2.8 Market failure – externalities and common pool or common access resources

Level7 Education

Learning objectives

2.8 Market failure – externalities and common pool or common access resources	Depth	Diagrams and calculations
Socially optimum output: marginal social benefit (MSB) equals marginal social cost (MSC). (MSB = MSC): allocative efficiency; social/community surplus maximized • Positive externalities of production and consumption and welfare loss • Merit goods • Negative externalities of production and consumption and welfare loss • Demerit goods • Common pool resources Characteristics: Tragedy of commons, rivalrous but non-excludable Unsustainable production creating negative externalities	AO2 AO4	Diagram: allocative efficiency Diagram: showing market failure due to: • negative externalities of production • negative externalities of consumption • positive externalities of production • positive externalities of consumption. **Calculation (HL only): welfare loss from a diagram**

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Learning objectives

2.8 Market failure – externalities and common pool or common access resources	Depth	Diagrams and calculations
Government intervention in response to externalities and common pool resources including: • Indirect (Pigouvian) taxes • Carbon taxes • Legislation and regulation • Education—awareness creation • Tradable permits • International agreements • Collective self-governance • Subsidies • Government provision	AO2 AO4	Diagram: showing government responses to externalities • Indirect (Pigouvian) taxes • Carbon taxes showing effects on the market of a particular polluting industry • Subsidies • Legislation and regulation • Education

Level7 Education

Learning objectives

2.8 Market failure – externalities and common pool or common access resources	Depth	Diagrams and calculations
Strengths and limitations of government policies to correct externalities and approaches to managing common pool resources including: • challenges involved in measurement of externalities • degree of effectiveness • consequences for stakeholders	AO3	
Importance of international cooperation • Global nature of sustainability issues • Challenges faced in international cooperation • Monitoring, enforcement		

Real world example

Consider the possible implications if Covid-19 vaccines were not directly provided or subsidized by the government but rather traded in a *free market*.

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Introduction

Market failure occurs due to an inefficient allocation of resources. The signaling, incentive, and rationing functions of the price mechanism may not always lead to a socially optimal outcome.

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Key terms – benefits and costs

Marginal private benefit (MPB): Additional benefits to consumers from an extra unit output.

Marginal social benefit (MSB): Total benefits to society from an extra unit of output.

Marginal private cost (MPC): Additional costs paid by producers from an extra unit of output.

Marginal social cost (MSC): Total costs paid by society from an extra unit of output.

Marginal external benefit (MEB): Additional benefits to third parties from an extra unit of output.

