

3. EXTERNALITIES:

PRIVATE COSTS AND PRIVATE BENEFIT:

Private costs are those costs which are borne solely by the individuals who incur them, that is, by the users. They are usually measured by the market price of the resources that the firm uses. They may be an activity of a consumer or a producer. For example, the private costs of a consumer who smokes would be the money he spends on cigarettes. A producer, who runs a business, incurs private costs on labour, materials, machines, among others.

On the other hand, private benefits refer to the utility or benefit derived by the users, that is, the person who generates the economic activity. For instance, it is the total satisfaction derived by the consumers or the profits earned by the private producers.

Indeed, when a private firm carries out production, it does consider only its private costs and private benefits.

EXTERNALITIES:

Externalities are said to exist when the action of producers or consumers affects not only themselves but also third parties and no compensation is provided to or paid by those who generate externalities. In other words, an externality is a situation where the production (or consumption) of a good directly affects the production (or the utility derived by the consumers) of another good.

The price system (market prices) does not reflect all the costs and benefits of an action to the society as a whole. In other words, externalities create a divergence between private and social costs and benefits. Because externalities are not reflected in market prices, these prices provide misleading information for an optimal allocation of resources. Externalities can be either negative (undesirable) or positive (desirable). Whenever other people are affected beneficially, there are said to be external benefits. On the other hand, whenever other people are affected adversely, there said to be external costs.

EXTERNAL COSTS AND SOCIAL COSTS:

External cost arises when social cost exceeds private cost and disadvantages third parties (cost which is borne by the non-users). Indeed, when a private firm carries out production, it does consider only its private costs. It, thus, discards any other costs inflicted externally such as fumes or smokes coming from its factory chimney, garbage thrown in rivers, all giving rise to different types of pollution and destruction of nature. These damages are evaluated in the form of costs known as external costs. Where such a negative externalities are present, the price mechanism is likely to fail in bringing about a Pareto-efficient allocation of resources (socially optimum output). External costs can also occur in consumption, for example, when people use their cars, other people suffer from their exhaust, the added congestion, the noise, etc...

Social cost represents the full cost to society. It includes private costs and external costs. In fact, social cost measures the best alternative use of resources that is available to the whole society. In other words, for the society's point of view, the price system must take into account both private costs and external costs.

$$\text{Social cost (SC)} = \text{Private costs (PC)} + \text{External costs (EC)}$$

In marginal terms (when each additional unit of good is produced),

$$\text{Marginal Social Costs (MSC)} = \text{Marginal Private Costs (MPC)} + \text{Marginal External Costs (MEC)}$$

EXTERNAL BENEFIT AND SOCIAL BENEFIT:

External benefit arises when social benefit exceeds private benefit. It refers to the benefit from production (or consumption) experienced by people other than the producer (or consumer). Usually when a private firm produces goods and services, it leads not only to a private benefit to the user, but also an external benefit (benefit to the non-users). For example, imagine a bus company that spends money training its bus drivers. Each year some workers leave to work for other companies. The latter benefit without incurring additional cost of training. External benefit can also occur in consumption, for example, when people travel by train rather than by car, other people benefit by there being less congestion and exhaust and fewer accidents on the roads.

Social benefit refers to, the full benefit to society from consumption and production of any good. From the society's point of view, the price system must consider both private benefit and external benefit.

$$\text{Social benefit (SB)} = \text{Private benefit (PB)} + \text{External benefit (EB)}$$

In marginal terms (when each additional unit of good is produced),

$$\text{Marginal Social benefit (MSB)} = \text{Marginal Private benefit (MPB)} + \text{Marginal External benefit (MEB)}$$

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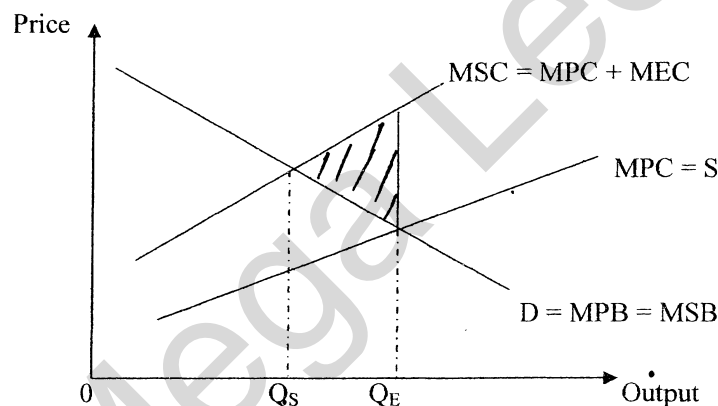
SOCIALLY OPTIMUM LEVEL OF OUTPUT AND MARKET FAILURES:

If $MSB > MSC$, then it is said to be socially efficient to produce more (or to consume) more. • On the other hand, if $MSC > MSB$, then it is socially efficient to produce (or consume) less. It follows, therefore, that if $MSB = MSC$, then the current level is optimum (socially equilibrium).

Hence, the socially optimum level of output occurs where $MSB = MSC$.

