

Negative Externalities

AS Economics Presentation
2005

Key Issues

- The meaning of externalities
- Examples of negative externalities
- Differences between private and social costs
- Externalities as a cause of market failure
- Approaches to reducing externalities
 - Command and control techniques
 - Intervention in the price mechanism
 - Extending the market
- The problems in valuing externalities

Key Concepts

- Externality
- Private cost (internal cost)
- External cost
- Social cost
- Social welfare
- Market failure
- Pollution tax
- Social optimum
- Command and control
- Government intervention

What are Externalities?

- Externalities are **third party effects** arising from production and consumption of goods and services for which no appropriate compensation is paid
- Externalities occur in nearly every market and industry
- They can cause **market failure** if the price mechanism does not take into account the full social costs and benefits of production and consumption
- Externalities occur **outside of the market** i.e. they affect economic agents not directly involved in the production and/or consumption of a particular good or service

Consumption and production can both create negative externalities



Examples of negative externalities

- Smokers ignore the impact of 'passive smoking' on non-smokers
- Acid rain from power stations in the UK can damage the forests of Norway
- Air pollution from road use
- The social costs of drug abuse
- The environment damage caused by the growing use of fertilizers in agriculture
- External cost of new housing developments in green belt areas
- Noise pollution from aircraft taking off and landing at a nearby airport
- Externalities from people's anti-social behaviour

Externalities and Property Rights

- Negative Externalities:
 - Where the social cost of production $>$ the private cost
- Air Pollution
 - Health effects (often long term consequences)
 - Clean up costs
 - Global warming effects
- Noise Pollution
 - Disutility effects to nearby residents
 - Impact on local house prices
- With environmental damage – it can be difficult to assign **property rights** and therefore hard for those affected to gain compensation from those creating the problem

Environmental Market Failure

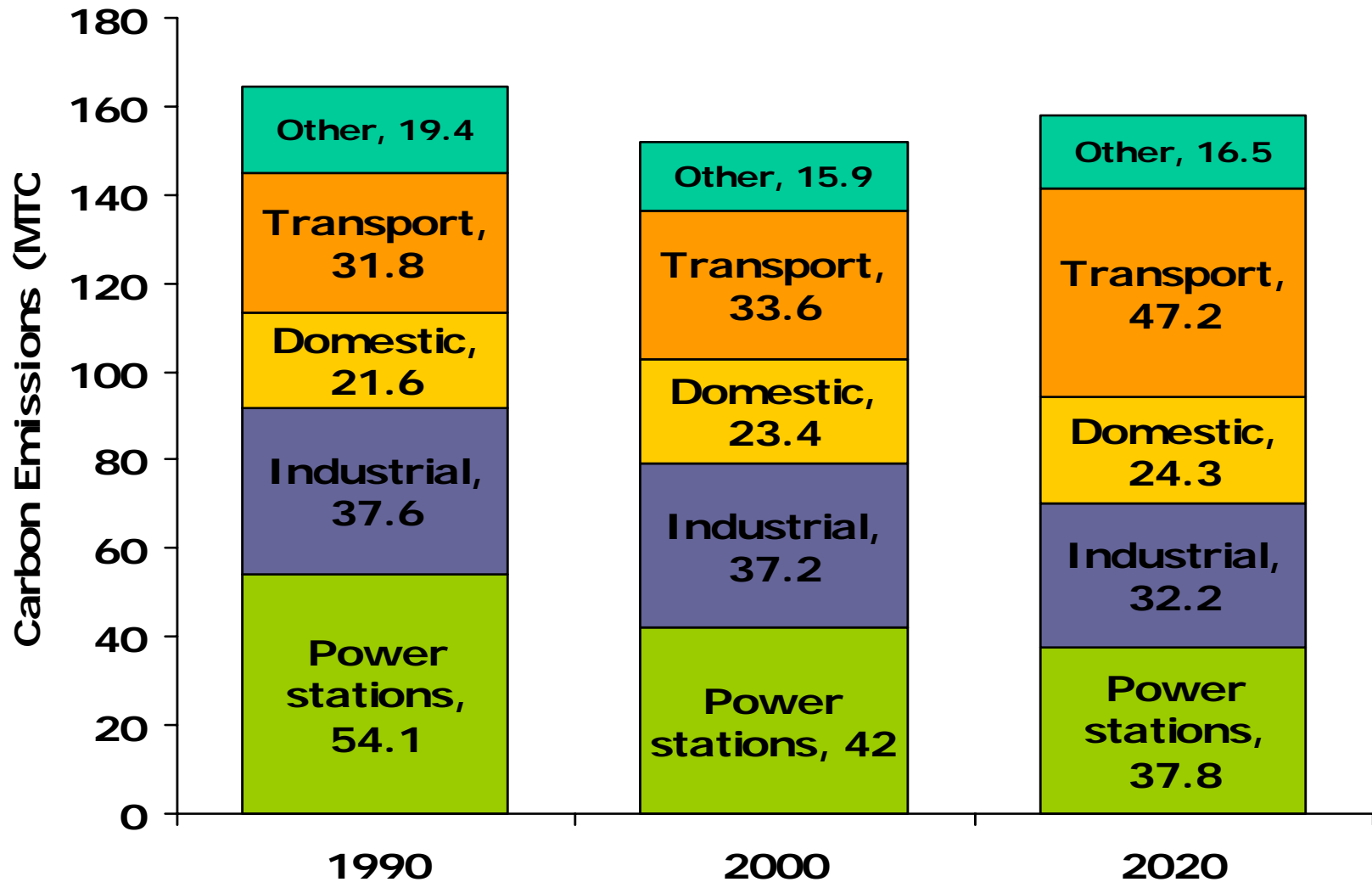
- Our environment is a scarce resource!
- Environmental market failures exist due to:
- Common resources that are not privately owned or charged for
 - (e.g. ocean fisheries)
 - This is known as the “Tragedy of the Commons”
- Public goods
 - (Indivisible common resources - e.g. the air)
- Impact on Future generations
 - (Caused by carbon emissions etc)
- Many uses of the natural environment are not charged for at all
 - Overuse of waste facilities?

