Externalities

AQA A-Level Economics

Market Failure · Social Costs & Benefits · Negative & Positive Externalities · Taxes · Subsidies · Permits

Market Failure & Externalities

Definition:
When the free market misallocates resources — too much or too little of a good is produced.

Social Cost = Private Cost + External Cost **Social Benefit = Private Benefit + External Benefit**

Externality: a cost or benefit to a third party outside the transaction

Private Costs & Benefits

Costs and benefits that fall on the producer or consumer directly involved. Markets are based on these — they ignore effects on third parties.

e.g. A factory's private costs are wages, materials and energy; a driver's private cost is fuel and insurance.

External Costs & Benefits

Spillover effects on third parties, not reflected in the market price. Negative externalities impose costs; positive externalities provide benefits.

e.g. Air pollution from the factory harms local residents; a well-kept garden benefits neighbours.

Social Costs & Benefits

The full cost or benefit to society. The social optimum is where marginal social cost (MSC) = marginal social benefit (MSB).

e.g. When external costs exist, MSC > MPC, so the market overproduces compared with the social optimum.

Negative Production Externalities

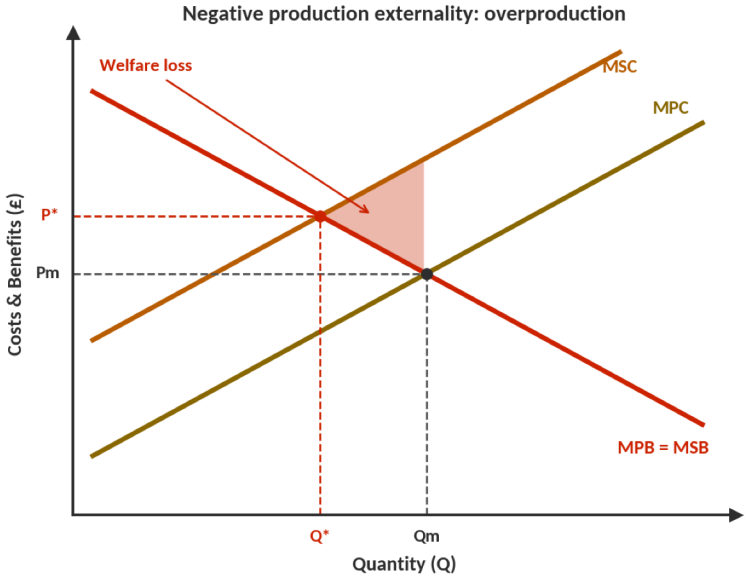
Definition:
External costs created by the production of a good, imposed on third parties — e.g. air and water pollution, noise, congestion.

The market outcome:
Firms only consider their private costs (MPC), so they produce at Qm, where MPC = MPB. But the true cost to society (MSC) is higher, as it includes the external cost.

The social optimum:
Where MSC = MSB, at Q*. The market overproduces (Qm > Q*) and the price is too low (Pm < P*).

Welfare loss:
The shaded triangle — units between Q* and Qm where the cost to society exceeds the benefit.

The vertical distance between MPC and MSC is the marginal external cost.



Real-World Example

UK water companies: sewage was discharged into rivers and seas for around 3.6 million hours in 2023 — a major external cost to wildlife, swimmers and tourism.

Negative Consumption Externalities

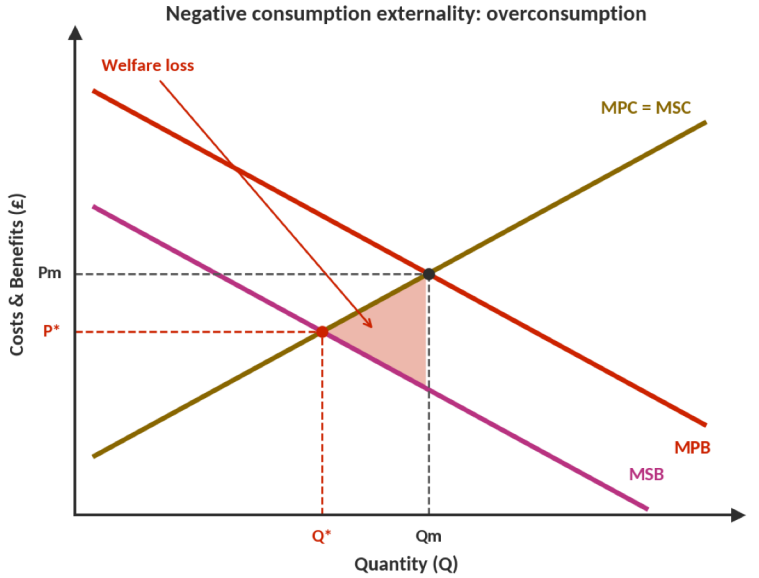
Definition:
External costs created by the consumption of a good, imposed on third parties — e.g. passive smoking, alcohol-related crime, noise from loud music.