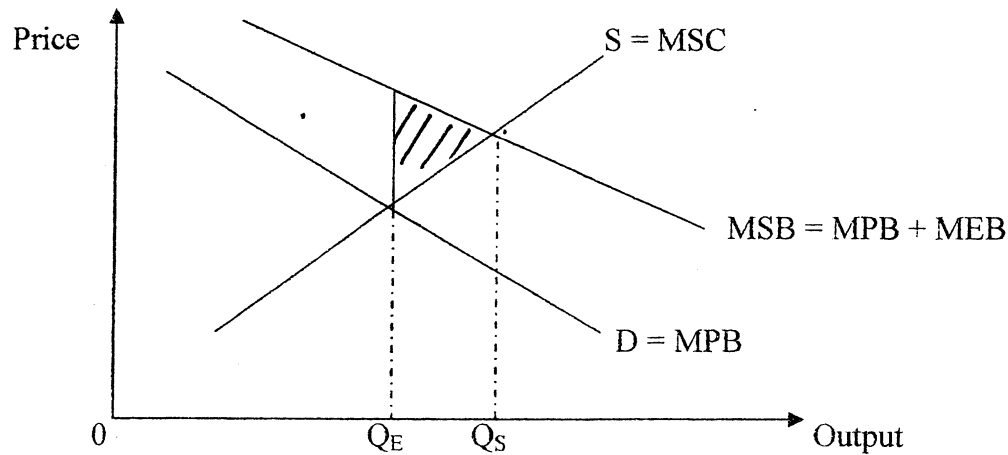
However, in the real world, the market rarely leads to social efficiency. The Marginal Social Benefit of most goods and services do not equal the Marginal Social Cost. This is due to externalities, whether adverse or beneficial, which cause market failure because they lead to allocation of resources that are non-optimal from the society's point of view.

As noted, the price system considers only private costs and private benefits, and ignores any external costs and benefit. Hence, private producers produce too much of commodities that generate harmful externalities because they bear none of the costs suffered by others. In other words, external costs result in a level of output greater than the social optimum. This can be illustrated as follows:



The MPC curve represents the supply curve of the industry, and assumes no external benefit, MSB is also the MPB and the demand curve for the industry. As the private producers reaches equilibrium where Demand = Supply (consider only their private costs and private benefits), the equilibrium output of the industry is thus $0Q_E$. MSC lies above MPC as MSC includes both MPC and MEC. The socially optimum output would be $0Q_S$, where $MSB = MSC$. Thus, in terms of socially efficiency, there is an overproduction of goods which generate negative externalities. By summing the excess of MSB and MSC for the units between Q_S and Q_E , a monetary measure of the welfare loss to society is occurred (shaded area).

In the same sense, activities which generate positive externalities can also bring welfare loss. Private producers will tend to produce too little of commodities that generate beneficial externalities because they bear all the costs, while others reap part of the benefits. This is illustrated as follows:



The MSB is greater than the MPB since there are external benefits. The socially optimum level of output is OQ_S which is above the equilibrium output that would occur in an "uncorrected" free-market, OQ_E . In other words, when there are positive externalities, there is a tendency for underproduction of the product in question. The shaded area shows the welfare loss brought by underproduction.

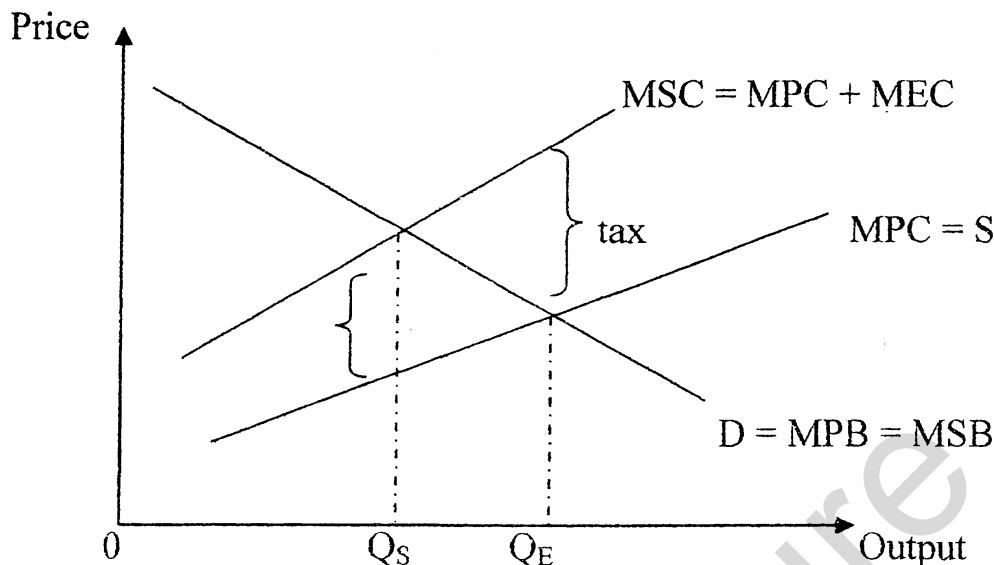
From the above expose, it can be deduced that whenever there are external benefits, there will be too little produced or consumed. On the other hand, whenever, there are external costs, there will be too much produced or consumed. The market will not equate marginal social benefit and marginal social cost.

