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AN INTRODUCTION TO MARKET FAILURE

Market failure has become an increasingly important topic at A level. Market failure occurs when resources are inefficiently allocated due to imperfections in the market mechanism. There is a clear economic case for government intervention in markets where some form of market failure is taking place. Government can justify this by saying that intervention is in the public interest.

There are two types of efficiency that we will briefly look at:

- Allocative efficiency – occurs when resources are distributed in such a way that no consumers could be made better off without other consumers becoming worse off.
- Productive efficiency – is achieved when production is carried out at its lowest cost.

DEFINING EXTERNALITIES

Externalities are common in virtually every area of economic activity. They are defined as third party (or spill-over) effects arising from the production and/or consumption of goods and services for which no appropriate compensation is paid.

Externalities can cause market failure if the price mechanism does not take into account the full social costs and social benefits of production and consumption. The study of externalities by economists has become extensive in recent years - not least because of concerns about the link between the economy and the environment.

PRIVATE AND SOCIAL COSTS

Externalities create a **divergence** between the private and social costs of production. Social cost includes all the costs of production of the output of a particular good or service. We include the third party (external) costs arising, for example, from pollution of the atmosphere.

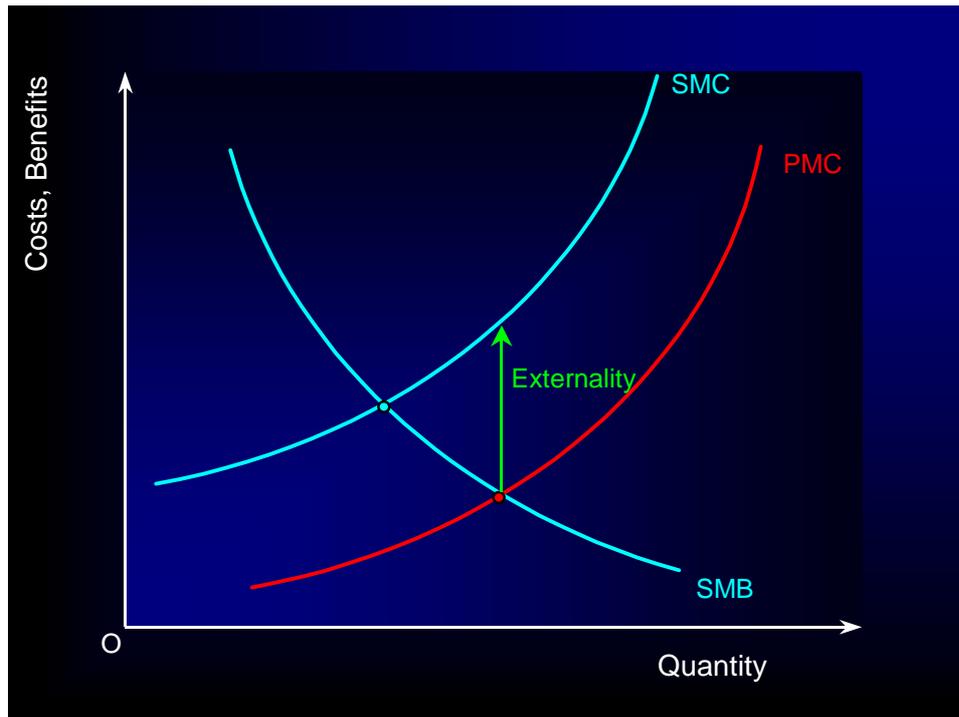
SOCIAL COST = PRIVATE COST + EXTERNALITY

For example: - a chemical factory emits wastage as a by-product into nearby rivers and into the atmosphere. This creates negative externalities which impose higher social costs on other firms and consumers. e.g. clean up costs and health costs.

Another example of higher social costs comes from the problems caused by traffic congestion in towns, cities and on major roads and motor ways. It is important to note though that the manufacture, purchase and use of private cars can also generate external benefits to society. This why **cost-benefit analysis** can be useful in measuring and putting some monetary value on both the social costs and benefits of production.

MARKET FAILURE AND EXTERNALITIES

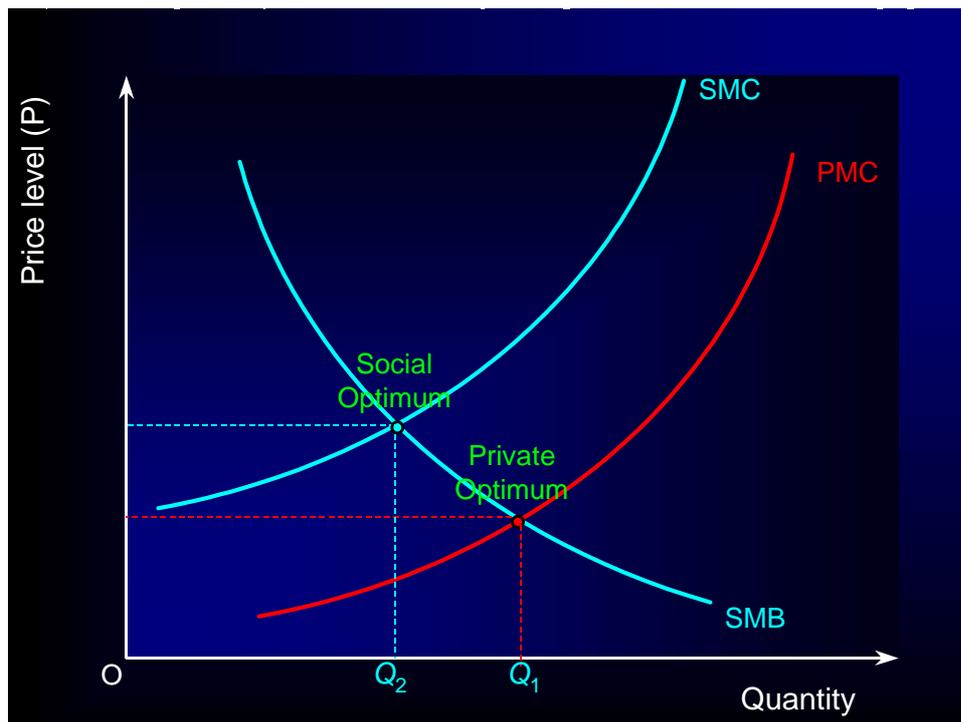
When negative production externalities exist, marginal social cost > private marginal cost. This is shown in the diagram below where the marginal social cost of production exceeds the private costs faced only by the producer/supplier of the product. In our example an externality could be caused by a supplier of fertiliser to the agricultural industry creating some external costs to the environment arising from their production process.



WHY DO EXTERNALITIES LEAD TO MARKET FAILURE?

If we assume that the producer is interested in **maximising profits** - then they will only take into account the **private costs** and **private benefits** arising from their supply of the product. We can see from the diagram below that the profit-maximising level of output is at Q1. However the **socially efficient** level of production would consider the **external costs** too. The **social optimum output level is lower at Q2**.

This leads to the private optimum output being greater than the social optimum level of production. The producer creating the externality does not take the effects of externalities into their own calculations. We assume that producers are only concerned with their own self interest.



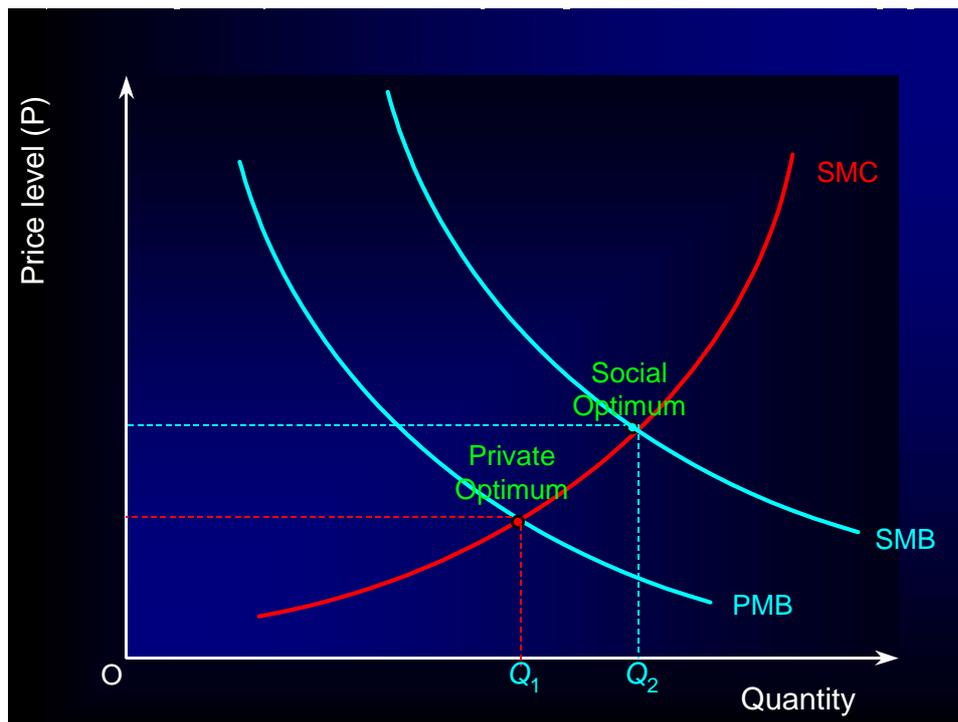
In the diagram above, the private optimum output is where private marginal benefit = private marginal cost, giving an output of Q_1 . For society as a whole though the social optimum is where social marginal benefit = social marginal cost at output Q_2 . The failure to take into account the negative externality effects is an example of **market failure**. This leads to the good or service being over-produced relative to the social optimum.