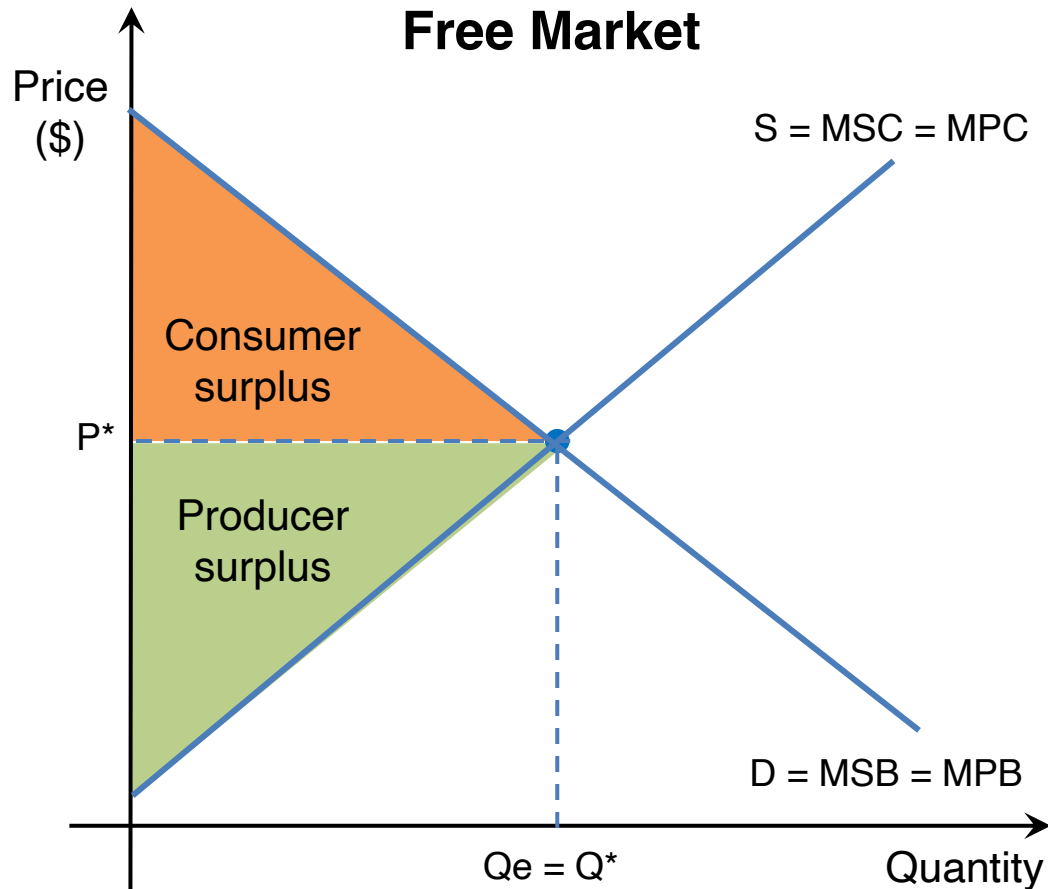**Marginal external cost (MEC):** Additional costs to third parties from an extra unit of output.

Introduction

Free Market
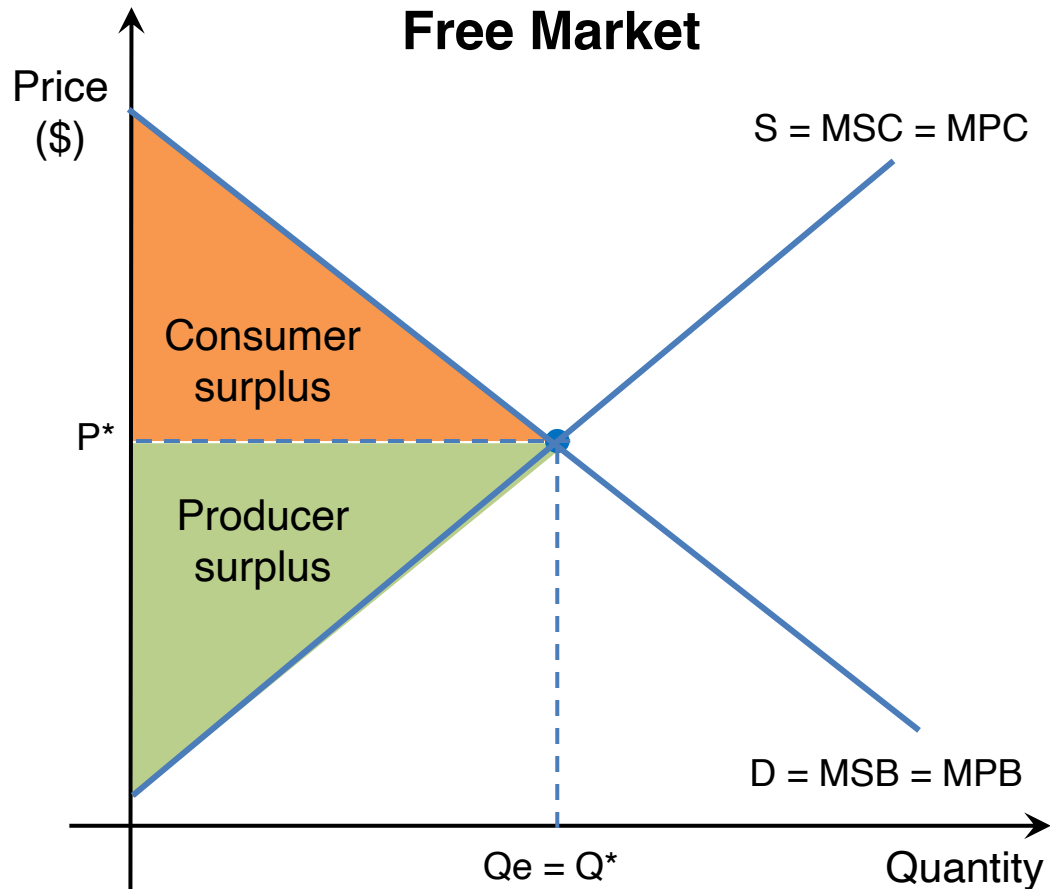
So far, we have learnt that the market equilibrium outcome is where social surplus is maximized, and allocative efficiency is achieved.