GOVERNMENT INTERVENTION TO DEAL WITH EXTERNALITIES:

When there are imperfections in the market, social efficiency will not be achieved. Marginal social benefit will not equal marginal social cost. A different level of output would be more desirable. Hence, the government has a number of instruments it can use to change the way markets operate. These include taxes, subsidies, laws and regulatory bodies.

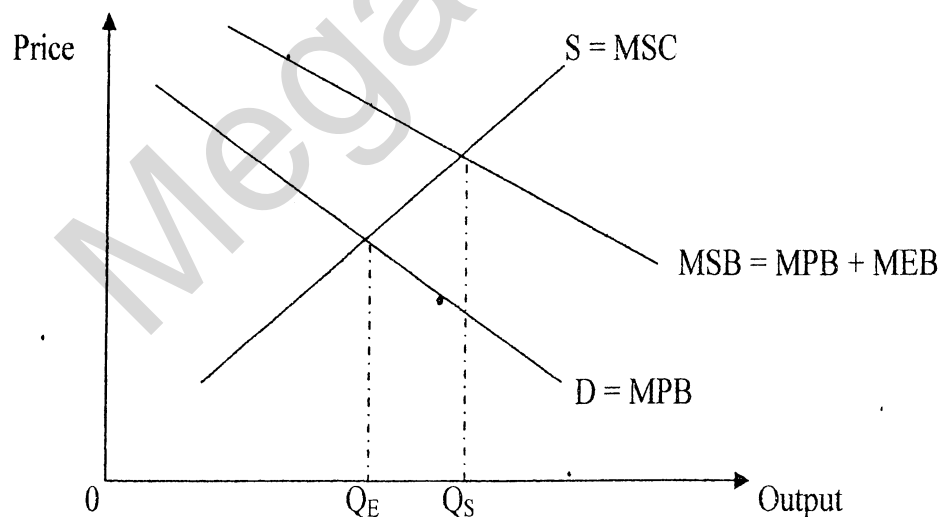
The more efficient method to correct these imperfections is taxes and subsidies. Essentially the approach is to tax those goods or activities where the market produces too much, and subsidise those where the market produces too little.

The government should impose a tax on each unit of output, where the amount of tax is equal to the amount of pollution (MEC). Hence, the externality will be internalised by the imposition of the tax. This means the government will make the externality to enter into the firm's own calculations of its private costs and benefits. As a result, output would be reduced to the desired level. Assume, for example, that a chemical plant emits smoke and thus pollutes the atmosphere. This creates external costs for the people who breathe in the smoke. This can be illustrated as follows:



The firm produces output $0Q_E$ where $MPC = MPB$ (demand = supply), and in doing so, it takes no account of the external pollution costs it imposes on society. If the government imposes a tax on production equal to the Marginal pollution cost (MEC), it will effectively internalise the externality. The firm will have to pay an amount equal to the external costs it creates. It will, therefore, now maximise profit at $0Q_S$, which is the socially optimum output where $MSB = MSC$.

Similarly, in the case of positive externality, the government has to grant subsidies equal to the MEB. This can be illustrated as follows:



Consider the demand and supply conditions for education. The market reaches equilibrium at output $0Q_E$. The government examines that there involves a positive externality. Hence, the government has to encourage the consumption of such good so that the whole society will benefit and grant subsidies on education. The subsequent effect is that the quantity consumed rises to $0Q_S$, the socially optimum level of output where $MSB = MSC$.

Effectiveness of implementing taxes and subsidies:

1. Many economies favour the tax / subsidy solution to the problem of externalities because it still allows the market to operate. It forces firms to take on board the full social costs and benefits of their actions. It also has the flexibility of being adjustable according to the magnitude of the problem. For example, the bigger the external cost of a firm's actions, the bigger the tax can be.
2. Firms are encouraged to find socially better ways of producing. The tax, thus, acts as an incentive over the longer term to reduce pollution. The more a firm can reduce its pollution, the more taxes it can save. Likewise, when granting subsidies, firms are given the incentive to adopt more good practices.
3. Taxes will raise revenue for the government.

Drawbacks of implementing taxes and subsidies:

1. However, it would be administratively very difficult and expensive to charge every offending firm its own particular tax rate or grant every relevant firm its own rate of subsidy. Given that costs and revenues differ substantially from one firm to another, separate tax and subsidy rates would be needed for each firm. Hence, an army of tax inspectors would be necessary to administer the system.
2. Even if government decides to charge a tax equal to each firm's MEC or grant subsidy equal to MEB, it would still have the problem of measuring these costs and benefits. It is very difficult to estimate the value of the MEC and MEB in monetary terms.
3. Imposition of polluting tax to cure negative externalities may also lead to inflationary pressure in the country. Hence, a government should be very cautious when imposing tax on its country's industries since it is likely to make its products more expensive than those of foreign competitors.