NEGATIVE CONSUMPTION EXTERNALITIES

Consumers can create externalities when they purchase and consume goods and services.

- Pollution from cars and motorbikes
- Litter on streets and in public places
- Noise pollution from using car stereos or ghetto-blasters
- Negative externalities created by smoking and alcohol abuse
- Externalities created through the mis-treatment of animals
- Vandalism of public property
- Negative externalities arising from crime

In these situations the **marginal social benefit** of consumption will be less than the **marginal private benefit** of consumption. (i.e. $SMB < PMB$) This leads to the good or service being over-consumed relative to the social optimum. Without government intervention the good or service will be under-priced and the negative externalities will not be taken into account.



In the example shown in the diagram above we illustrate the potentially negative effects of people consuming cigarettes on other consumers. The **disutility** (dis-satisfaction) created leads to a reduction in the overall social benefit of consumption. If the cigarette consumer only considers their own private costs and benefits, then there will be over-consumption of the product. Ideally, the socially efficient level of cigarette consumption will be lower (Q_2). The issue is really which policies/strategies are most appropriate in reducing the total level of cigarette consumption!

WHAT ARE POSITIVE EXTERNALITIES?

Positive externalities exist when the **marginal social benefit** of production and or consumption exceeds the **marginal private benefit** i.e. production and/or consumption generate external benefits that may go under-valued by the market.

There are plenty of examples of economic activities that can generate positive externalities:

- **Industrial training by firms:** This can reduce the costs faced by other firms and has important effects on labour productivity. A faster growth of productivity allows more output to be produced from a given amount of resources and helps improve living standards throughout the economy, thereby shifting the production possibility frontier outwards.
- **Research into new technologies** which can then be disseminated for use by other producers. These technology spill-over effects help to reduce the costs of other producers and cost savings might be passed onto consumers through lower prices
- **Education:** A well educated labour force can increase efficiency and produce other important social benefits. Increasingly policy-makers are coming to realise

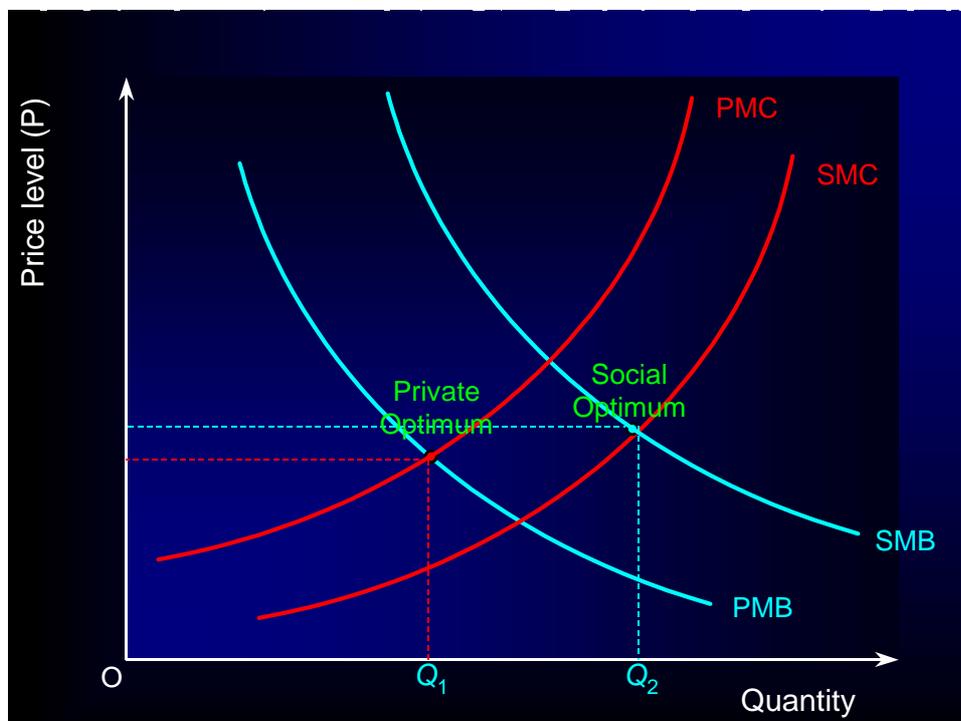
the increased returns that might be exploited from investment in human capital at all ages.

- **Health provision:** Improved health provision and health care reduces absenteeism and creates a better quality of life and higher living standards.
- **Employment creation** by new small firms
- **Flood protection system** and spending on improved **fire protection** in schools and public arenas
- **Arts and sporting participation** and enjoyment derived from **historic buildings**

POSITIVE EXTERNALITIES AND MARKET FAILURE

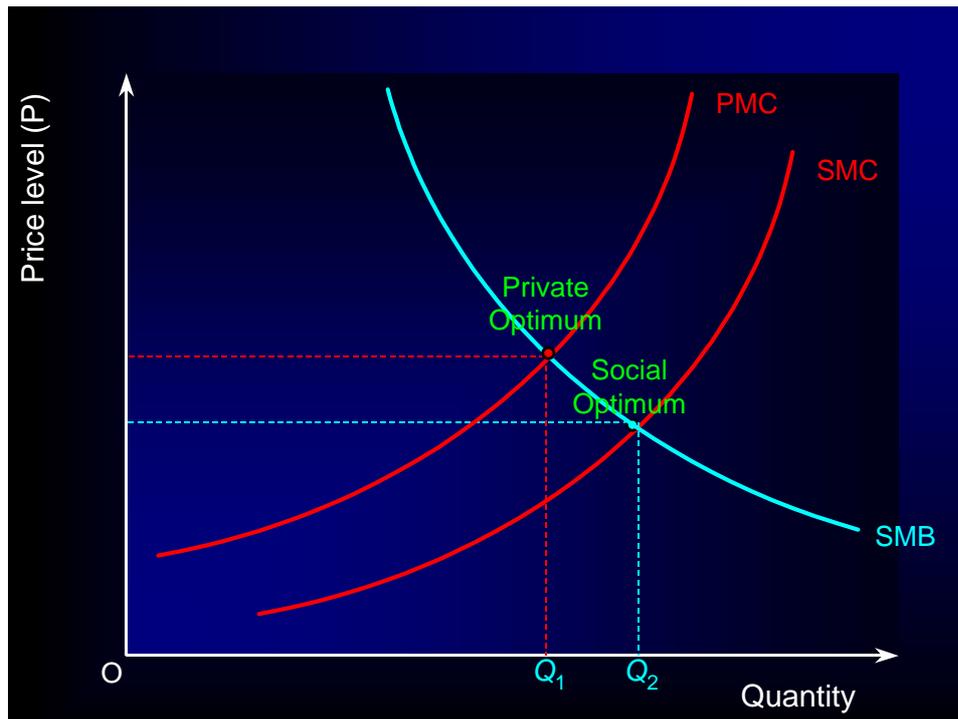
Why do positive externalities lead to a failure of the normal free-market mechanism? Where substantial positive externalities exist, the good or service may be under consumed or under provided since the free market may fail to take into account their effects. This is because the marginal social benefits of consuming the good $>$ private marginal benefits.

In the case of external benefits from production, the marginal social cost would be private marginal costs. Consider the example of health care. Good quality health care brings positive spillover effects both for the recipient of the care but also their families and associates. A well functioning health care system also reduces the scale of absenteeism from work due to sickness and illness. We see in the diagram above how the provision and consumption of health care services leads to an increase in social benefits and a reduction in social costs. As a society we should be encouraging people to increase their consumption of health care services.



