
200	8	1600	2300	-700
300	8	2400	2400	0
400	8	3200	2524	676
500	8	4000	2775	1225
600	8	4800	3200	1600
650	8	5200	3510	1690
700	8	5600	4000	1600
800	8	6400	6400	0

The profit-maximizing level of output for this firm can be represented in figure 1.4 (obtained by plotting the values of columns 1, 3, 4, and 5 of Table 1.1).

Figure 1.4: Short run Equilibrium



In Figure 1.4, the arrows indicate parallel lines. The TR curve is a positively sloped straight line through the origin because P remains constant at \$8. At 100 units output, this firm maximizes total losses or negative profits (points A and A'). At 300 units of output, TR equals TC (point B) and the firm breaks even (point B'). The firm maximizes its total profits (point D') when it produces and sells 650 units of output. At this output level, the TR curve and the TC curve have the same slope and so the vertical distance between them is greatest.

2) Marginal Approach

In general, it is more useful to analyze the short-run equilibrium of the firm with the marginal revenue–marginal cost approach. Marginal revenue (MR) is the change in TR for a one-unit change in the quantity sold. Thus, MR equals the slope of the TR curve. Since in perfect competition, P is constant for the firm, MR equals P. The marginal approach tells us that the perfectly competitive firm maximizes its short-run total profits at the output level, where MR or P equals marginal cost (MC) and MC is rising. The firm is in short-run equilibrium at this best, or optimum, level of output.

Table 1.3: Short run Equilibrium

Q	P=MR	MC	Ac	Profits/Unit	Total Profits
100	8	12	20	-12	-1200
200	8	3	11.60	-3.5	0700
300	8	1	8	0	0
400	8	1.25	6.31	1.69	676
500	8	2.50	5.55	2.45	1225
600	8	4.25	5.33	2.67	1602
650	8	8	5.40	2.60	1690
700	8	8	5.71	2.29	1603
800	8	24	8	0	0

In the Table 1.3, columns (3) and (4) are calculated directly from column (4) and column (1) of Table 1.2. The values in column (5) are obtained by subtracting each value of

column (4) from the corresponding value in column (2). The values of column (6) are then obtained by multiplying each value of column (5) by the values in column (1). Note that the values of total profits are the same as those in Table 1.2 (except for two very small rounding errors). The firm maximizes total profits when it produces 650 units of output. At that level of output, $MR = MC$ and MC is rising.

The profit-maximizing, or best, level of output for this firm can also be viewed from Figure

1.5 (obtained by plotting the values of the first four columns of Table 1.2).

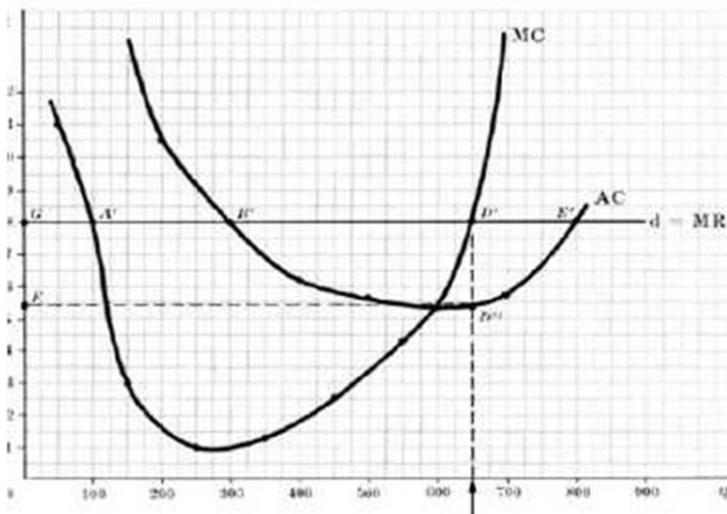


Figure 1.5: Profit Maximising Output

As long as MR exceeds MC (from A' to D'), it pays for the firm to expand output. The firm would be adding more to its TR than to its TC and so its total profits would rise. It does not

pay for the firm to produce past point D' , since MC exceeds MR . The firm would be adding more to its TC than to its TR and so its total profits would fall. Thus, the firm maximizes its total profits at the output level of 650 units (given by point D' , where P or MR equals MC and MC is rising). The profit per unit at this level of output is given by $D'D''$ or \$2.60, while total profit is given by the area of rectangle $D'D''FG$, which equals \$1690.