Other measures:

2. Laws - The firms could be prohibited by law from producing more than socially optimum, output. Various polluting activities could be banned or restricted.
3. Regulatory bodies - Having identified possible cases where action might be required, the regulatory body would probably conduct an investigation and then prepare a report containing its finding and recommendations.
4. Persuasion - Government runs public campaign to try to limit the problem.
5. Nationalisation - Firms with associated externalities could be taken into public ownership and their output controlled to take account of social costs and benefits.

COST-BENEFIT ANALYSIS (CBA):

The growing size of the public sector and its significant use of society's limited resources have increased the need for a rational approach to the allocation of resources in the public sector. Given our limited resources, any resources used on a project in the public sector have an opportunity cost of the benefit from the best alternative use in some other projects in the public sector. Hence, project evaluation involves determination of the ways in which the most efficient use can be made of scarce resources. Thus, the rational approach for the appraisal of projects in the public sector is the cost-benefit analysis.

The cost benefit analysis refers to the identification, measurement and weighing-up of the costs and benefits of a project in order to decide whether or not it should go ahead. It differs from ordinary investment appraisal carried by profit maximising firms in that the approach considers only private costs and private benefits. But in a public sector, decision-makers have wider responsibilities. It is necessary to take a wider view of the project, in the sense that the decision makers in the public sector must consider the social costs and social benefits of the proposed projects as a guide when deciding upon the desirability of these projects. In other words, cost benefit analysis is intended to enable the decision makers to choose between alternative projects on the basis of their potential contribution to social welfare. A project is considered to be economically feasible when the project must be capable of producing an excess of benefits such that everyone in society could be made better off. In other words, if the social benefits of the project exceed the social costs, then it would be socially efficient to go ahead with it.

The process of cost benefit analysis requires that all costs and benefits be valued in monetary terms. Since the project is being viewed from society's point of view, it should be society's valuation of costs and benefits which should be used. However, in a world where imperfect competition, externalities and ignorance abound, market prices will not reflect the true social costs and benefits. Hence, the cost benefit analysis estimates "shadow prices". These are imputed prices which are intended to reflect more faithfully the true social costs and benefits of a project. For example, the value of time saved by an individual following an improvement in transport facilities is often approximated using that person's average hourly wage.

Mega Lecture

PRIVATE GOODS AND PUBLIC GOODS:

A private good possesses the twin characteristics of diminishability and excludability. The amount of private good in a shop or elsewhere is limited. Once bought by someone for consumption purposes, the amount available to others is reduced or diminished. In other words, private goods are said to be rival in consumption. On the other hand, a good which is privately owned must not be legally shared with other individual. Thus, others can be excluded from its use. For instance, a good consumed by Mr X must not be necessarily consumed by Mr Y. X's consumption is only possible if X pays the price, while Y, who does not pay, is excluded. In other words, private goods have property rights.

However, public goods such as street lightning, defence, law and order possess the characteristics of non-diminishability and non-excludability. The consumption of public goods by additional consumers does not reduce the quantity consumed by existing consumers. In other words, public goods are said to be non-rival in consumption. The benefits of public goods are enjoyed by more than one person at the same time. For example, both Mr X and Mr Y can simultaneously enjoy the benefits of street lightning. Mr X's consumption of the light does not significantly reduce the quantity of light available to Mr Y. In this case, Mr X consumption and Mr Y consumption are said to be non-rival.

Besides, public goods are meant for all individuals or population as a whole. There is no group of individual who is excluded from consuming the public goods. This means that it is difficult to create property rights over the public goods. Non-excludability is said to exist when a person is likely to enjoy the benefits of the public goods whether or not payment is made for its use. Those who have already paid for the provision of the public goods have no means of preventing those who refuse to pay from benefiting from their purchase (free-rider).

There is indeed no additional cost associated with the supply of an additional quantity of public goods to an extra user. Hence, the marginal cost of production for an extra person is zero. In other words, the benefits it confers on consumers can be extended to others at zero cost (the cost of providing the same level of public goods, say defence, to an extra person is zero). As such, this makes public goods unattractive to private sectors. The characteristics of non-excludability suggests that private enterprise would find it difficult to persuade people not to consume the product. Therefore, not only is it impossible to charge for the consumption of public goods, it is also undesirable. These considerations obviously make public goods unsuitable for provision through price mechanism.

MERIT GOODS:

Merit goods are those goods whose consumption is highly desirable for the welfare of the citizens. They constitute a category of those goods which have large positive externalities so that the social benefits derived from consuming merit goods exceed the private benefits. In other words, the government believes that consumers derive greater benefit from the consumption of the merit goods than consumers themselves perceive. Examples of merit goods are education, health and housing.

Merit goods, unlike public goods, can be supplied both by the public and private sectors. But they are usually not left entirely in the hands of the private firms. This is because the government believes that consumers will buy too little of the merit goods if they are provided by private enterprise at market prices. They would only be available to a few who could afford to pay. Thus, the government intervenes to encourage higher consumption of such a product, and this is done through subsidies.

WHY MAY THE PROVISION OF MERIT GOODS NOT BE LEFT ENTIRELY TO PRIVATE SECTOR?

1. The case of under-consumption:

The major argument is that had the provision of merit goods been left alone to the private sector, there would be an under-consumption situation.