POSITIVE EXTERNALITIES FROM TECHNOLOGICAL SPILL-OVERS

In the diagram below we assume there has been a positive externality in production in the form of a technology spillover. The use of new technology has brought down costs to other producers - social cost lies below private cost and output of the product (i.e. a new robot or piece of software) should be encouraged towards output Q_b rather than the private optimum Q_a . This might be achieved through the use of a producer subsidy that reduces the cost of production / consumption and encourages an expansion of supply in the market



CORRECTING FOR EXTERNALITIES - GOVERNMENT POLICIES

Individuals who consider only their own **private costs** and **private benefits** will do too much of any activity that generates negative externalities, and too little of one that generates positive externalities. When an activity generates both positive and negative externalities, private and social welfare will coincide only in the unlikely event that these opposing effects happen to offset one this exactly.

When externalities are present the individual pursuit of self interest rarely results in maximum social welfare. When it does not, we have an outcome that is, by definition, inefficient. This, in turn, means that it is possible to rearrange things in a way that makes at least some people better off without harming others in the process. There is an economic rationale for some form of government intervention in markets where externalities are prevalent.

How can we take into account the third party effects that necessarily arise? The key is to internalise the externalities that exist - i.e. make the firms and consumer that create

the externalities take them into account when making their decisions and bring it back it into the framework of the market mechanism.

POLLUTION TAXES

The classic way to adjust for externalities is to tax those who create negative externalities. This is sometimes known as making the polluter pay or introducing **Pigouvian Taxes**. There are, though, problems with this taxation approach:

- Reduced output and higher prices might reduce consumer surplus
- It is difficult to put a monetary value on externalities and to identify which firms are creating the most pollution
- Producers may be able to pass on a tax to the consumers if the demand for the good is inelastic
- Taxes on some de-merit goods may have a regressive effect on low-income households incomes.

Examples of "**green taxation**" introduced into the UK in recent years includes the increased real level of excise duty on cigarettes and alcohol; the **landfill tax** and substantial increases in the real value of **duties on petrol**. The government has also announced the introduction of the **climate change levy** - a controversial decision described in one article as "manufacturing industry's version of the poll tax"

Taxes and charges with beneficial environmental effects (1997)

	Ausl	Bel	Den	Fra	Ger	Hun	Ire	Jap	Neth	Nor	Swe	UK	USA
Motor fuels													
Leaded/unleaded	•	•	•	•	•	•	•		•	•	•	•	
Diesel (quality differential)			•			•				•	•		
Carbon/energy taxation			•						•	•	•		
Sulphur tax										•	•		
Other excise duties	•	•	•	•	•	•	•	•	•	•	•	•	•
Other energy products													
Carbon/energy tax		•	•						•	•	•		
Sulphur tax or charge		•	•	•				•		•	•		
NO ₂ charge				•							•		
Other excise duties	•	•	•	•	•	•	•	•	•	•	•	•	•
Vehicle-related taxation													
Large cars>small cars: sales tax		•	•			•	•	•	•	•	•		•
Large cars> small cars: road tax		•	•		•	•	•	•	•	•	•		•
Agricultural inputs													
Fertilisers										•	•		
Pesticides			•							•	•		
Other goods													
Batteries		•	•			•					•		
Plastic carrier bags			•			•							
Disposable containers		•	•			•				•			
Tyres			•			•						•	•
CFCs/halons	•		•			•							•
Disposable razors/cameras		•				•							
Lubricant oil charge										•			
Oil pollutant charge	•												
Solvents			•										

POLLUTION REGULATION

Examples include:

- Setting minimum standards for health and safety at the workplace
- Stricter penalties for firms and consumers who break regulations

- Banning cigarette advertising and making workplaces no-smoking environments

EXTENDING PROPERTY RIGHTS

If a lorry delivering chemical crashed into your home you would expect to receive compensation. However if the chemical company were to pollute the atmosphere and killed the trees in your garden you wouldn't expect to receive any compensation, especially if the company was in another country.

Externalities can arise because property rights aren't fully allocated, for example nobody owns the atmosphere or oceans. An alternative to regulation is the extension of property rights. It gives water companies the right to charge companies who pollute the rivers and seas. Extending property rights is a method of internalising the externality.

Advantages of extending property rights are

- The government doesn't have to assess the value of property as it is assumed the owners of the property will have a better knowledge of its value.
- There will be a direct transfer of resources from the polluters those who suffer. With regulation it isn't those who suffer that receive the compensation.

There are however a number of disadvantages:

- The government may not have the ability to extend property rights, e.g., how would the British government prevent Brazilian firms from destroying the rainforests which leads to global warming.
- Extending property rights within a nation's borders can be difficult if the link between the pollution and the problem, e.g., asbestos and various carcinogenic leading to medical problems.
- It is often difficult for the owner of the property to assess its value, e.g., if one home owner may place a different value on his trees than another, which value of compensation should be paid if the trees are destroyed?

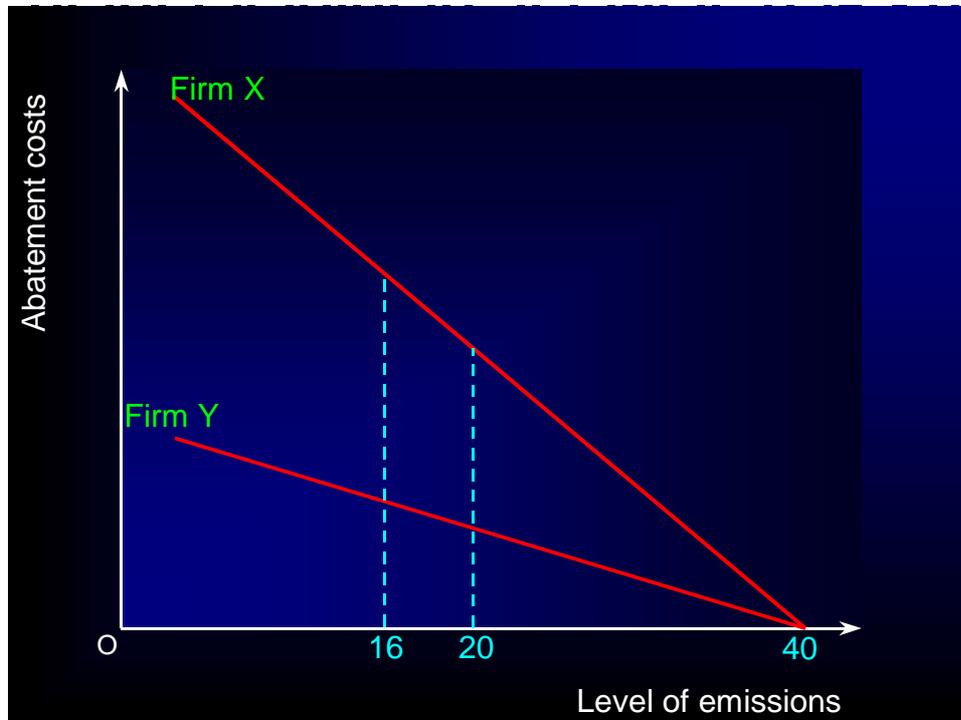
MARKETABLE POLLUTION PERMITS

Some economists believe that a **tax-subsidy solution** to externalities rarely works effectively and without distortions to the way a market operates. They believe that the free market mechanism offers a better solution.

Pollution permits are a combination of **command and control** and **market-based** approaches to the task of limiting pollution emissions. Polluters can bid for a **permit** that allows them to create a fixed amount of pollution. These permits can be resold: The government can gradually reduce the number (volume) of pollution permits available so that total pollution emissions can be controlled.

- If you can sell a permit for more than it is worth to you -- you do so
- If you can buy a permit for less than it is worth to you -- you do so

If a company (X) has a high marginal benefit from pollution emissions – it will be willing to buy some permits from another business (Y) who has a lower marginal benefit from emitting pollution.



Assume initially that both firms X and Y are producing 20 units of a pollutant each from their output. The government may decide that only eighteen units of pollution is permissible for each firm. If firm X manages to reduce pollution emissions to sixteen units it would be given a credit of 2 units.

This permit could be traded with firm Y – allowing Y to continue producing twenty units of the pollutant. The effect is that total pollution emissions still falls to thirty six units (for the two firms combined) - but the systems of traded permits means that pollution reduction is concentrated in the firms where pollution reduction can be achieved at the lowest cost.