The Tragedy of the Commons



Fish stocks in the north sea have fallen to dangerously low levels. There are fears that over-fishing of a renewable resource has led to a permanent depletion of fish stocks – threatening jobs in fishing and fish processing

Sources of UK CO2 emissions



External Costs from Marine Pollution

- Marine pollution creates numerous external costs
 - Interference with maritime traffic by damaging ships' propulsion systems
 - Increased risk to human lives and safety
 - Damaging effects on tourism
 - Extra costs facing fishing and aquaculture industries
 - Additional costs on rescue and emergency services like the Royal National Lifeboat Institution (RNLI)
- In 2000, a study of the impact of marine debris and small oil spills off the coasts of northern Europe put the cost at £750 million

Private and Social Costs

- Private Costs
 - Are paid only by the producer or consumer concerned
 - They are internal costs of production or consumption
- Social Costs
 - $\text{Social Cost} = \text{Private Cost} + \text{External Cost}$
 - Negative externalities add to social costs or reduce social benefits
 - We assume that the consumer and/or producer does not take external costs into account when making decisions
 - This can lead to a misallocation of resources (causing a loss of allocative efficiency)
 - This means that social welfare is not maximized - a cause of market failure

Private and social costs



Private and Social Benefits

- **Private benefits**

- The utility derived from consumption (for a consumer)
- The revenue accruing to a producer

- **Social benefit**

- Social benefit = Private benefit + External benefit

Private and Social Benefits (2)