The market outcome:
Consumers only consider their private benefit (MPB), consuming at Qm where MPB = MPC. But the benefit to society (MSB) is lower, due to the external costs.

The social optimum:
Where MSB = MSC, at Q*. The good is overconsumed (Qm > Q*).

Welfare loss:
The shaded triangle — units consumed beyond Q* where the cost to society exceeds the social benefit.

Many demerit goods (alcohol, tobacco) also create negative consumption externalities.



Real-World Example

Alcohol harm is estimated to cost England around £27bn a year — through NHS treatment, crime, policing and lost productivity, much of it borne by third parties.

Positive Production Externalities

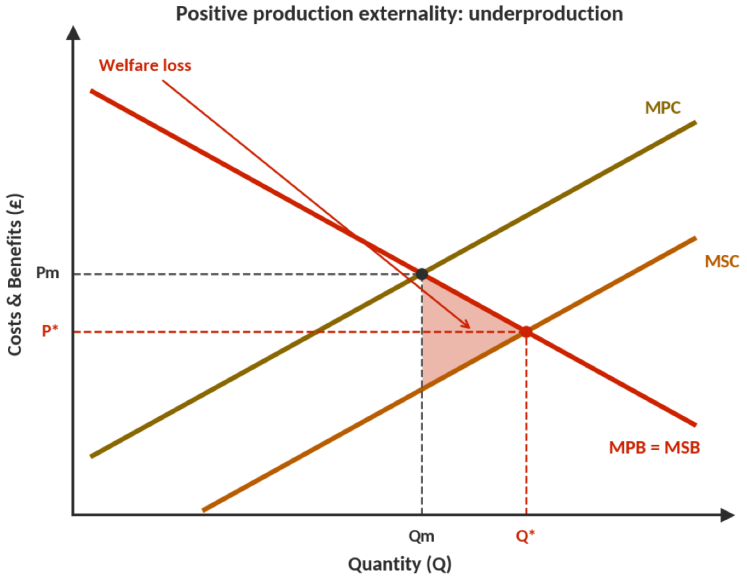
Definition:
External benefits created by the production of a good, enjoyed by third parties — e.g. firms training workers, research and development, beekeeping.

The market outcome:
Firms consider only their private costs (MPC). Because production creates external benefits, the true cost to society (MSC) is lower than MPC.

The social optimum:
Where MSC = MSB, at Q*. The market underproduces (Qm < Q*).

Welfare loss:
The shaded triangle — units between Qm and Q* that would benefit society but are not produced.

Policy response: subsidies to lower firms' costs, or direct state provision.



Real-World Example

Training: workers trained by one firm often move to rivals, so firms underinvest in skills. The Apprenticeship Levy (0.5% of large employers' payroll) aims to correct this.