The market for permits will reach a market-clearing price where the marginal benefit of pollution emissions is equal. Businesses can either buy permits or invest in technology to reduce pollution emissions - whichever approach saves them money. Gradually the total amount of pollution allowed can be reduced – as the stringency of pollution limits is tightened, so the value of permits may rise, they will be more valuable to companies that can bring down pollution levels at lowest marginal cost.

Marketable permits have been tried in several countries – including **Singapore** where an **auction mechanism** has been introduced for the trading of ozone-depleting substances. For the system to be effective there needs to be common acceptance of the legal framework for the trading of permits and regulation of the amount of pollution produced. The **Kyoto Summit** on Climate Change (held in December 1997) witnessed a decisive move towards a greater use of **internationally traded pollution permits** –

based on the idea that each country is required to achieve a specific percentage reduction in pollutants such as CO₂.

POTENTIAL PROBLEMS WITH TRADED POLLUTION PERMITS:

- How are permitted levels of pollution decided? If based on current production levels they may be no advantage for firms that have **already** taken steps to control their pollution emissions
- Traded permits may see **pollution being concentrated in certain geographical areas**. At the Kyoto Summit, developing countries were not required to make reductions in pollution – but could be given credits for “certified reductions” in pollution that could be then traded with other countries. This might allow countries such as the United States to buy up pollution permits from LDCs (including many from high polluting countries in Eastern Europe) – and avoid the need to reduce pollution themselves
- There are likely to be high **administrative costs** associated with monitoring pollution emissions – particularly if the number of firms involved is very large.

THE CLIMATE CHANGE LEVY

The **climate change levy** is an explicit **pollution tax** designed to encourage greater energy efficiency and cut industrial emissions

The levy is expected to raise "at least" £1.75 billion in its first full year, 2001-2002, but the impact on UK based companies will be offset by a half-point reduction in employer's **national insurance contributions**. In this respect the introduction of the levy is "revenue neutral" - although organised business believes that the macroeconomic effect will be damaging.

The levy applies to electricity, gas and coal supplies (including natural gas and liquid petroleum gas) used by business, agriculture and the public sector. Oil is not included in the tax - oil is already covered by mineral oils taxes.

Government estimates suggest the levy will save around 1.5m tones of carbon a year and make an important contribution towards meeting the target to reduce **greenhouse gases**.

The climate change levy has been the subject of intensive lobbying of the government by many high profile industries. Businesses are concerned about the impact of the tax on their **international competitiveness**. They believe that reductions in carbon emissions can be achieved in more efficient ways than an explicit levy. The alternatives include **negotiated settlements** and **emission trading**.

A survey by **Business Strategies** in the summer of 1999 forecast that the levy will cost 156,000 manufacturing and service jobs over the next decade. Manufacturing will bear the brunt with 95,000 jobs at risk, including almost 50,000 in the engineering sector

alone with the service industry accounting for the balance. The report claimed the levy could widen the **North-South divide**, reduce gross domestic product by £11 billion over the next 10 years and produce a near-1pc fall in manufacturing and service sector productivity.

In response to this lobbying the government has already made some concessions to chemical, steel and aluminum producers - key industries for the UK manufacturing sector, but also heavy users of energy in their production processes.

CHANGES TO THE CLIMATE CHANGE LEVY

In November 1999, Gordon Brown announced changes to the climate change levy. The levy will be reduced to £1bn in total, and energy-intensive industries will receive a rebate of up to 80% if they agree a programme of energy savings. In addition, combined heat and power, and renewable energy sources will be exempted from the levy. All the revenue raised will be recycled to business through a reduction of 0.3% in the rate of employer National Insurance contributions.

THE COASE THEOREM

An alternative to pollution taxes and government regulation is for the polluters and those affected to come to a **bargaining solution** where the latter are compensated.

Ronald Coase, from the University of Chicago, was the first to see that if **property rights** are fully assigned and if people can negotiate at low cost with one another they will arrive at efficient solutions to problems caused by externalities without the need for explicit government intervention in the form of regulation and/or taxation.

This insight is called the **Coase Theorem**, and on the strength of it Coase was awarded the Nobel Prize in Economics in 1991.

THE LANDFILL TAX

The **Landfill Tax** was introduced in October 1996 and is levied on waste deposited in landfills. The objectives of the tax are to

- encourage waste producers to minimise the volume of waste generated
- reduce the amount deposited in landfills
- encourage recycling

Landfill operators are liable for the tax on all consignments of wastes accepted for landfill disposal.

A distinction is made between **inactive waste**, which is taxed at £2 per tonne, and **other waste** at the standard rate of £10 per tonne.

In the March 1999 budget, the Chancellor announced that the standard rate will be subject to a **landfill tax escalator** of £1 per tonne per year for at least another five years, reaching £15 per tonne in 2004. This is designed to increase the incentive to recycle or incinerate waste (see below)

EXEMPTIONS TO THE LANDFILL TAX

A number of categories of waste are exempt from taxation. These are:

- dredgings from inland waterways and harbours
- naturally-occurring minerals from mines and quarries
- domestic pets, buried in pets' cemeteries
- wastes from the remediation of historically contaminated land if the purpose of the remediation is development, conservation or the provision of amenity, or to remove the potential harm from pollutants

Areas at landfill sites where waste is sorted, recycled or incinerated may be designated tax-free areas. Critics of the Landfill tax argue that it has had little impact on the environment and has caused a surge in illegal "fly-tipping" in both urban and rural areas.

KYOTO TREATY ON GLOBAL CLIMATE CHANGE

In December 1997, a global treaty to reduce emissions of gases which may be changing the Earth's climate was agreed in Kyoto. The discussions had almost collapsed because of political infighting. India and China nearly destroyed the treaty by objecting to an international trade in pollution permits on the grounds that emissions trading was not fair to poor countries.

THE MAIN KYOTO COMMITMENT

The Kyoto protocol commits **developed countries** to making **legally-binding reductions in their emissions of carbon dioxide by 2010**, the European Union countries by eight per cent, the United States by seven per cent and Japan by six per cent. Other nations were expected to offer six per cent.

Russia, New Zealand, and Ukraine are to stabilize their emissions, while Norway may increase emissions by up to 1%, Australia by up to 8%, and Iceland 10%. Demonstrable progress on these commitments will have to be shown by 2005. The Kyoto agreement gives countries some flexibility in measuring and achieving their emissions reductions.

A **clean development mechanism** enables industrialized countries to finance emissions-reduction projects in developing countries and receive credit for doing so. An international **emissions trading regime** is planned to allow industrialized countries to buy and sell excess emissions credits amongst themselves.

MARKETABLE POLLUTION PERMITS - A STEP CLOSER

One important aspect of the Kyoto Summit is the progress made in introducing **traded pollution permits** as a means of pricing the use of carbons. Within a decade, under the treaty, industries are likely to have to buy permits to pollute, if they wish to allow their emissions to grow. Alternatively they will have to fit energy-saving equipment. These permits will be tradeable allowing each country to meet some of their targets by buying up rights to pollute in other countries. In 1998, the Labour Government published it's own proposals to reduce carbon dioxide emissions. Arising from this is the introduction of the **climate change levy**.

UNITED NATIONS CONVENTION ON CLIMATE CHANGE **(THE HAGUE NOV 2000)**

These talks which aimed to avert the threat of global warming collapsed as deep divisions were exposed between the United States and Europe.

European ministers had expressed concern about allowing the US and its supporters, such as Canada, to offset emissions from cars, factories and power stations against carbon absorbed by forests and farmland. The issue of US 'sinks', of soaking up carbon using forests and farmland, in the end proved too much for ministers in Europe.

The US insisted that its forests, which are well-managed and fertilised to grow faster, were absorbing 300 million tonnes of carbon from the atmosphere. Farmlands were also soaking up more than 20 million tonnes. The US, which agreed at the Kyoto summit in 1997 to reduce greenhouse gas emissions by 7 per cent by 2010, insisted that it should be allowed to meet its reductions entirely abroad. This proposal involves the "purchase" of reductions in greenhouse gases in former Soviet Bloc countries, which have occurred since 1990 with the collapse of their economies. The US wished to buy these reductions to offset their own.

The American economy has grown under the Clinton Administration and emissions of greenhouse gases are expected to increase by 28 per cent by 2010. Frank Loy, the chief American negotiator at the talks, said that the US would need to cut gas emissions by 35 per cent in ten years when the 7 per cent cutback was also considered. The US made several concessions. It said that it would seek only 100 million tonnes of "carbon credits" from forests and appeared to accept that 50 million tonnes would be enough.