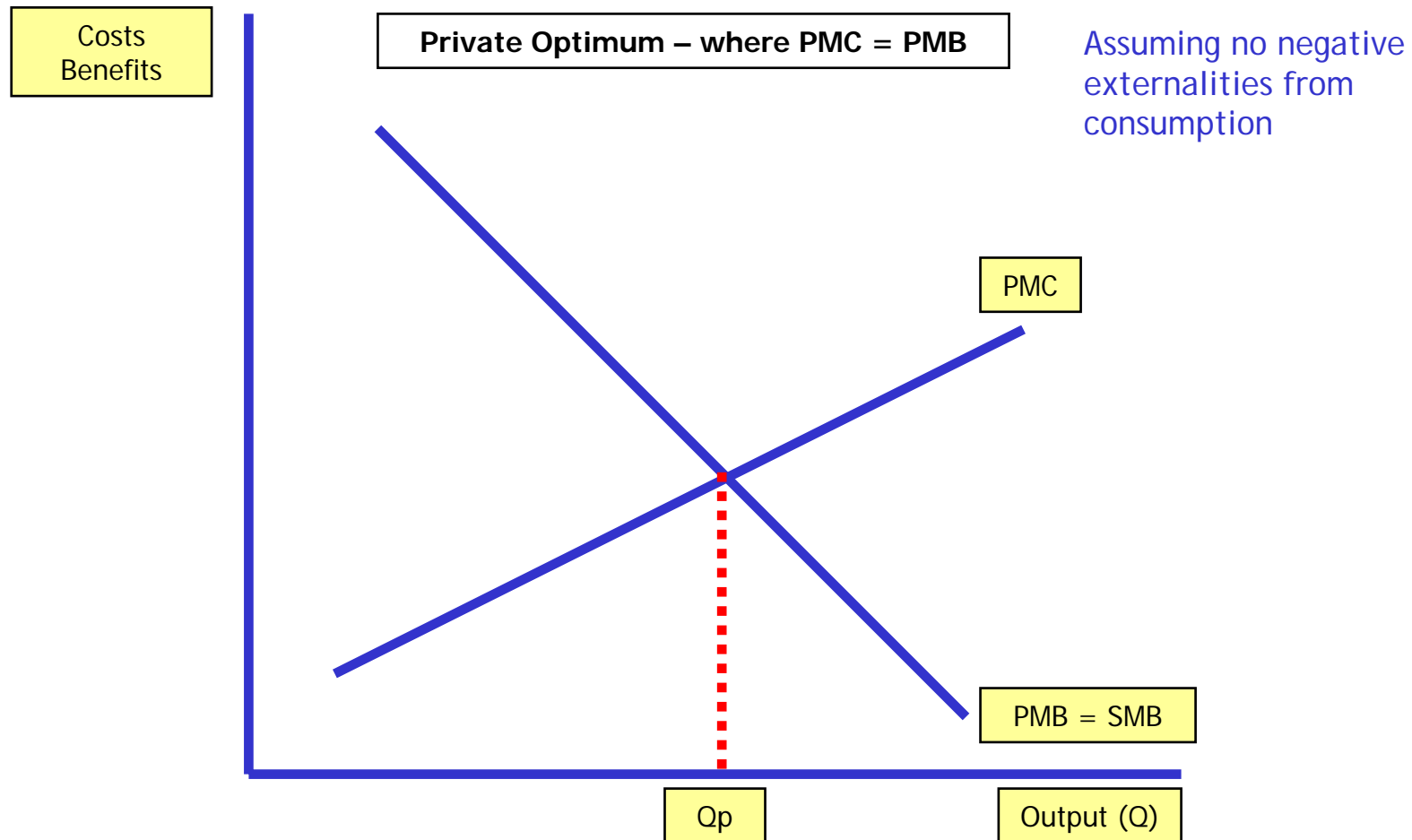
- **Positive externalities**

- Activities where the external benefit is positive
- Social benefit $>$ private benefit