This assumes there are **no externalities** in the market and S = MSC = MPC and D = MSB = MPB, as shown on the diagram.

Introduction

Free Market

Price ($)

S = MSC = MPC

Consumer surplus

Producer surplus

P*

D = MSB = MPB

Qe = Q*   Quantity

In this unit, we will introduce the concept of **externalities** which refers to the spill-over benefits or costs imposed on third parties through economic activities of consumption or production.

Externalities arise when MSC ≠ MPC or when MSB ≠ MPB, resulting in an under or over allocation of resources and subsequently **market failure**.

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Positive externalities

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Real world example

Research: [Post 2015 Copenhagen Consensus](#)

The data on page 2 estimates the social, economic, and environmental benefits i.e., positive spillover effects that can be generated by every $1 spent on well-meaning targets.

For example, under "Health" we can see that every dollar spent on "Expanded Immunization" is expected to generate **$60** worth of social, economic, and environmental benefits for society.

Consider how $1 spent on expanded immunization might generate $60 worth of social, economic, and/or environmental benefits for society.

Real world example – positive externalities

1. Pick 3 items from the Post 2015 Copenhagen Consensus from different categories.

2. Outline the potential social, economic, and/or environmental benefits for society as a result of increased allocation of resources to the selected item.

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Positive externalities

Positive externalities are the external benefits imposed to third parties through economic activities.

Merit goods exclusively refer to goods associated with **positive externalities of consumption**. Due to the external benefits imposed to a third party, the marginal social benefit (MSB) of a merit good is larger than the marginal private benefit (MPB).

What are some examples of merit goods?

Real world example

Using examples, distinguish between the private benefits and external benefits of receiving a Covid-19 vaccine.

Real world context – positive externalities of consumption

Private benefits (to consumers)

- Protection from transmittable diseases.

- Save potential health care costs.

External benefits (to third parties)

- Reduces the risk of transmittable diseases for non-vaccinated individuals.

- Saving health care costs for non-vaccinated individuals.