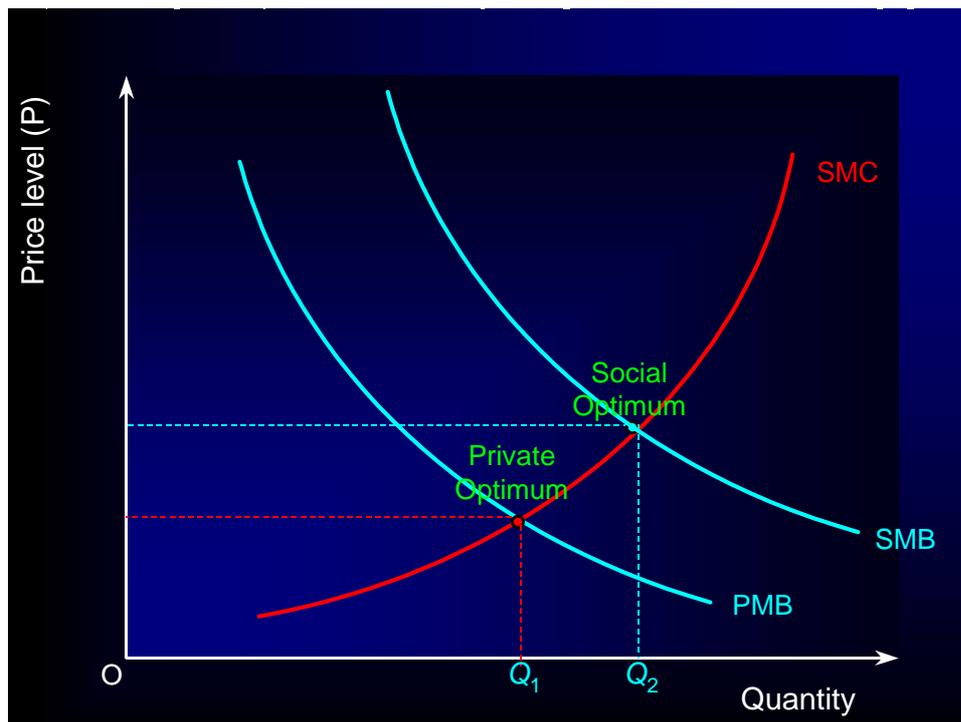
America has, for years, insisted that it had the right to meet its emission cutbacks entirely abroad if it wanted to. These primarily centred on so-called "hot air". These are the reductions in greenhouse gases which occurred since 1990 in the former Soviet Bloc with the collapse of their economies. America wished to buy these reductions to offset their own rising emissions.

Planting forests in the developing world, which is cheap, was also part of the US emission reduction plan.

The countries have agreed to meet in Bonn in May 2000 and in Marrakesh later in 2000.

MERIT GOODS

Merit goods are goods and services where the social benefits exceed the private benefits. Merit goods are underprovided by the market mechanism, as individuals don't take into account the positive externalities that arise from consumption. This will lead to the market equilibrium quantity being lower than the social optimum.



One reason for the underprovision is that individuals find it difficult to make rational choices when the costs arise today and the benefits are only received in the future. Healthcare and pensions are two examples of merit goods where money has to be spent (or saved) today, but the benefits aren't reaped for a number of years.

Empirical evidence has suggested that if left to market forces young people wouldn't make the necessary provisions for sickness or unemployment (retirement) in old age. Young people tend to be healthy and in work therefore they find it difficult to appreciate that on day they will be ill and out of work. The cost of healthcare and pensions are so great that you could only afford them if you start saving at a young age. It therefore makes sense for the government to intervene and force individuals to make contributions that will safeguard them against illness and retirement.

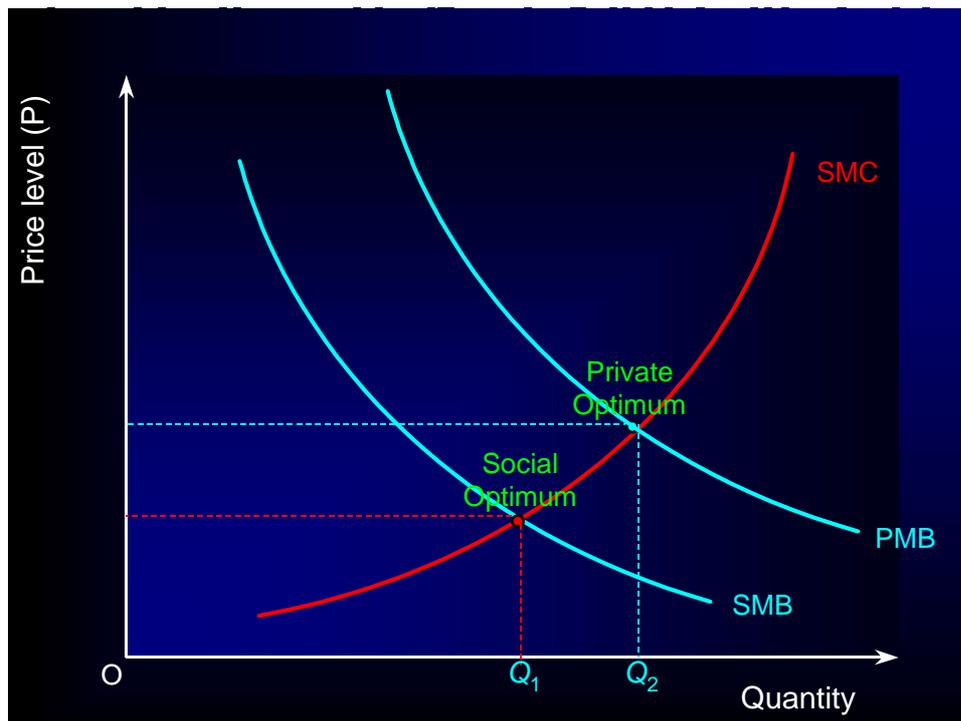
The beneficiary of the education will often not be the person who has to pay for it. This could lead to a conflict of interests as parents may wish to minimise their expenditure on education, whilst it would be in the child's best interests to receive the highest quality of education available. In addition to the external benefits the child/student will gain society as a whole will also be better off. Somebody who is unable to read or write could be deemed as a burden on society as they would more than likely need supporting, whereas an educated individual would contribute to the welfare of the nation.

This leads to the case for some form of government intervention to encourage increased consumption of merit goods. It might take the form of an explicit government subsidy to reduce the private costs of consumption and cause an expansion of demand.

Higher government spending on these merit goods should yield a positive social rate of return which leads to an improvement in total economic welfare.

DE-MERIT GOODS

De-merit goods are those goods or services that create negative externalities when the product is consumed. This reduces the social marginal benefit of consumption and also leads to potential market failure through over-consumption.



The government normally chooses to tax those products that generate negative consumption externalities e.g.:

- Cigarettes .
- Alcohol.

Or it may choose some form of regulation as an alternative strategy, e.g.:

- Pollution.
- Noise.

Finally it may choose to ban the good or service all together, e.g.:

- Drugs .
- Prostitution.

PUBLIC GOODS - PROVIDED BY THE STATE

One key area of government spending is on **public goods**. These differ from private goods, which are normally left to be provided through the price mechanism. A **private good** has three main characteristics:

- **Excludability**: Consumers can be excluded from consuming the product if they are not willing to pay for it (for example - a ticket to the theatre or a meal in a restaurant)
- **Rivalry**: One person's consumption reduces the amount that is available for other people to consume - because scarce resources are used up in producing and supplying the good or service
- **Rejectability**: private goods and services are rejectable - if you don't like the look of the soup on the school menu, you can reject the chance to consume it and use your money to buy something else.

THE NATURE OF PUBLIC GOODS

Public goods are services which are clearly in demand, but which must be provided collectively by the Government for two main reasons;

- **Non excludability** - the goods cannot be confined to those who have paid for it.
- **Non rivalry in consumption** - the consumption of one individual does not reduce the availability of goods to others.

Examples of public goods include flood control systems, street lighting, the police and national defence.

Public goods (in fact most of them are services!) are not normally provided by the private sector in an economy. Partly this is because of the **free-ride principle**.

The “**free rider**” **principle** says that you cannot charge an individual a price for the provision of a non excludable good because somebody else would gain the benefit from consumption without paying anything. Consider the case of the provision of traffic wardens and safety signs on roads. One person's benefit from these services is not unique - other motorists benefit from the service as well - but they cannot be stopped and asked to pay for the benefits they derive. The solution is collective provision.