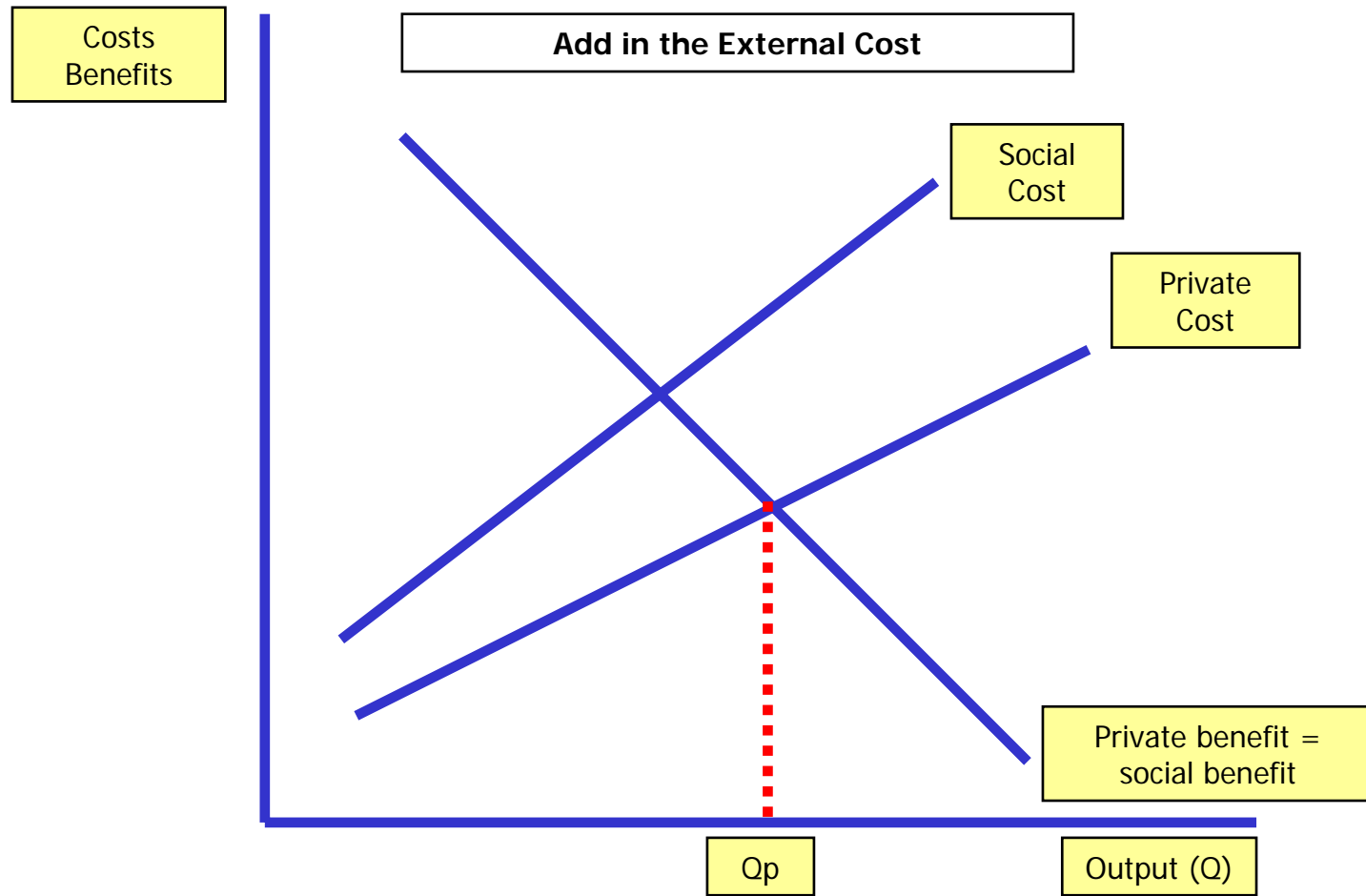
- **Negative externalities**

- Activities where consumption creates a negative external benefit (ie disutility)
- Social benefit $<$ private benefit