Short-Run Equilibrium of the Industry:

An industry is in equilibrium in the short-run when its total output remains steady, there being no tendency to expand or contract its output. If all firms are in equilibrium, the industry is also in equilibrium. For full equilibrium of the industry in the short-run, all firms must be earning only normal profits.

The condition for this is $SMC = MR = AR = SAC$. But full equilibrium of the industry is by sheer accident because in the short-run some firms may be earning supernormal profits and some incurring losses. Even then, the industry is in short-run equilibrium when its quantity demanded and quantities supplied are equal at the price which clears the market.

This is illustrated in Figure 1.6 where in Panel (A), the industry is in equilibrium at point E where its demand curve D and supply curve S intersect which determine OP price at which its total output OQ is cleared. But at the prevailing price OP , some firms are earning supernormal profits $PEIST$, as shown in Panel (B), while some other firms are incurring

FGE2P losses, as shown in Panel (C) of the figure.

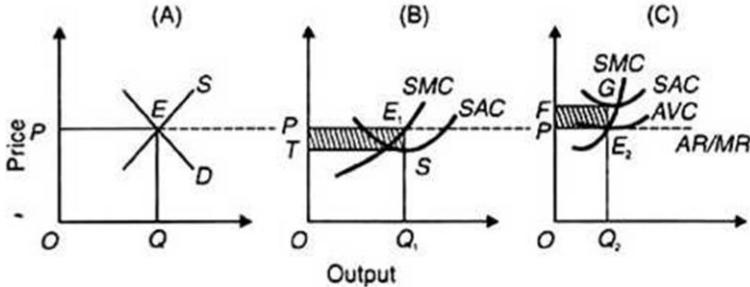


Figure 1.6: Industry Equilibrium

Shut Down Point

If, at the best, or optimum, level of output, P exceeds AC , the firm is maximizing total profits; if P is less than AC but greater than AVC , the firm is minimizing total losses; if P is less than AVC , the firm minimizes its total losses by shutting down. It is shown in figure 1.7.

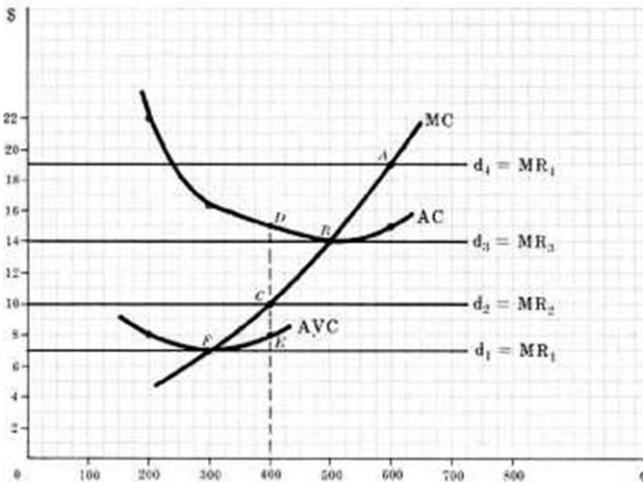


Figure 1.7: Shutdown Point

Figure 1.7 shows hypothetical MC, AC, and AVC curves for a “representative” firm; d_1 to d_4 (and MR_1 to MR_4) are alternative demand (and marginal revenue) curves that might face the perfect competitive firm. The results with each alternative demand curve are summarized in Table 1.4.

Table 1.4

	Equilibrium Point	q	P (\$)	AC (\$)	Profit/Unit (\$)	Total Profits (\$)	Result
With d_4	A	600	19	15.00	4.00	24.00	Total profits maximized
With d_3	B	500	14	14.00	0	0	Break-even point
With d_2	C	400	10	15.00	-5.00	-2000	Total losses minimized
With d_1	F	300	7	16.33	-9.33	-2800	Shut-down point

Long Run Equilibrium of the Firm

In the long run, all factors of production and all costs are variable. Therefore, a firm will remain in business in the long run only if (by constructing the most appropriate plant to produce the best level of output) its TR equals or is greater than its TC. The best, or optimum, level of output for a perfectly competitive firm in the long run is given by the point where P or MR equals LMC and LMC is rising. If, at this level of output, the firm is making a profit, more firms will enter the perfectly competitive industry until all profits are squeezed out.