FINANCING PUBLIC GOODS - COLLECTIVE PROVISION

The usual solution is for the government to supply public goods either directly or indirectly (contracting out services e.g. road-gritting), in both cases funding the services through subsidy and/or taxation.

INDIRECT TAXES – REDUCING NEGATIVE EXTERNALITIES

An indirect tax is a tax on the expenditure on goods, often this is done to discourage the consumption of a good that leads to a negative externality. These are taxes paid by the seller of the good, who usually asks the consumer to pay some or all of it.

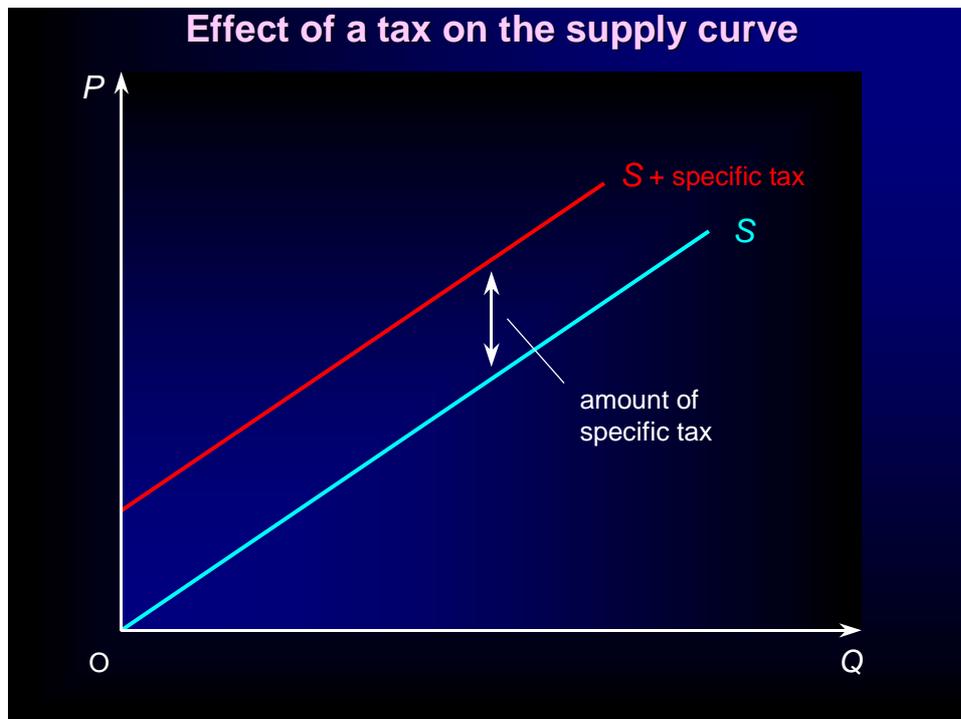
Specific taxes are indirect taxes where a fixed sum is paid per unit sold. Examples of such taxes in the UK are excise duties on tobacco, alcoholic drinks and petrol.

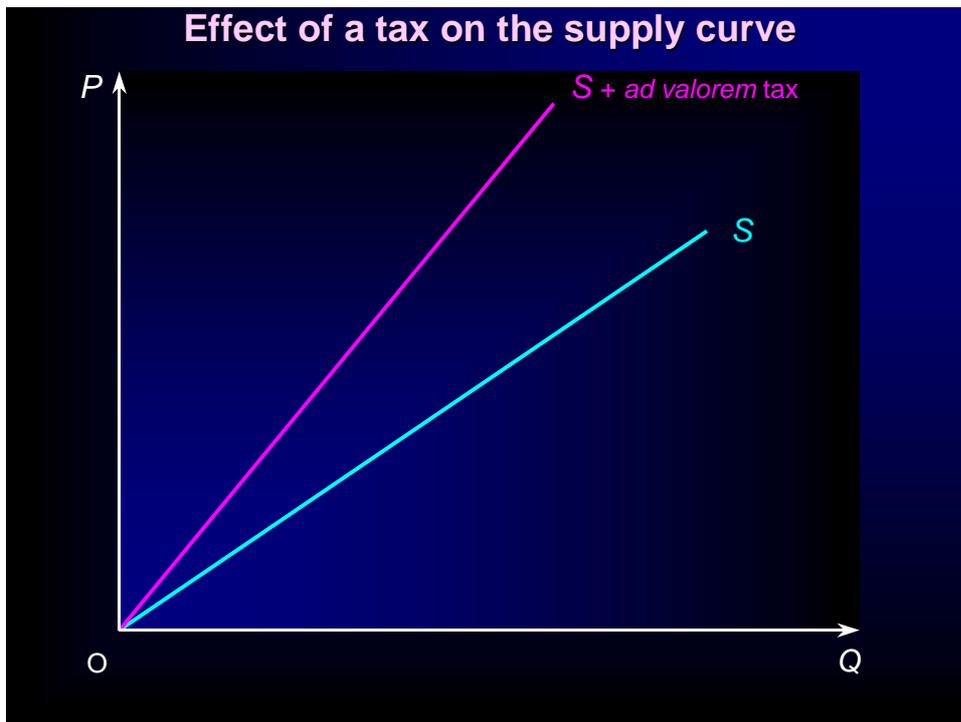
Ad valorem taxes are indirect taxes where a certain percentage is added on to the price of each unit sold. A UK example is Value Added Tax (VAT) currently standing at 17.5%.

A subsidy is a grant given by the government which is usually a fixed sum granted per unit sold.

EFFECT ON SUPPLY CURVES OF THE DIFFERENT INDIRECT TAXES

Taxes have the effect of raising costs of production a thereby shifting the supply curve to the left. For a specific tax this will mean that the shift will be a parallel one because the amount of tax is the same at all prices, the vertical distance between the supply curves will give the amount of specific tax. For an ad valorem tax the curve will swing to the left, because the amount of tax per unit increases as prices get higher, thereby widening the gap between the pre tax supply curve and the post tax supply curve. This situation is shown on the diagrams overleaf:

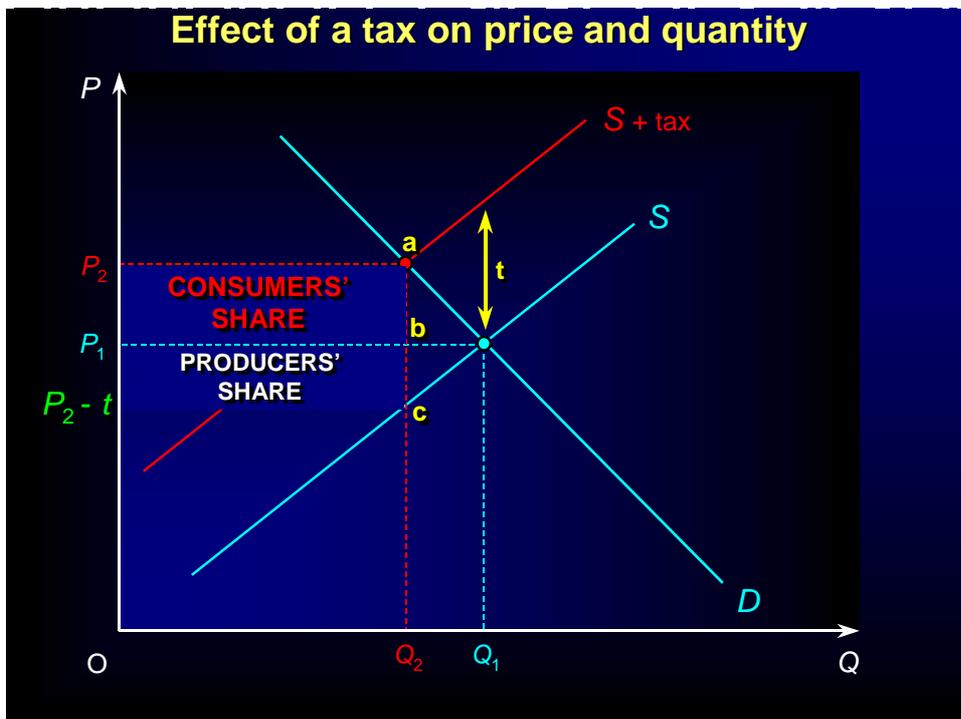




THE INCIDENCE OF TAXATION

The incidence of taxation is the burden of tax shared between buyers and sellers.