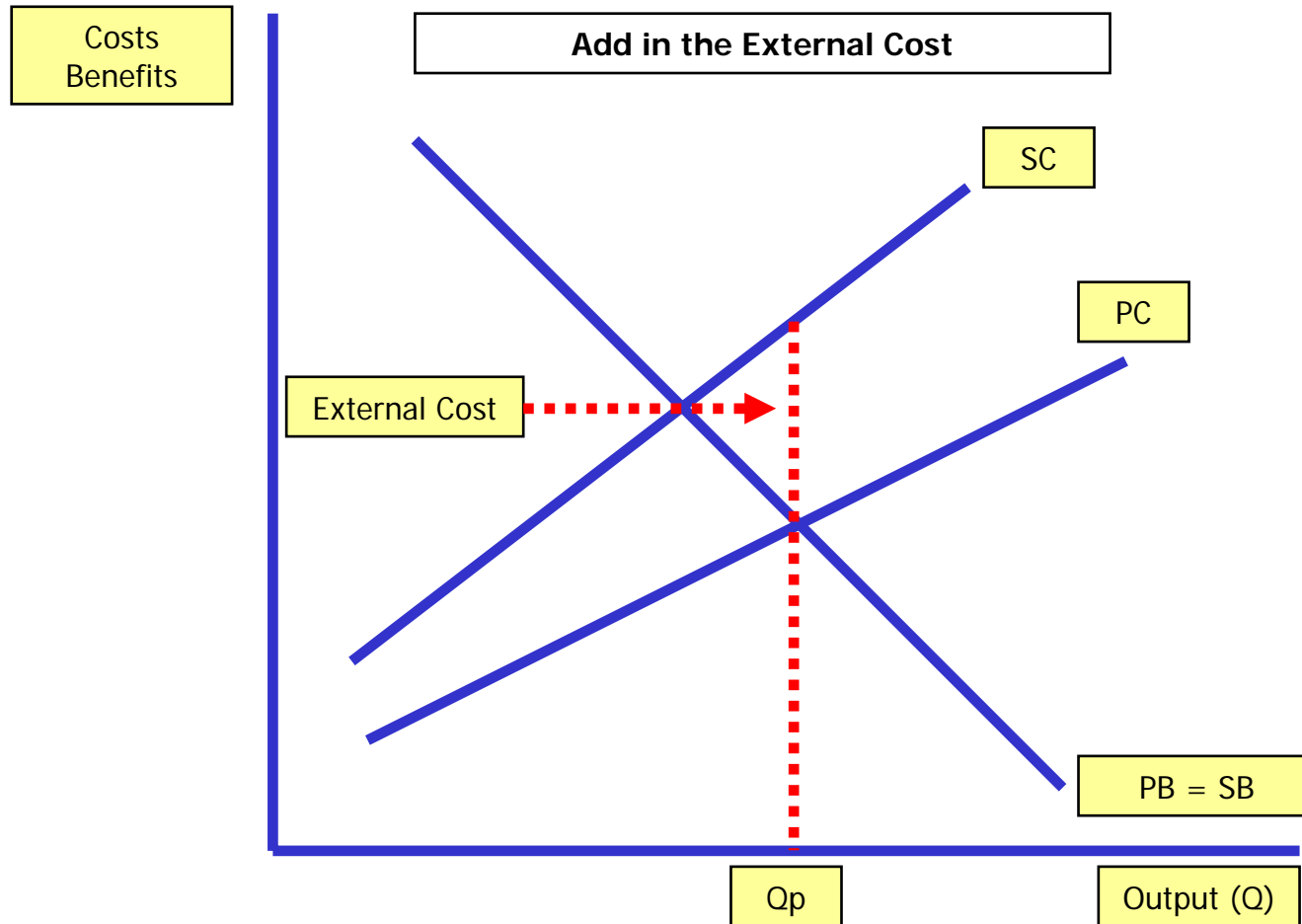
Negative Externalities & Market Failure



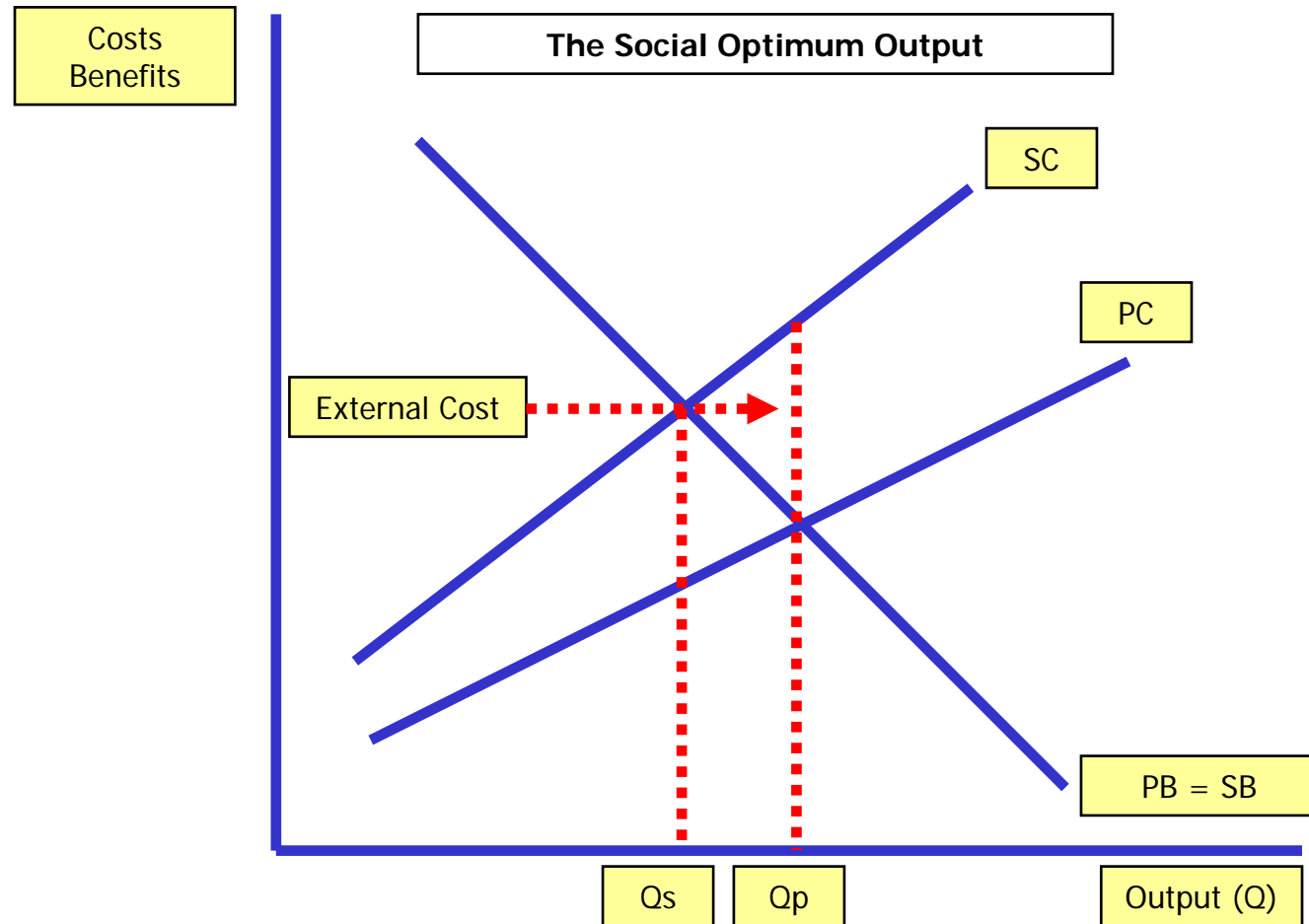
Negative Externalities & Market Failure



Negative Externalities & Market Failure



Negative Externalities & Market Failure



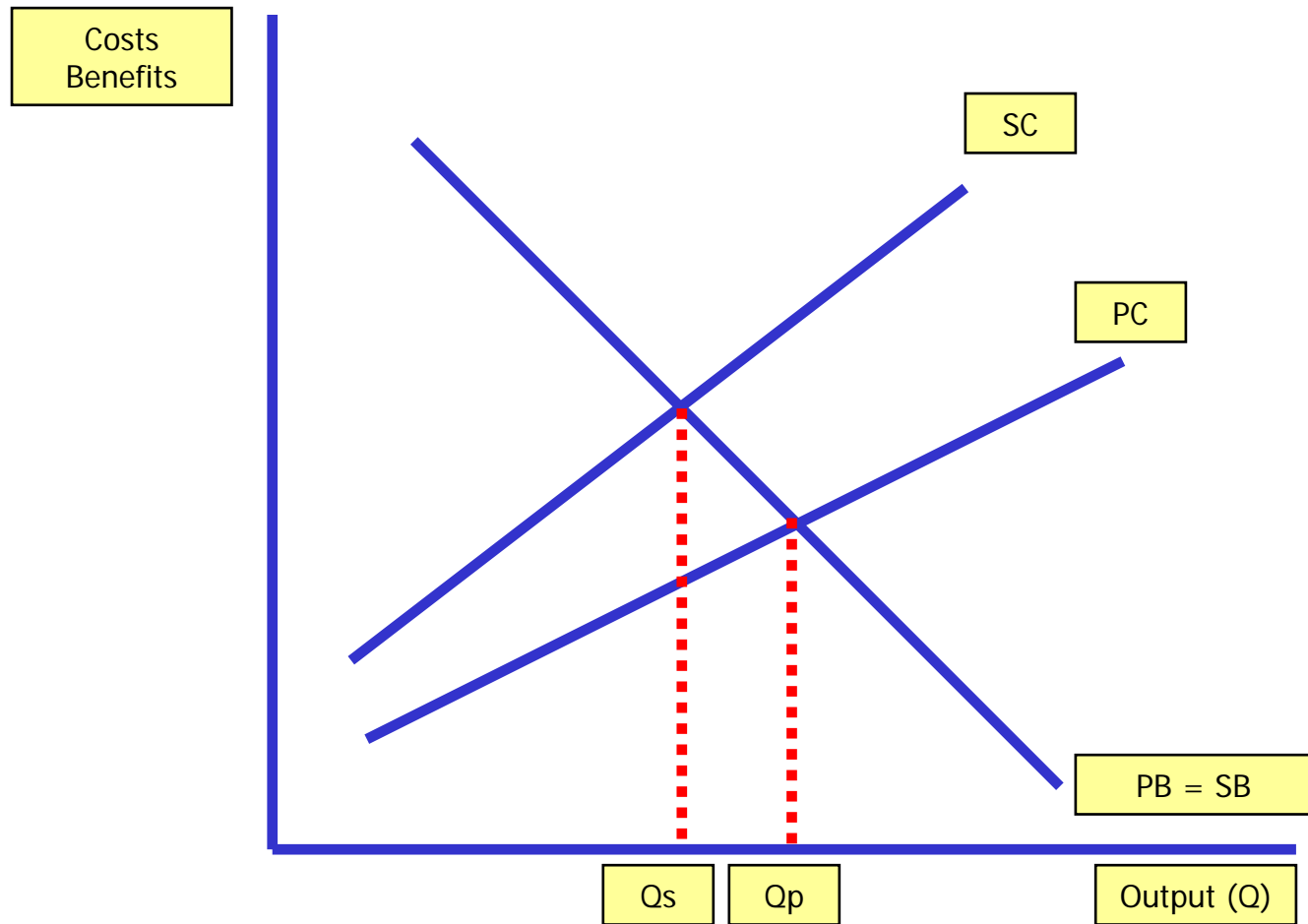
Controlling Externalities

- Command and Control Techniques
 - Output quotas for producers and fines for exceeding pollution
 - Outright prohibition of production that generates pollution
 - Legislation: Environmental Protection Acts
 - Clean Air Act and Noise Abatement Protection
 - Beach safety regulations
 - Mandatory catalytic converters in cars
 - Banning of certain products (e.g. CFCs in aerosols)