- Healthier labour force means greater labour productivity and increased economic growth.
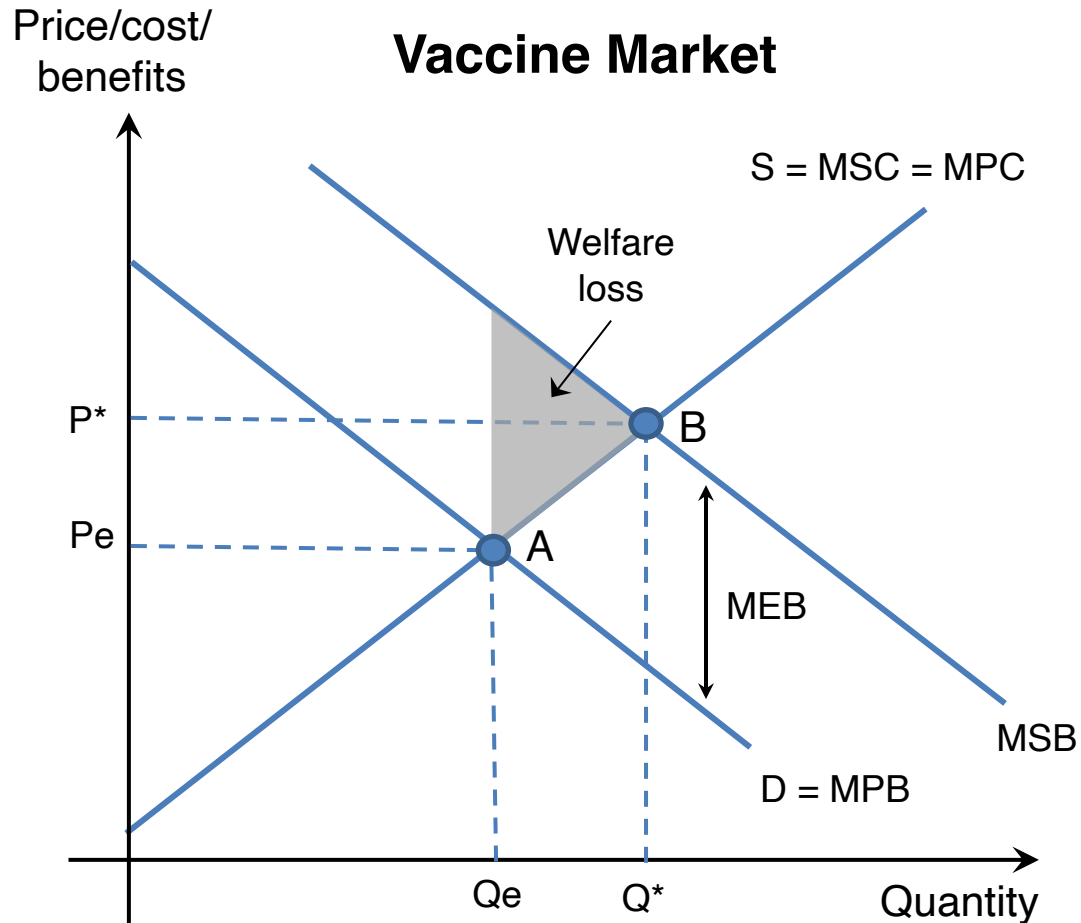
- Higher tax revenues collected by the government.

Social benefits = Private benefits + External benefits

Positive externalities of consumption

Positive externalities of consumption refer to the positive spill-over effects generated to third parties as a result of consuming **merit goods**.

# Positive externalities of consumption

Positive externalities of consumption occur when MSB > MPB, where MSB = MPB + MEB.

Market equilibrium (A) occurs where MPC = MPB Socially optimal equilibrium (B) is where MSB = MSC.

Since MSB > MPB, the market equilibrium quantity is less than the socially optimal quantity, Qe < Q*.