The diagram overleaf demonstrates how this is calculated:



The specific tax per unit is shown as the vertical distance (t) between the two supply curves. The price to the consumer has risen to P_2 and output of the good has fallen to Q_2 . The incidence or burden for the consumer can be calculated as the change in price multiplied by the quantity of the good consumed, this gives the area P_1P_2ab . The total government revenue from the tax can be found by multiplying the specific tax per unit (t) by the quantity bought/sold Q_2 this gives the area $P_{2-t}P_2ac$. That part of the government revenue not paid by the consumer must therefore have been paid by the producer and producer contribution is $P_{2-t}P_1bc$.

The total government's tax revenue is equal to the specific tax per unit multiplied by the equilibrium output after tax.

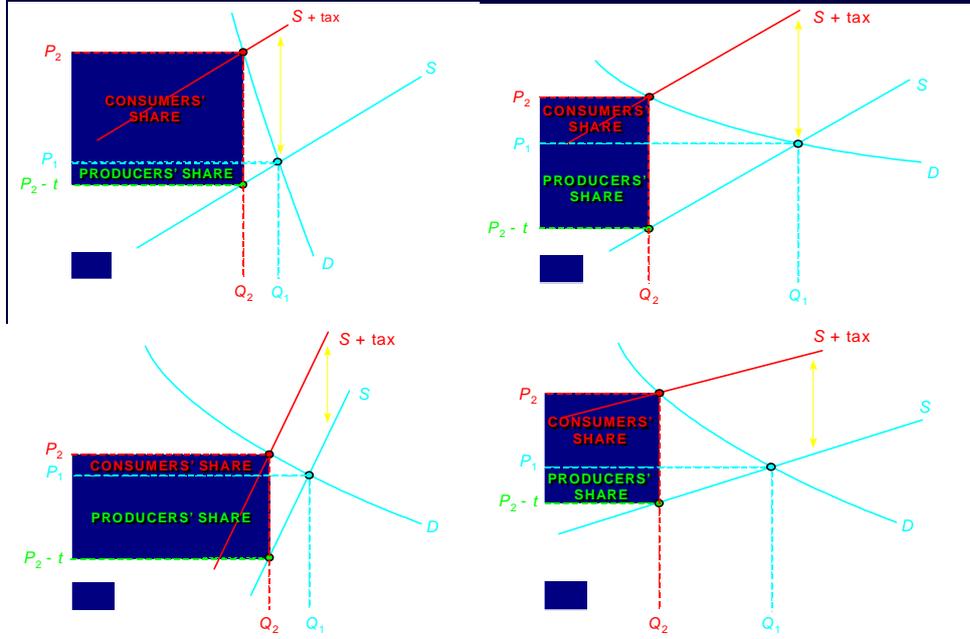
The consumer's tax burden or incidence is equal to the change in price multiplied by the equilibrium output after tax. It is the top portion of the government's revenue.

The producer's tax burden is equal to the area of the government's tax revenue which is not paid by the consumer. This is the bottom portion of the government's tax revenue.

TAX INCIDENCE AND ELASTICITY

- Demand is inelastic the consumer's tax burden is greater than the producer's.
- Demand is elastic the producer's tax burden is greater than the consumer's.
- Supply is elastic the consumer's tax burden is greater than the producer's.
- Supply is inelastic the producer's tax burden is greater than the consumer's.

Incidence of tax and elasticity of demand and supply



The relationship between elasticity and tax incidence is exactly when an ad valorem tax is levied on goods.

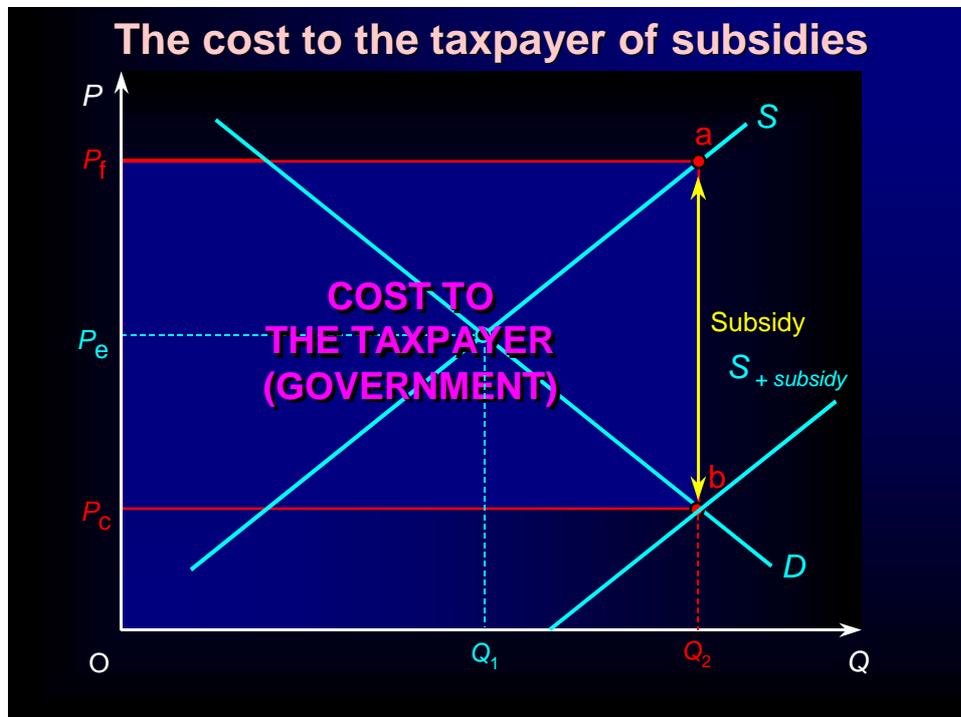
FURTHER OBSERVATIONS

Government's tend to impose specific taxes on alcohol, petrol and cigarettes the reasons for this are:

Demand will be relatively unaffected and so firm's will lose little in the way of revenue. Government's revenue is highest when taxing goods with inelastic demand. Recent governments have tried to persuade consumers to use less of these goods for health/environmental reasons.

SUBSIDIES - ENCOURAGING THE PRODUCTION OF MERIT GOODS

As with taxes the total subsidy per unit is the vertical distance between the supply curves, but since it has the effect of lowering costs of production the subsidy will shift supply to the right to $S + \text{subsidy}$. This has the effect of increasing output to Q_2 and lowering the price to P_c . The cost taxpayers (paid by the government) is equal to the total subsidy per unit (ab) multiplied by the quantity of the good consumed (Q_2) this gives the shaded area $P_c P_f ab$. This is shown on the diagram overleaf.



COST BENEFIT ANALYSIS (CBA)

Cost-budget analysis (CBA) is a framework for evaluating the social costs and benefits of an investment project. This involves identifying, measuring and comparing the private costs and negative externalities of a scheme with its private benefits and positive externalities, using money as a measure of value.

Step 1: identify all costs and benefits using the principle of opportunity cost

Step 2: measure the benefits and costs using money as a unit of account

Step 3: consider the likelihood of the cost or benefit occurring (i.e. sensitivity analysis)

Step 4: take account of the timing of the cost and benefit (i.e. discounting). A £1,000 benefit now is worth more than £1,000 benefit in 10 years time

IDENTIFY ALL COSTS AND BENEFITS

A firm deciding on an investment project will only take account of its own private costs and benefits e.g. total cost and total revenue. Firms ignore externalities. **CBA** will take account of both private and external costs and benefits.

Consider a project to build a bridge over a river:

- **Private Costs** e.g. construction costs, operating costs and maintenance costs
- **External Costs** i.e. costs incurred by non owners (a) monetary e.g. loss of profits to competitors e.g. to ferry owner and (b) non monetary e.g. noise, loss of countryside, inconvenience
- **Private benefits** direct the amount consumers are prepared to pay e.g. the tolls paid
- **External benefits** i.e. benefits to non owners e.g. consumer surplus of users; time savings for travellers and fewer accidents

MEASURE THE BENEFITS AND COSTS

Benefits and costs can be valued using money. Private costs and benefits are relatively easy to measure in monetary terms

Total costs and total revenue.