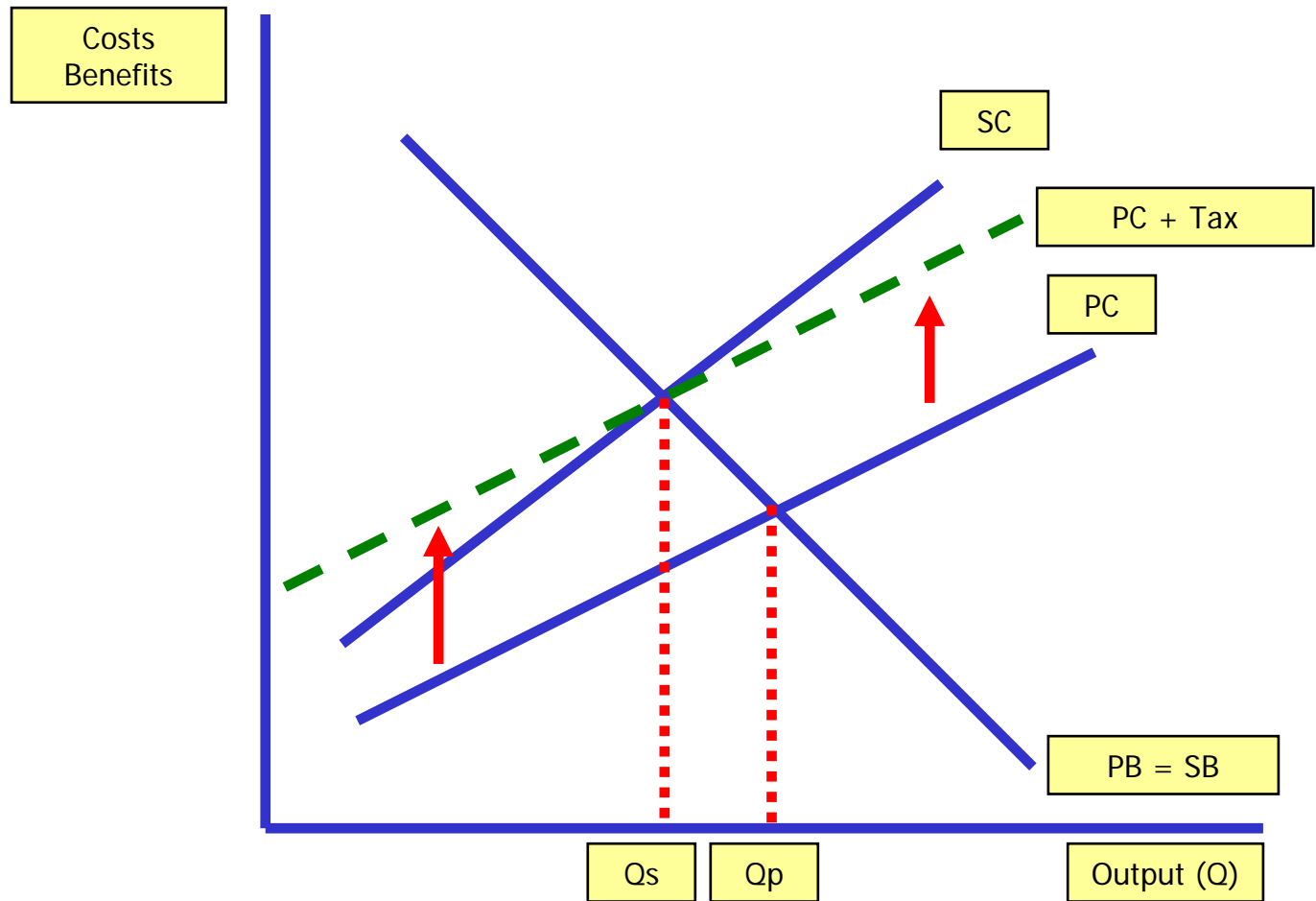
Command and Control – An Evaluation

- Regulation involves costs
 - Costs of monitoring legislation
 - Costs of assessing the damage caused by externalities
 - Costs in bringing individual cases to court and chasing up non-payment of fines!
- Regulators have imperfect information
 - There are problems in assigning monetary values to externalities created
 - Danger that regulators might act more in the interests of producers rather than consumers
- The market mechanism might be a better means of achieving the desired reduction in externalities

Pollution Taxes – Internalizing the Externality



Pollution Taxes – Internalizing the Externality



The case for a pollution tax

- According to the UK government
- “Taxes send a signal to polluters that our environment is valuable and is worth protecting.”

“Making the Polluter Pay”

- Taxes are designed to “make the polluter pay” for some of the external costs they cause
 - Taxes help ensure that users pay the full cost of resource use
 - Should cause the producer / consumer to reduce output / consumption
 - Lower output should then reduce total volume of pollution
 - Taxes provide an incentive for environmental improvement
 - Revenue from taxes can be “ring-fenced” and then used to fund socially beneficial Government spending
- Many economists now question the effectiveness of environmental taxes – they favour
 - An extension of command and control measures
 - A switch towards market-based pollution permit systems

Examples of environmental taxation

- The Landfill Tax - this tax aims to encourage waste producers to produce less waste and to use more environmentally friendly methods of waste disposal
- The Climate Change Levy - a tax on the use of energy in industry, commerce and the public sector
- The Aggregates Tax - the purpose of the levy is to reduce the environmental costs associated with quarrying operations (noise, dust, visual intrusion, loss of amenity and damage to biodiversity)

Examples of environmental taxation

- The Congestion Charge: -designed to cut congestion in inner-London by charging motorists £5 per day to enter the central charging zone
- Plastic Bag Tax (Ireland) - The levy is designed to encourage people to use reusable bags and has stimulated an increase in the availability of biodegradable bags

Taxation and Pollution



The congestion charge has reduced traffic volumes in London