2. To avoid monopolisation of essential services:

Left alone to the private enterprise, the provision of essential services such as housing, education and health would easily create a monopolisation of the services in question and several demerits would be encountered. There would be an exploitation of consumer surplus.

3. Huge expenditure is involved.

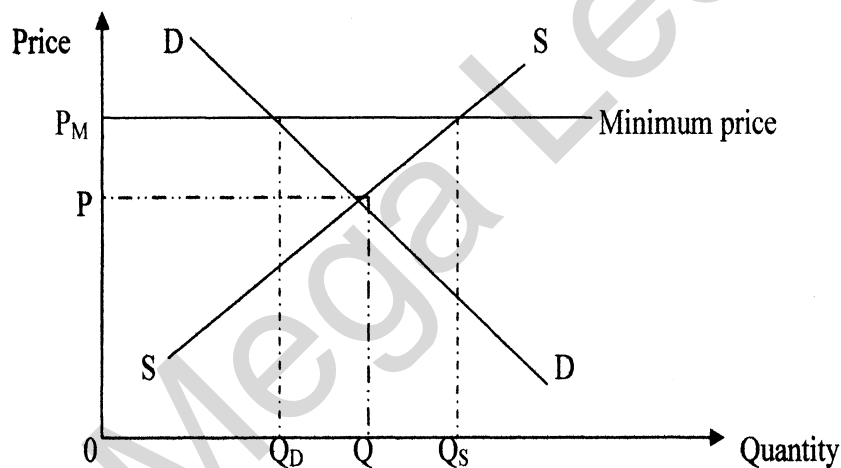
It is not possible for any private sector to undertake the provision of merit goods because it demands a huge amount of investment to sustain the equally high expenditure. It is very much likely that if the private sector only provides these goods, production would not attain a desirable level. Hence, the entire provision of merit goods by only the private sector is beyond the latter's productive capacity.

MAXIMUM AND MINIMUM PRICE LEGISLATION:

At the equilibrium price, there will be no shortage or surplus. However, this equilibrium price may not be the most desirable price. The government, therefore, intervenes in an economy to fix the prices of certain goods and services. The government may prefer to keep prices above or below the equilibrium price. Hence, intervention can be either through the minimum price legislation (price floor) or maximum price (price ceiling).

IMPOSITION OF A MINIMUM PRICE:

A minimum price is established when the government passes a law imposing the lowest permitted price at which a particular good or service can be purchased. The minimum price is imposed because it is believed that the equilibrium price or the market price is too low. Thus, the minimum price is always set above the equilibrium price. The government sets minimum price to prevent them falling below a certain level. The effect of the minimum price can be illustrated as follows:



The market equilibrium price is OP at which price the quantity demanded is equal to the quantity supplied at Q . The government may fix a minimum price for this market at OP_M which is above the current equilibrium price OP . At this higher price there is an excess of supply over demand given by the extent $Q_s - Q_D$.

There are various methods the government can use to deal with the surpluses associated with minimum price:

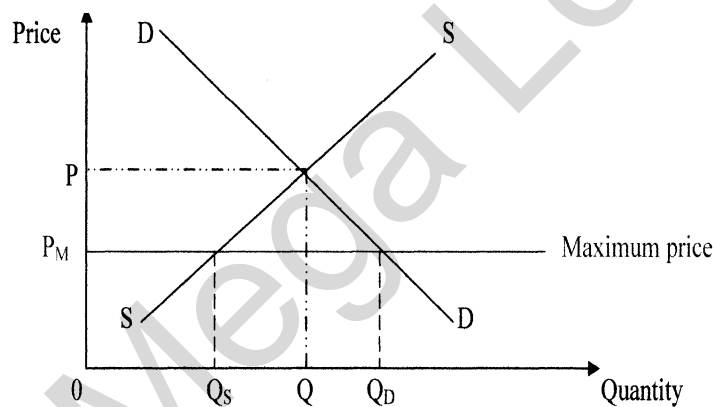
- The government could buy the surplus and store it.
- Demand could be raised by advertising, by finding alternative uses for the good, by increasing prices of its substitutes.
- Supply could be artificially lowered, for instance, supply could be reduced to Q_D

The government imposes minimum prices for various reasons:

- To protect producers' incomes. If the industry is subject to supply fluctuations and if industry demand is inelastic, prices are likely to fluctuate severely. Minimum prices will prevent the fall in producers' income that would accompany periods of low prices.
- In the case of wages, minimum wage legislation can be introduced to increase the wages of low-paid workers so that their standard of living rises.

IMPOSITION OF A MAXIMUM PRICE:

Maximum price is a form of price control policy where the government establishes the highest permissible price the producer can legally charge. Maximum price should be imposed on goods and services whose equilibrium price is too high. Thus, it is always set below the equilibrium price and prevent it rising above a certain level. The effect of the imposition of maximum price can be illustrated as follows:



The market equilibrium price is OP . The government may fix a maximum price for this market at OP_M which is below the current equilibrium price OP . At this lower price there is an excess of demand over supply (shortage) given by the extent $Q_D - Q_S$. Thus, price is failing to fulfill its rationing function. This disequilibrium will be dealt with in a variety of ways

- A rationing system can be used on the basis of "First come first serve"
- Firms decide which customers should be allowed to buy, for example, giving preference regular customers; sell the goods based on religion or caste.
- Suppliers and consumers may trade illegally at a price above the legal maximum price (black market)

To minimise these types of problem, the government may attempt to reduce the shortage by encouraging supply: by releasing the shortage from its stocks, by direct government provision, or by giving subsidies or tax relief to firms. Alternatively, it may attempt to reduce demand.