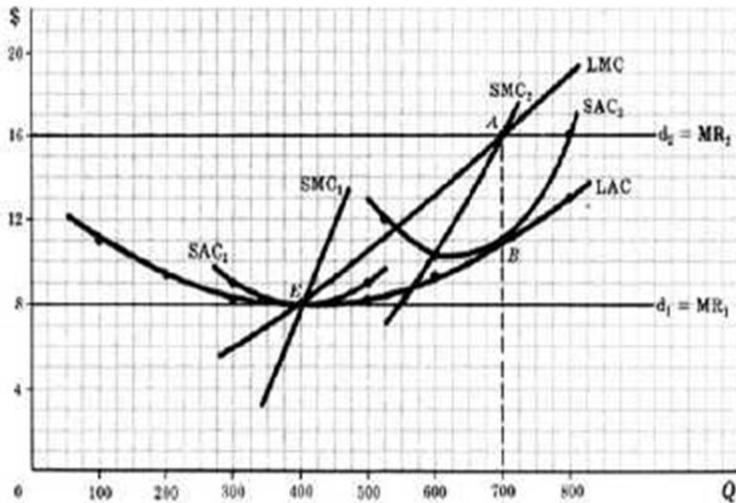


Figure 1.8: Long Run Equilibrium

In Figure 1.8, at the market price of \$16, the perfectly competitive firm is in long-run equilibrium at point A, where P or $MR = SMC = LMC > SAC = LAC$. The firm produces and sells 700 units of output per time period, utilizing the most appropriate scale of plant (represented by SAC_2) at point B. The firm makes a profit of \$5 per unit (AB) and a total profit of \$3500.

Since the firm is making profits, in the long run more firms will enter the industry, attracted by those profits. The market supply of the commodity will increase, causing the market equilibrium price to fall. This will continue until all firms just break even. In Figure 1.8, this occurs at point E, where $P = MR = SMC = LMC = SAC = LAC = \8 . The firm will operate the optimum scale of plant (represented by SAC_1) at the optimum rate of output (400 units) and will make zero

profits. All firms in the industry find themselves in the same situation (if all firms have identical cost curves), and so there is no incentive for any of them to leave the industry or for new firms to enter it.

Constant, Increasing and Decreasing Cost Industries

1. Constant Cost Industries

In the long-run equilibrium for the perfectly competitive firm and industry, if the market demand curve for the commodity increases, thus giving a higher market equilibrium price, each firm will expand output within its existing plant in the short run and make some pure economic profit. In the long run, more firms will enter the industry, and if factor prices remain constant, the market supply of the commodity will increase until the original market equilibrium price is re established. Thus, the long-run market supply curve for this industry is horizontal (at the level of minimum LAC) and the industry is referred to as a “constant cost industry.” It is shown in the figure 1.9.

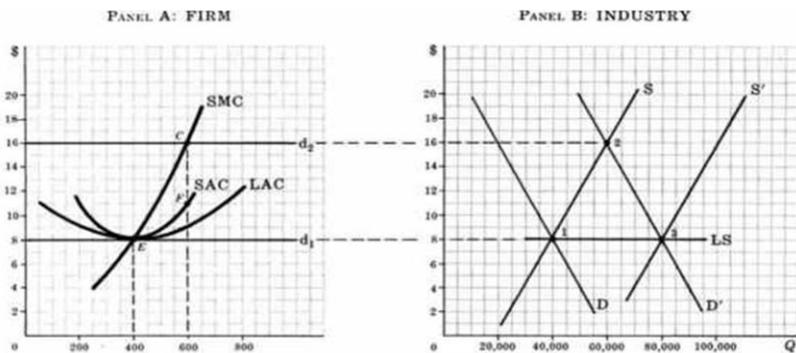


Figure 1.9: Constant Cost

In panel B of figure 1.9, the original market equilibrium price of \$8 is established by the intersection of the short-run industry or market demand curve (D) and supply curve (S) for the commodity. At this price, the perfectly competitive firm (panel A) is in long-run equilibrium at point E. If all firms have identical cost curves, there will be 100 identical firms in the industry, each producing 400 units of the 40,000 units equilibrium output for the industry. If, for some reason, the short-run market demand curve shifts up to D', the new market equilibrium price of this commodity becomes \$16 (point 2 in panel B). At this new price, each of the identical 100 firms will expand output within its existing scale of plant in the short run to 600 units (given by point C) and will make a profit of \$5 per unit (CF) and \$3000 in total.