But many believe that the landfill tax has been less effective in encouraging recycling of household & industrial waste products

The congestion charge & road pricing

- Despite their claims to the contrary, road users do not pay the social costs for their use of the road network. This is a classic case of market failure
- Traffic congestion occurs where the demand for road space exceeds capacity, particularly during peak periods. Consequently, there is an inefficient use of resources and a huge opportunity cost in terms of time that could be spent in a more productive way
- The external costs of congestion have been estimated at £20bn, most of which is for the value of time.

Problems with “Green Taxes”

- (1) Difficulties in working out who is causing the pollution – linked to the problem of assigning property rights to the environment
- (2) Estimating an accurate monetary value for externalities caused – how do we value environmental resources now and in the future?
- (3) The Demand for final output may be inelastic - Producers can pass most of the burden of the tax onto consumers
- (4) Low-income groups may not be able to pay - leading to a regressive impact on income (i.e. issues of equity)

Problems with “Green Taxes”

- (5) Higher taxes might cause inflation and worsen the international competitiveness of domestic producers (Bush’s rejection of Kyoto)
- (6) High taxes might encourage “boot-legging” and other forms of tax evasion (cigarette and alcohol smuggling in the south-east?)
- (7) Pollution taxes are a second-best form of pollution control
- (8) As with regulation - improper use of environmental taxation can cause “government failure”

The aviation tax debate

- Airports represent major sources of air pollution in developed countries
 - Aircraft engines emit carbon dioxide, water vapour, particulates (mainly comprising sulphates and soot), hydrocarbons, oxides of sulphur and oxides of nitrogen
 - We might also consider the local environmental impact of thousands of jets taxiing, taking off and landing
 - Additional pollution comes from land transportation servicing airports
- Aviation is currently exempt from taxation on international air travel under the terms of the 1944 Chicago Convention

Possible policy approaches to aviation pollution

- A duty on aviation fuel
- Higher air passenger duty
- Tougher regulations on pollution emissions by aircraft
- Establishing a pollution emissions trading scheme