Positive Consumption Externalities

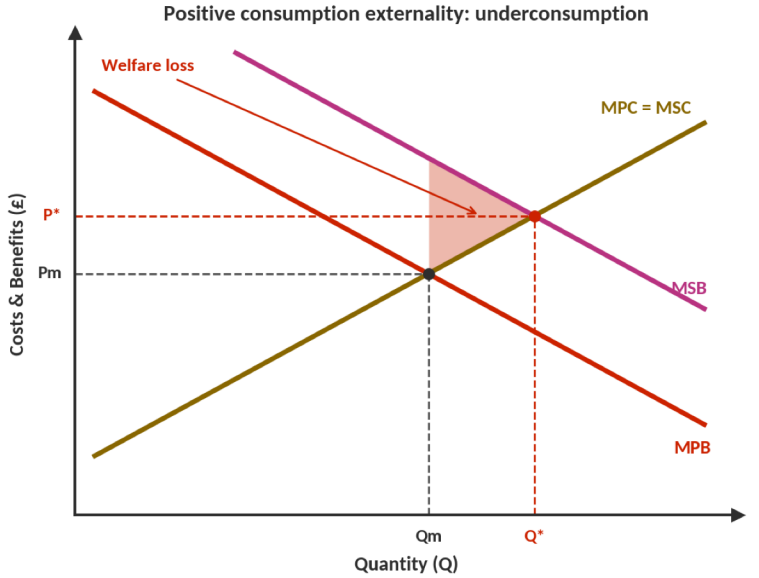
Definition:
External benefits created by the consumption of a good, enjoyed by third parties — e.g. vaccinations, education, public transport use.

The market outcome:
Consumers consider only their private benefit (MPB), consuming at Qm. But the benefit to society (MSB) is higher, due to the external benefits.

The social optimum:
Where MSB = MSC, at Q*. The good is underconsumed (Qm < Q*).

Welfare loss:
The shaded triangle — the extra social benefit lost because too little is consumed.

Many merit goods (education, healthcare) also create positive consumption externalities.



Real-World Example

Vaccination creates herd immunity. With MMR uptake in England below the 95% target, measles cases rose sharply in 2024 — showing the cost of underconsumption.

Correcting Externalities: Taxes & Subsidies

Pigouvian (indirect) taxes:

A tax equal to the marginal external cost shifts MPC up to MSC. The externality is internalised — producers and consumers now pay the full social cost, so output falls to Q*.

Subsidies:

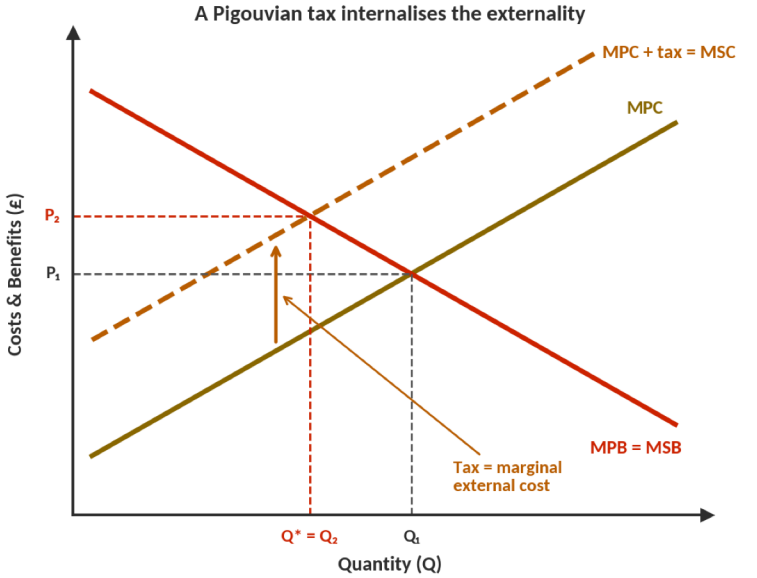
For positive externalities, a subsidy equal to the marginal external benefit lowers costs or prices, raising output or consumption to the social optimum.

Evaluation of taxes:

Uses the price mechanism; raises revenue. ✗ Hard to measure the external cost in money. ✗ Inelastic demand means quantity may fall little. ✗ Regressive; may encourage smuggling.

Evaluation of subsidies:

Increases consumption of beneficial goods. ✗ Opportunity cost to the government. ✗ Firms may become inefficient or dependent on subsidies.



Real-World Example

The Soft Drinks Industry Levy (2018) taxed high-sugar drinks. Manufacturers reformulated to avoid it, cutting the sugar content of affected soft drinks by over 40%.

Other Policies to Correct Externalities

Governments can also use regulation, market-based schemes, information and property rights:

Regulation & Standards

Legal limits on pollution or harmful activity, backed by fines — e.g. emissions standards, ULEZ.