Private costs Build the bridge: £5,000, 000 to operate it £200,000 a year, to repair and maintain £ 50,000

Private benefits 1,000,000 users each paying £1 each = £1,000,000 a year

Externalities are more difficult to measure:

- **Noise or loss of countryside.** What value do people place on these? By how much do those who suffer need to be compensated Ask them using a questionnaire! If 50,000 affected people value the annual loss of countryside at £5 then cost = £250,000
- **Time savings.** What value do we place on work time saved or leisure time saved? Is the time saved worth the same to everyone? If 100,000 hours re saved and valued at £4 per hour, benefit = £400,000

- **Fewer accidents.** Economists value human life using money. One life = £750,000. If the bridge saves on life a year, annual benefit is £750,000

LIKELIHOOD OF THE COST OR BENEFIT

If there is a 50% chance that a life will be saved then the benefit is $£750,000 \times 0.5 = £375,000$

THE TIMING OF THE COST AND BENEFIT

The major costs of the project occurs straight away. The benefits occur over the life of the project. The bridge may cost £5m to build but consumers benefit by £1m a year. If the expected life of the bridge is 25 years then economists use discounting to value now the £1m of benefit in 25 years time. Commonly the rate of interest or inflation is used to discount the future earnings as the £1m in 25 years time will be worth substantially less today.

IS A PROJECT WORTH UNDERTAKING?

Yes if **discounted benefits** outweigh **discounted costs**. If the government has to choose between competing projects then the ones with the highest positive net present value should be undertaken.

GENERAL POINTS REGARDING CBA

Here are some common examples that can be applied to many CBAs they will hopefully assist you in answering any question.

The most common external costs arising from production are:

- noise.
- pollution of atmosphere, rivers etc..
- danger to workers and public.
- congestion.

The most common external costs arising from consumption are:

- pollution from motor vehicles.
- litter.
- noise pollution.
- externalities from smoking and drinking alcohol.

External benefits from production and consumption are often grouped together, the following are the most commonly used examples:

- industrial training by firms.
- education which leads to an increase in human capital.
- healthcare.
- knowledge.
- employment created.
- arts and sports.
- neighbourhood watch schemes.

A range of different projects often attract cost-benefit analysis, e.g.,

- the building of a new road.
- the building of new airport/runway.
- the expansion of a factory.
- the building of a supermarket.
- the provision of a public or merit good.

There are a number of problems with cost-benefit analysis:

- if the project leads to a time saving, it can often be difficult to place a value on the time saved.
- Lives maybe saved, again what value do we place on a life?
- How do we place a monetary value on an eyesore, pollution or illness? These require a level of judgement that may vary from person to person.
- Over time the value of the benefits will fall as inflation erodes the value of the pound. Any future benefits would have to be discounted.

It is accepted that cost-benefit analysis can be an imprecise, however it is deemed to be better than making no attempt to recognise the externalities at all. Due to the amount of judgement involved when coming to the figures and discount rate the results should be viewed with caution. All of the assumptions made in the cost-benefit analysis should be explicitly stated.

It is important to note who is carrying out the cost-benefit analysis and do they have a particular agenda, i.e., do they want the project in question to be approved/turned down. Depending upon their stance will affect what data they choose to include and their methods of interpreting it.

BARRIERS TO ENTRY

There are a number of different factors that will prevent a firm entering any particular industry.

CAPITAL COSTS

Buying a shop is relatively cheap, therefore entering most forms of retailing is easy. Buying an oil rig or a car production plant requires a substantial capital investment, entry costs into such industries can only be met by large companies. These capital costs, which vary from industry to industry, are an important barrier to entry.

Sunk costs

Sunk costs are those that aren't recoverable, e.g., the difference between the purchase price and the resale price of capital equipment and the costs of advertising. High sunk costs will act as a barrier to entry as the cost of failure is so great. Conversely low sunk costs will encourage firms to enter an industry, as they will have little to lose.

Scale economies

In some industries the minimum efficient scale (MES) is very large and it takes many years to reach that level of output. Existing firms who have the lower costs would be able to win any price war against a new entrant.

Patents

The government assigns patents to the owner of a particular idea or invention for 17-20 years, they legally prevent other firms producing or using something that is patented, e.g., catseyes, Dyson vacuum cleaners.

Government licences

Prevent other firms from providing a good or service, e.g., commercial television and radio, the national lottery, delivery of letters by Royal Mail and the production of nuclear energy.

Marketing barriers

Marketing can lead to barriers to entry, as huge spending by firms leads to consumer loyalty. New entrants have to at least match this level of advertising if they wish to persuade consumers to buy their product, e.g., soap powders are produced cheaply using a low level of technology, therefore existing firms advertise heavily so that any new entrant would have to spend an estimated £10 million to launch their product (a very high sunk cost).

International trade restrictions

Tariffs and quotas are deemed to be barriers to entry as they prevent firms from competing in a particular market.

Restrictive practices

Restrictive practices are illegal and can occur in a number of ways:

- manufacturers may refuse to supply a retailer who stocks a competitor's product, e.g., Brewers
- a firm may refuse to sell one good unless the buyer purchases a whole range of goods, e.g., Levi's won't just supply 501s.
- firms may lower the price so much that competitors are driven out of the market, e.g., British Airways are being accused of doing this with their budget airline Go.

MONOPOLY**THERE ARE THREE CHARACTERISTICS OF MONOPOLY:**

- There is only one firm in the industry, the monopolist.
- There are substantial barriers to entry.
- The monopolist is a short run profit maximiser.

In reality the government and other agencies call firms who have more than 25% of any particular market a monopoly.

Monopolies can be

- National, e.g., royal mail
- Regional, e.g., water companies
- Local, e.g., petrol station

The downward sloping demand curve for the industry must also be the demand curve for the firm (as the monopolist is the only firm in the industry). This gives the monopolist the power to be a price maker, he can set the price and then sell whatever quantity consumers are willing to buy at that price. Rather than setting the price, he can set the quantity he wishes to sell and then accept the price the market is willing to pay. Show this on the diagram below. It is because of this we say that the monopolist is constrained by the demand curve.

This is very different to the situation that occurs when there is competition in the market place (e.g., perfect competition and monopolistic). When competition exists the equilibrium quantity and price will be higher and lower respectively; it can be argued that this is better for consumer welfare. It is due to this reason that governments will intervene in the market in order to prevent monopolies from existing.

The monopolist however is better off as it will be able to earn abnormal profits due to the lack of any competitors in the markets.

MONOPOLY AND PRODUCTIVE EFFICIENCY

The monopolist will more than likely produce at the lowest possible cost for the level of demand. Breaking up the monopoly will lead to an increase in average costs as output per firm falls.

MONOPOLY AND ALLOCATIVE EFFICIENCY

The monopolist will charge a price above the marginal cost as it will drive up prices in order to earn abnormal profits.

MONOPOLY AND DYNAMIC EFFICIENCY

It can be argued that monopolists will be dynamically efficient as there is an incentive to invest in research and development, as they will reap the future profits. In perfect competition firms will be unwilling to invest due to the presence of perfect knowledge; any innovation will quickly become general knowledge to all firms in the industry, thereby removing any future rewards.

GOVERNMENT REGULATION OF MONOPOLY

Governments will use a number of policies in order to regulate monopolies.

Taxes

Governments could attempt to tax away abnormal profits, however this is unlikely to improve efficiency. There would be no incentive for firms to reduce prices or costs. The

tax may even discourage research and development due to the high level of taxes of any future profits.

Subsidies

Subsidies could be used to lower the equilibrium price and increase quantity, in an attempt to achieve efficiency. This is only likely to occur if the monopoly is loss making (e.g., railways) as increasing a profit making company's profits will be politically unacceptable.

Price Controls

Many regulating bodies have been set up in order to ensure that monopolists don't exploit consumers, e.g.,

- OFTEL (Office of Telecommunications)
- OFGEM (Combined Office Of Gas & Electricity Regulation)
- OFWAT (Office of Water Regulation)
- OFGAS (Office of Gas Regulation).

Setting maximum price increases in industries it will encourage monopolists to reduce their costs in order to increase profits, thereby improving productive efficiency.

Monopolists argue that they need to increase prices in order to be able to sustain dynamic efficiency, e.g., water companies need to earn high profits so they can invest in better water treatment plants etc..

Privatisation and Deregulation

The Thatcher government embarked on a policy on privatisation through the 1980s, when many previously state owned companies were sold to the private sector in the hope improving efficiency, e.g.,

- British Gas
- British Rail
- British Telecom
- Water Boards
- Sealink Ferries
- Jaguar Cars
- British Airways
- Rolls Royce

Privatisation may or may not accompany deregulation. Deregulation is the process of allowing competitors to enter markets that were previously protected by legal barriers to entry. Competition would hopefully drive down the price.

Breaking up the Monopolist

This was done in an attempt to introduce competition into markets, however it more than often simply led to regional monopolies, e.g., railways and water companies.

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