Since all firms in make profits, in the long run more firms will enter the industry. If factor prices remain constant, the short-run market supply curve will shift to S', giving (at the intersection with D') the original market equilibrium price of \$8 per unit. At this price, each perfectly competitive firm will return to the original long-run equilibrium point (point E in panel A). There will now be 200 identical firms, each producing 400 units of the 80,000 units new equilibrium output for the industry. By joining equilibrium points 1 and 3, we get the long-run supply curve (LS) for this perfectly competitive industry. Since the LS curve is horizontal (at the level of minimum LAC), this is a constant cost industry.

2. Increasing Cost Industries

If factor prices rise as more firms (attracted by pure economic profits in the short run) enter a perfectly competitive industry in the long run and as the industry output is expanded, we have an increasing cost industry. In this case, the industry long-run supply curve is positively sloped, indicating that greater outputs of the commodity per unit of time will be forthcoming in the long run only at higher prices.

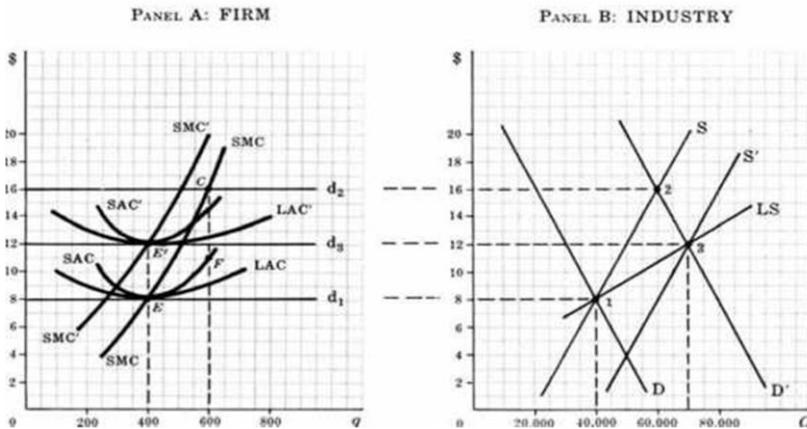


Figure 1.10: Increasing Cost

In figure 1.10 the perfectly competitive industry and the firm are originally in long-run equilibrium at points 1 and E, respectively. If the short-run market demand curve shifts from D to D' the new equilibrium price becomes \$16 (point 2) and each established firm will expand output in the short run to point C and make CF profits per unit. If factor prices rise as more firms enter this industry, the firm's entire set of cost curves will shift up (from LAC, SAC, and SMC to LAC', SAC', and SMC'). The firm and industry will return to long-run

equilibrium when the short-run industry supply curve has shifted from S to S' , giving the new equilibrium price of \$12 (point 3) at which all firms just break even (point E'). We will now have 175 firms, each producing 400 units of the new equilibrium output of 70,000 units for the industry. Joining market equilibrium points 1 and 3, we get the rising industry LS curve.

3. Decreasing Cost Industries

If factor prices fall as more firms (attracted by the short-run pure economic profits) enter a perfectly competitive industry in the long run and as the industry output is expanded, we have a decreasing cost industry. In this case, the industry long-run supply curve is negatively sloped, indicating that greater outputs per unit of time will be forthcoming in the long run at lower prices

Impact of Tax and Subsidy

Governments will choose to implement taxes to either individuals or firms in order to increase its revenue. When considering taxes to firms, it must be noted that these taxes will increase the price of goods being produced and sold, which translates into a welfare loss. However, a distinction between the loss in consumer and producer surplus must be made. The impact on both surpluses depends on the period analysed.

Short and long run analysis:

In the short run, both consumers and producers will suffer from the tax imposed. A new tax increases the price of goods. Let's say this tax is imposed to firms, which increase

their prices in order to cover their losses. In this case, as shown in the adjacent figure, supply will shift to the left, decreasing the quantity being produced, which increases its prices since demand remains unchanged: the new equilibrium price will be p_D (if the tax was to be imposed to consumers, there would be a shift in demand instead). A corresponds to the amount of the tax paid by consumers, while B is the amount paid by producers. Only consumers actually pay more, but producers are getting less out of the sale. The loss in consumer and producer surplus will depend on the elasticity of the demand curve, as shown in the figure 1.11.