Eval: simple and certain — but costly to enforce, and gives no incentive to cut beyond the limit.

Bans

Prohibiting a harmful activity or product altogether — e.g. the ban on smoking in public places (2007).

Eval: very effective if enforced — but may create black markets and lose any benefits.

Tradable Pollution Permits

A cap on total emissions, with permits that firms can buy and sell — see next slide.

Eval: cuts pollution at lowest cost — but setting the cap is difficult.

Extending Property Rights

Giving someone ownership of a resource, so they can charge or sue for damage to it (Coase).

Eval: hard to apply where many parties are involved or the source of harm is unclear.

Information Provision

Campaigns and labelling to change behaviour — e.g. health warnings on cigarettes, energy labels.

Eval: cheap — but people may ignore information, and effects are slow.

State Provision

The government provides goods with large external benefits directly — e.g. free vaccinations, schooling.

Eval: raises consumption — but costly and may be inefficient without a profit motive.

Tradable Pollution Permits

How cap-and-trade works:

The government sets a cap on total emissions and issues permits equal to that amount. Each permit allows a firm to emit one tonne of CO_2.

Trading:

Firms that can cut emissions cheaply do so and sell spare permits. Firms that find it costly buy extra permits. Pollution is reduced where it is cheapest to do so.

Reducing pollution over time:

The cap is lowered each year, so permits become scarcer and more expensive — raising the incentive to invest in cleaner technology.

Evaluation:

Total pollution is capped with certainty. Market-based and efficient. ✗ Too many permits issued makes the price too low (as happened in the early EU ETS). ✗ Firms may relocate to countries without a scheme (carbon leakage).

Advantages

Certain level of pollution; cost-efficient; revenue from auctioning permits; creates a market price for carbon.

Disadvantages

Hard to set the right cap; monitoring is costly; price volatility; may favour large firms that can afford permits.

Real-World Example

The UK Emissions Trading Scheme replaced the EU ETS in 2021. It covers power, heavy industry and aviation, and its cap falls each year towards net zero by 2050.

★ Bonus: The Coase Theorem & Property Rights

The problem:
Externalities often arise because no one owns the affected resource — clean air, rivers and oceans. Without property rights, no one can charge for damage.

The Coase theorem (1960):
If property rights are clearly defined and transaction costs are low, the parties will bargain to reach the efficient outcome — whoever is given the rights.

Example:
If residents own the right to clean air, a factory must pay them to pollute. If the factory owns the right, residents could pay it to cut pollution. Either way, bargaining reaches Q*.

Evaluation:
No need for government to measure external costs. ✗ Transaction costs are high when many parties are involved. ✗ Who gets the rights affects the distribution of income.

Tragedy of the Commons

Resources owned by no one (e.g. fish stocks) are overused, as each user ignores the cost imposed on others.

Transaction Costs

The costs of negotiating and enforcing agreements — they make Coasian bargaining unrealistic for large-scale pollution.

Real-World Example

Fishing quotas: Iceland and New Zealand gave fishers tradable shares of the total catch. Owning a share of future stocks gave them an incentive to conserve, helping stocks recover.

Summary: Key Terms & Relationships

Key Term	Meaning
Market failure	When the free market misallocates resources — too much or too little is produced.
Externality	A cost or benefit to a third party not involved in the transaction.
Social cost	Private cost + external cost. MSC includes all costs to society.
Social benefit	Private benefit + external benefit. MSB includes all benefits to society.
Social optimum	Where MSC = MSB — the allocatively efficient level of output.
Negative externality	External cost → overproduction or overconsumption compared with the social optimum.
Positive externality	External benefit → underproduction or underconsumption.
Welfare loss	The loss to society from producing at Qm instead of Q* — the shaded triangle.
Pigouvian tax	A tax equal to the marginal external cost — internalises the externality.
Subsidy	Payment to producers to lower costs and raise output of goods with external benefits.
Tradable permits	A cap on pollution, with permits that can be bought and sold. e.g. UK ETS.
Coase theorem	With clear property rights and low transaction costs, bargaining reaches efficiency.
Tragedy of the commons	Overuse of shared resources that no one owns.