There are a number of reasons for a government imposition of a maximum price below the equilibrium:

- The government may aim to reduce the price that consumers pay for the good in order to raise the real income of these consumers. For example, the government imposes a maximum price on private sector rental housing.
- The government may also fix maximum price in order to check excessive profits being made by firms supplying the good.

NOTE:

- A minimum price will have no effect on the market if it is fixed at or below the market equilibrium price.
- A maximum price will have no effect on the market if it is fixed at or above the market equilibrium price.

TAXES AND SUBSIDIES:

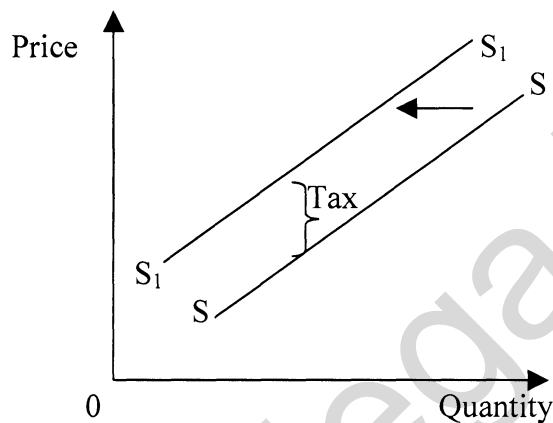
Taxes fall into two main groups, direct and indirect. Direct taxes are those which are levied directly on people's incomes, for example income tax. On the other hand, indirect taxes are those which are levied on expenditure, that is, on goods and services.

Indirect taxes are classified into 2 categories mainly: (1) ad valorem tax

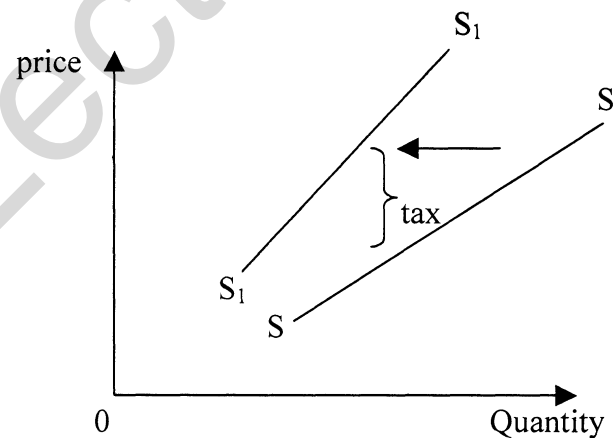
(2) specific or per unit tax

Ad valorem tax is levied as a percentage of the selling price of the commodities, that is, on value, for example, VAT. On the other hand, specific tax is levied per unit of the commodity, irrespective of its price, for example, excise duty.

Indirect taxes may be regarded as a cost of production. Hence, when indirect taxes are imposed, the producers face a higher cost of production. As a result, the supply curve shifts to the left by the amount of the tax. However, the shift is different for ad valorem tax and specific tax.



Effect of specific tax



Effect of ad valorem tax

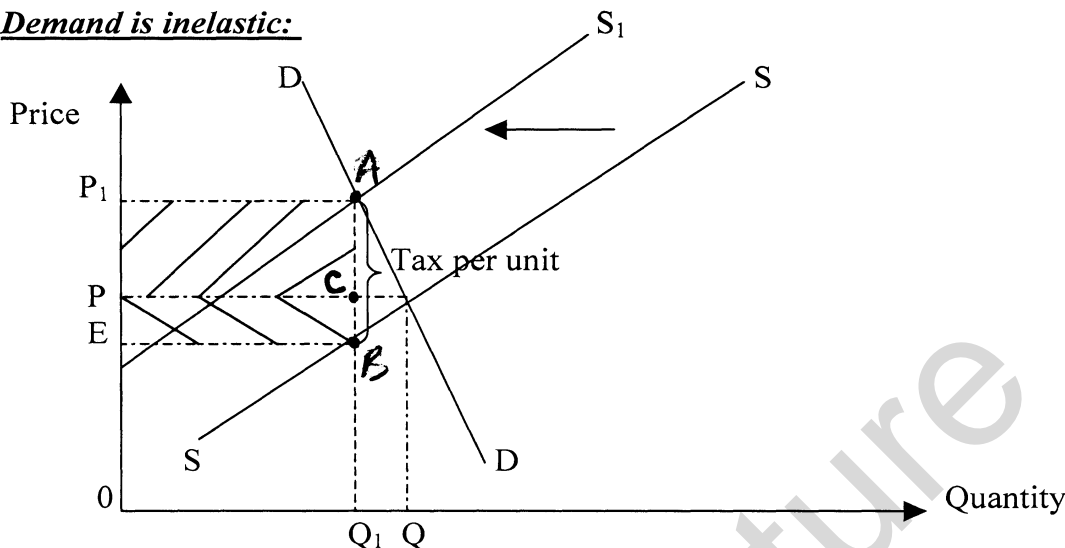
INCIDENCE AND BURDEN OF TAX:

Incidence of taxation means who the tax falls upon. The formal incidence of a tax is upon the person who is legally responsible for paying it. On the other hand, the burden of tax means who actually pays the tax.