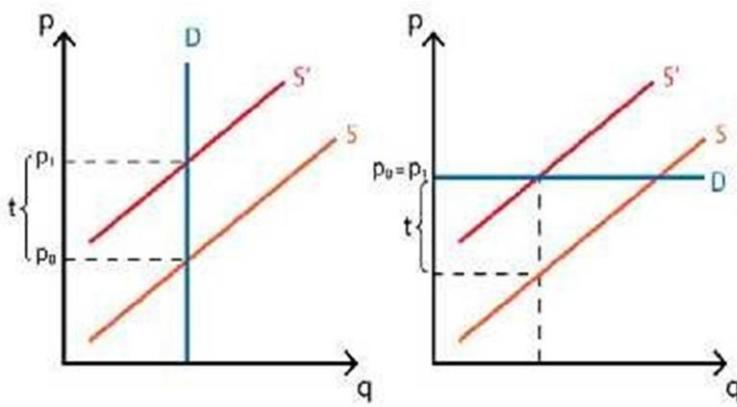


Figure 1.11

The lower the elasticity in absolute terms (left figure), the higher the loss in consumer surplus, and the lower in producer surplus. Higher elasticity (figure 1.12) will have the opposite effect.

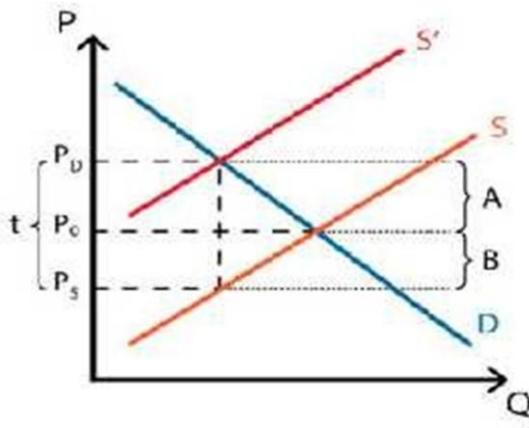


Figure 1.12

In the long run, since the supply curve is completely elastic, the new tax will reduce only consumer surplus. Producer surplus will remain equal to zero, since there are no profits to be made. It is shown in the figure 1.13.

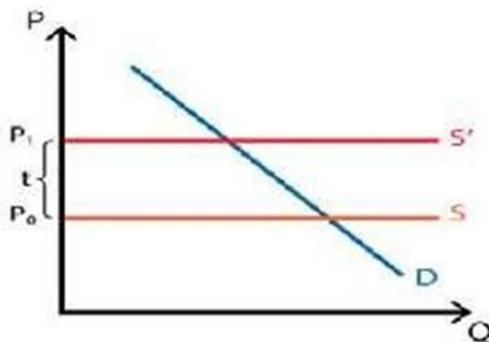


Figure 1.13

Welfare analysis and government's revenue:

Governments usually increase taxes to increase their revenue, which they use to relocate wealth and increase social

welfare. The figure 1.14 shows the effects of imposing a new tax on a good. P_0 was the price before the tax was imposed, p_D is the price consumers pay and p_S the price producers receive. Consumer surplus is reduced by B and E , producer surplus decreases by C and F , while government increases its revenue from zero to B and C . Consumers and producers lose $B+E+C+F$ and the tax revenue is $B+C$, which determines the deadweight loss, the reduction in total surplus: $E+F$. The deadweight loss depends on the elasticity of both the supply and demand curves: the higher the elasticity in absolute terms, the larger the deadweight loss.

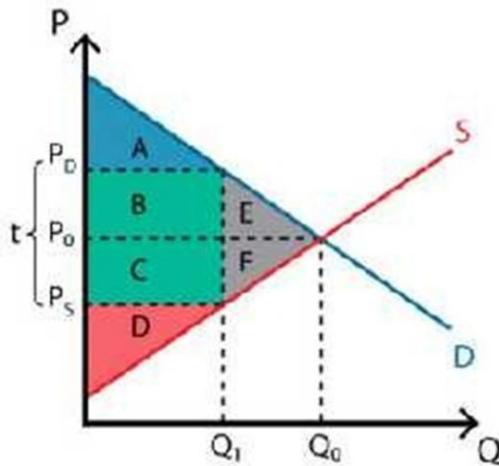


Figure 1.14

Also, depending on the size of a tax, the tax revenue may be bigger or smaller. In the figure 1.15 we see how as the tax increases, the deadweight loss (grey) increases too.