Under-allocation of resources (Q* – Qe) resulting in deadweight loss and market failure.
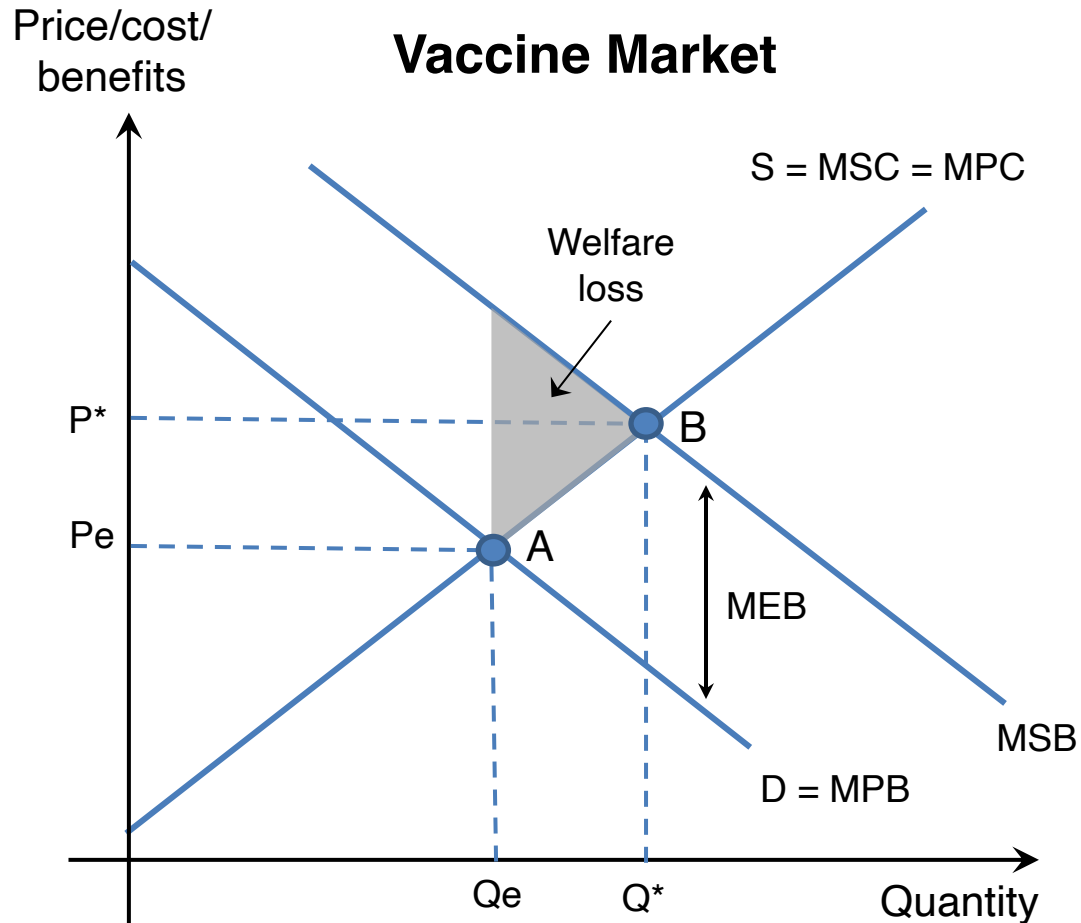
Positive externalities of consumption

Vaccine Market

MPB = market demand curve

MSB = socially optimal demand curve

MPC = market supply curve

MSC = socially optimal supply curve

Point A = market equilibrium, MPB = MPC

Point B = socially optimal equilibrium, MSC = MSB

Q* = socially optimal quantity

Qe = market equilibrium quantity

Positive externalities of production

Using examples, outline the possible positive externalities from the Apple Watch production process.

Level7 Education

Real world context – positive externalities of production

Private benefits

- Benefits to Apple, the production of Apple Watch, e.g. sales revenues, market dominance, and profits.

External benefits

- Innovation of Apple Watch technology reduces costs for healthcare firms (third parties) in terms of collecting patient data, e.g. heart rate, steps, blood pressure etc.

- Apple works with the medical community to conduct research and testing on different diseases, which further reduces costs for healthcare providers (third parties).