The incidence and burden of direct tax fall on one and the same person. Whereas, the incidence of indirect tax falls on producers, but the burden is on consumers. In other words, the incidence of indirect tax can be shifted so that burden of the tax is wholly or partly upon the consumers. It should be noted that the burden of the tax is paid wholly or partly by consumers. In other words, the producers also pay part of the tax.

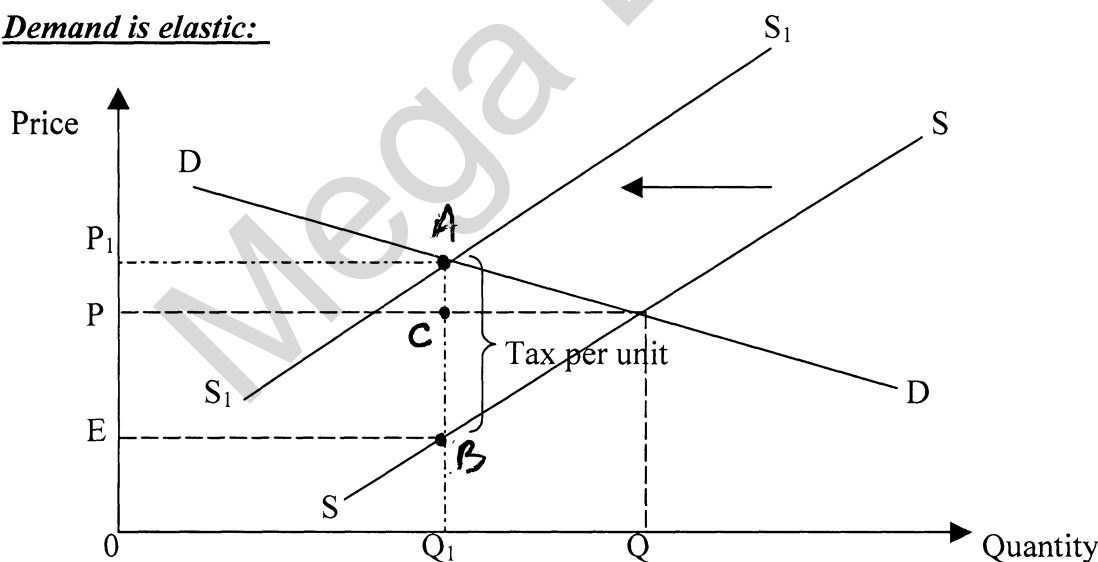
The extent to which the tax is passed on to the consumer will be determined by the price elasticity of demand and supply.

1. Demand is inelastic:



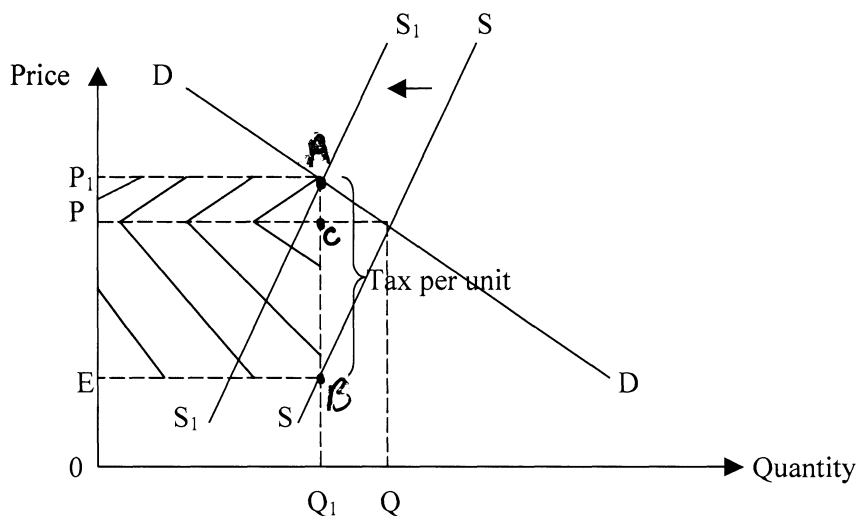
AB is the total tax per unit imposed by the government. This tax is borne both by the producer and by the consumer. AC is the tax per unit paid by consumers, while CB is paid by producers. Hence, it can be noted that consumers pay more tax than producers if demand is inelastic. This follows that when demand is perfectly inelastic, all the tax would be passed on to the consumers