[Type here]

[Type here]

[Type here]

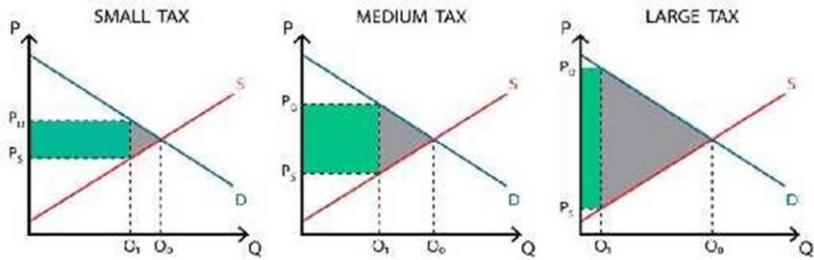


Figure 1.15

However, the tax revenue will first increase, and then will start to shrink. This relationship is known as the Laffer curve, shown in the figure 1.16 (being t the tax size and T the tax revenue). The Laffer curve might seem as an incredibly useful tool for government intervention. However, it has been widely criticized, mainly because empirical evidence to support it is rarely found, and because even if the relationship was accurate, it's quite hard to know at which point of the curve a country actually is.

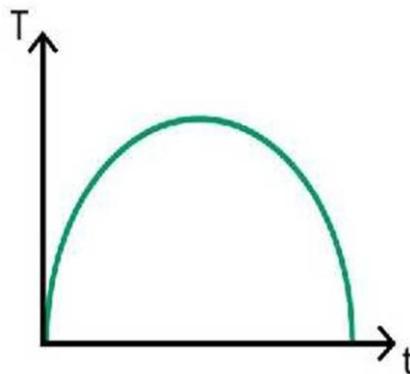


Figure 1.16: Laffer curve

Taxing firms:

There are three main possible ways the government can impose taxes on firms: lump-sum tax, tax on profits and tax on output.

1. Lump-Sum Tax:

A certain amount of money has to be paid by the firm over a period of time. This kind of tax represents an increase in fixed costs and they consequently treat it as one. It holds the entry of firms in the market as it acts as an entry barrier, and will force some inefficient firms out of the market.

2. Tax on Profits:

Firms have to pay the government a percentage of their profits. This kind of tax is also considered a fixed cost. Sometimes the application this tax will cause profits to be negative, thus forcing some firms to exit the market. The effects on total quantity sold and the quantity produced by a given firm of both lump-sum taxes and taxes on profits can be analysed with the figure 1.17:

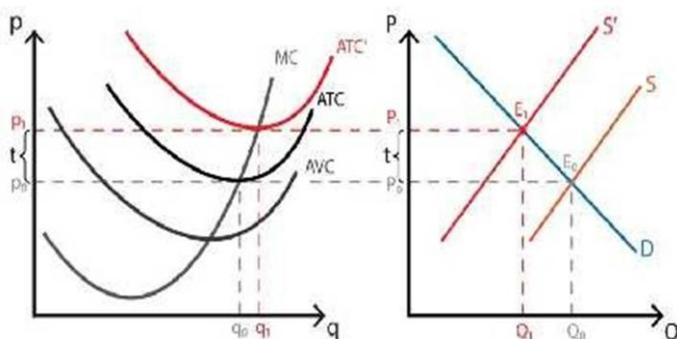


Figure 1.17

3. Tax on Output (or output tax):

In this case, firms pay a certain amount for each unit of output produced. As it has a direct relationship with the output level it is considered an increase in variable costs. The least efficient firms will be forced to exit the market.

The effects on total quantity sold and the quantity produced by a given firm of an output tax can be analysed with the figure 1.18:

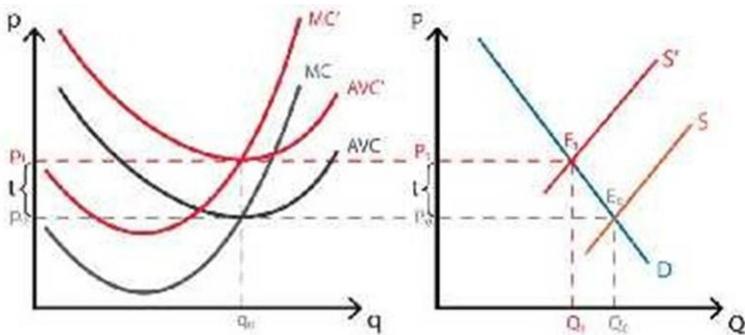


Figure 1.18

[Type here]

[Type here]

[Type here]