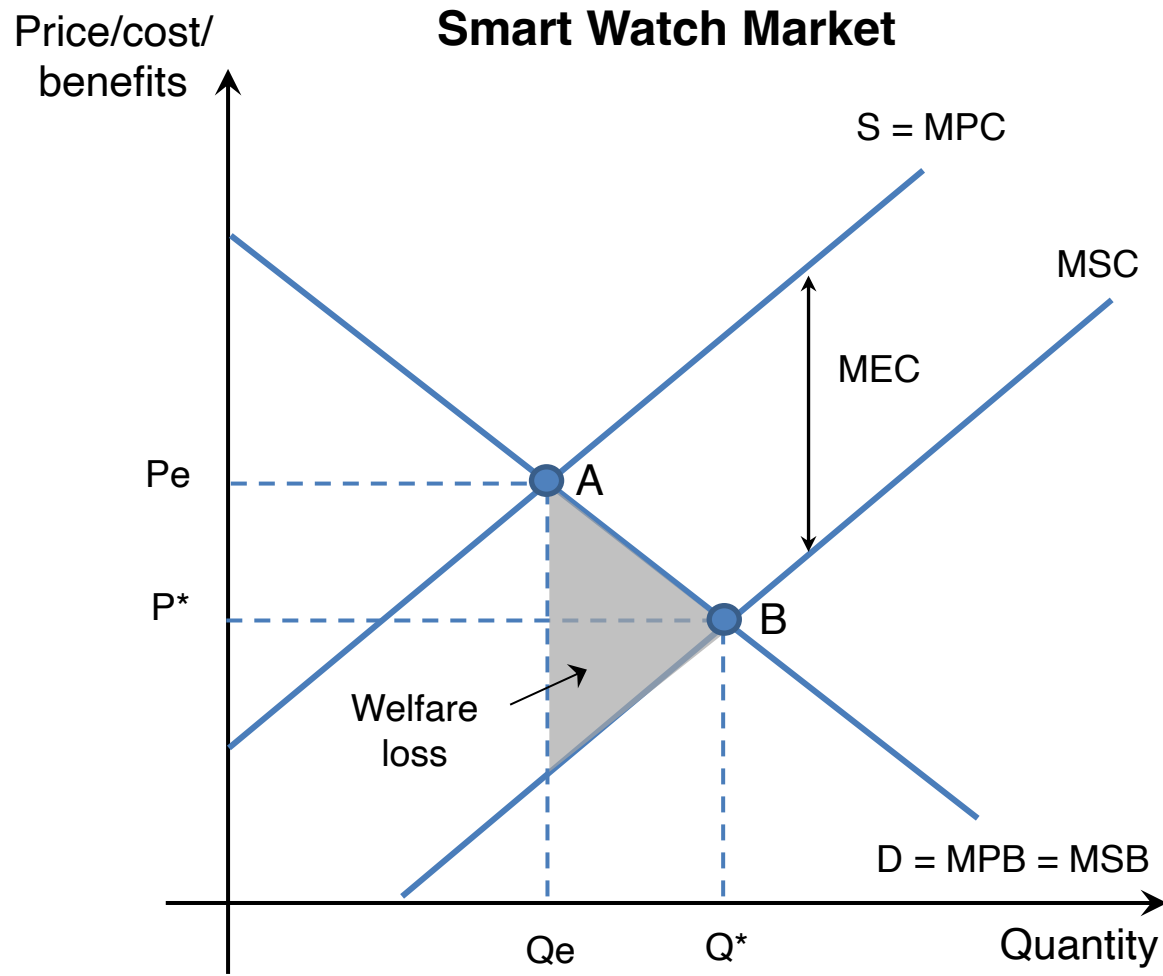- The workforce becomes healthier, increasing labour productivity and economic growth.

Social benefits = Private benefits + External benefits

Positive externalities of production

Positive externalities of production refer to the positive spill-over effects generated to third parties as a result of production activities.

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Positive externalities of production

Smart Watch Market

Price/cost/benefits (vertical axis), Quantity (horizontal axis)

S = MPC

MSC

MEC

Pe — A

P* — B

Welfare loss

D = MPB = MSB

Qe   Q*

Positive externalities of production occur when marginal social cost (MSC) of production is lower than the marginal private cost (MPC), i.e., MSC < MPC.

Market equilibrium (A) occurs where MPC = MPB
The socially optimal output (B) is where MSB = MSC.

Since MPC > MSC, the market equilibrium quantity is less than the socially optimal quantity, Qe < Q*.

Under-allocation of resources resulting in dead weight loss and market failure.