2. Demand is elastic:



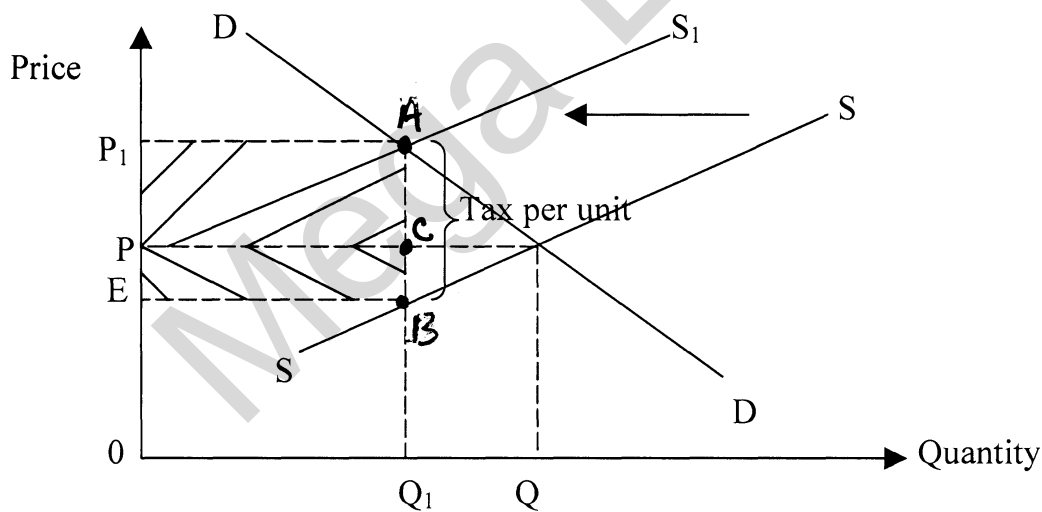
AB is the total tax per unit imposed by the government. This tax is borne both by the producer and by the consumer. AC is the tax per unit paid by consumers, while CB is paid by producers. Hence, it can be noted that producers pay more tax than consumers if demand is elastic. This follows that when demand is perfectly elastic, all the tax is paid by producers only.

3. Supply is inelastic:



AB is the total tax per unit imposed by the government. This tax is borne both by the producer and by the consumer. AC is the tax per unit paid by consumers, while CB is paid by producers. Hence, it can be noted that producers pay more tax than consumers if supply is inelastic. This follows that when supply is perfectly inelastic, all the tax is paid by producers only.

4. Supply is elastic:

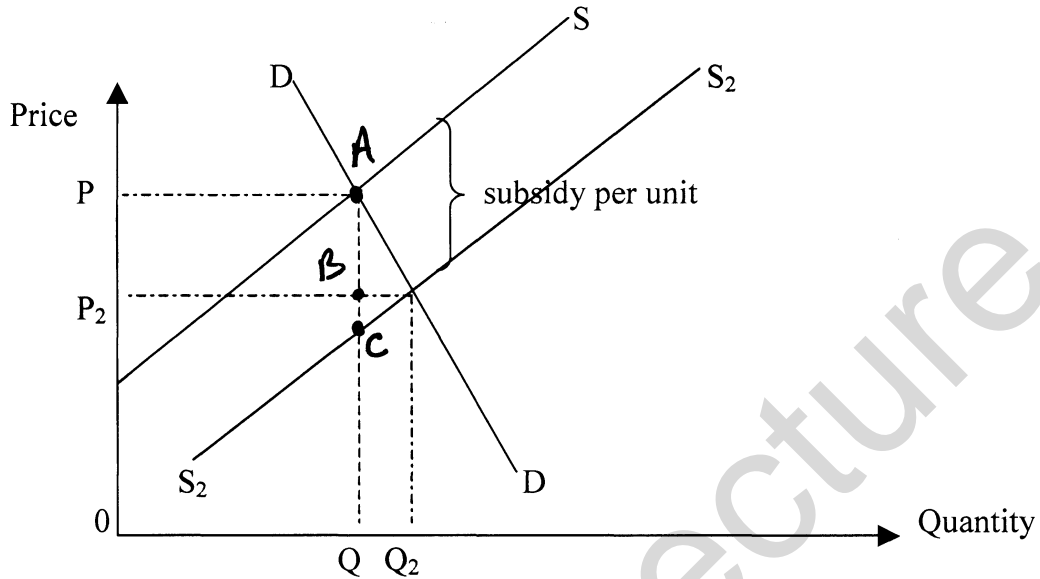


AB is the total tax per unit imposed by the government. This tax is borne both by the producer and by the consumer. AC is the tax per unit paid by consumers, while CB is paid by producers. Hence, it can be noted that consumers pay more tax than producers if supply is elastic. This follows that when supply is perfectly elastic, all the tax is paid by consumers only.

Note: In all situations, P_1BDE is the total tax revenue for the government.

SUBSIDIES:

The government sometimes subsidises a product by giving an amount of money to the producers for each unit they sell. The benefit of the subsidy will be split between the producer and consumer. The division will again depend upon the price elasticity of demand.



AC is the total subsidy per unit granted by the government. This subsidy is benefited both by the producer and by the consumer. AB is the subsidy per unit benefited by consumers, while BC is benefited by producers.