Positive externalities of production

Smart Watch Market

Price/cost/benefits

S = MPC

MSC

MEC

Pe — A

P* — B

Welfare loss

D = MPB = MSB
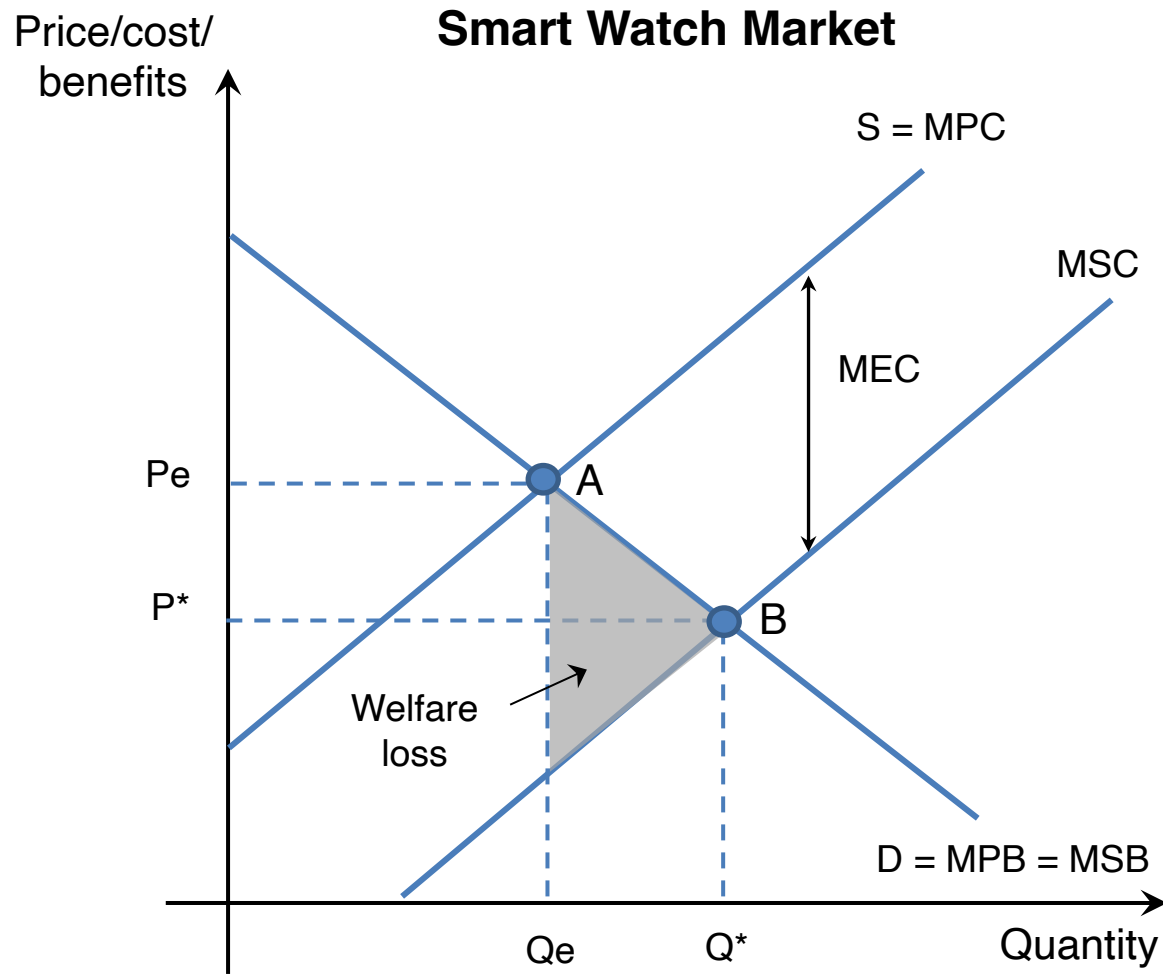
Qe   Q*   Quantity

MPB = market demand curve

MSB = socially optimal demand curve

MPC = market supply curve

MSC = socially optimal supply curve

Point A = market equilibrium, MPB = MPC

Point B = socially optimal equilibrium, MSC = MSB

Q* = socially optimal quantity

Qe = market equilibrium quantity

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Test your knowledge on this unit: Kahoot!

Government intervention correcting positive externalities

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Government intervention correcting positive externalities

Markets associated with positive externalities of consumption or production suffer from an **under-allocation** of resources leading to market failure.

Governments usually intervene in such markets by **increasing the allocation of resources** to correct the market failure. This may involve:

1. Legislation and regulation

2. Education and awareness creation

3. Direct provision

4. Subsidies

Government intervention correcting positive externalities

Legislation and regulation

Laws enforced by the government to ensure certain behaviour from consumers and producers.

Examples:

- Compulsory mask-wearing in public areas

- Compulsory education for all students up to a certain age

- Legal requirement for children to receive vaccination against certain diseases

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Government intervention correcting positive externalities

Legislation and regulation

Market for face masks
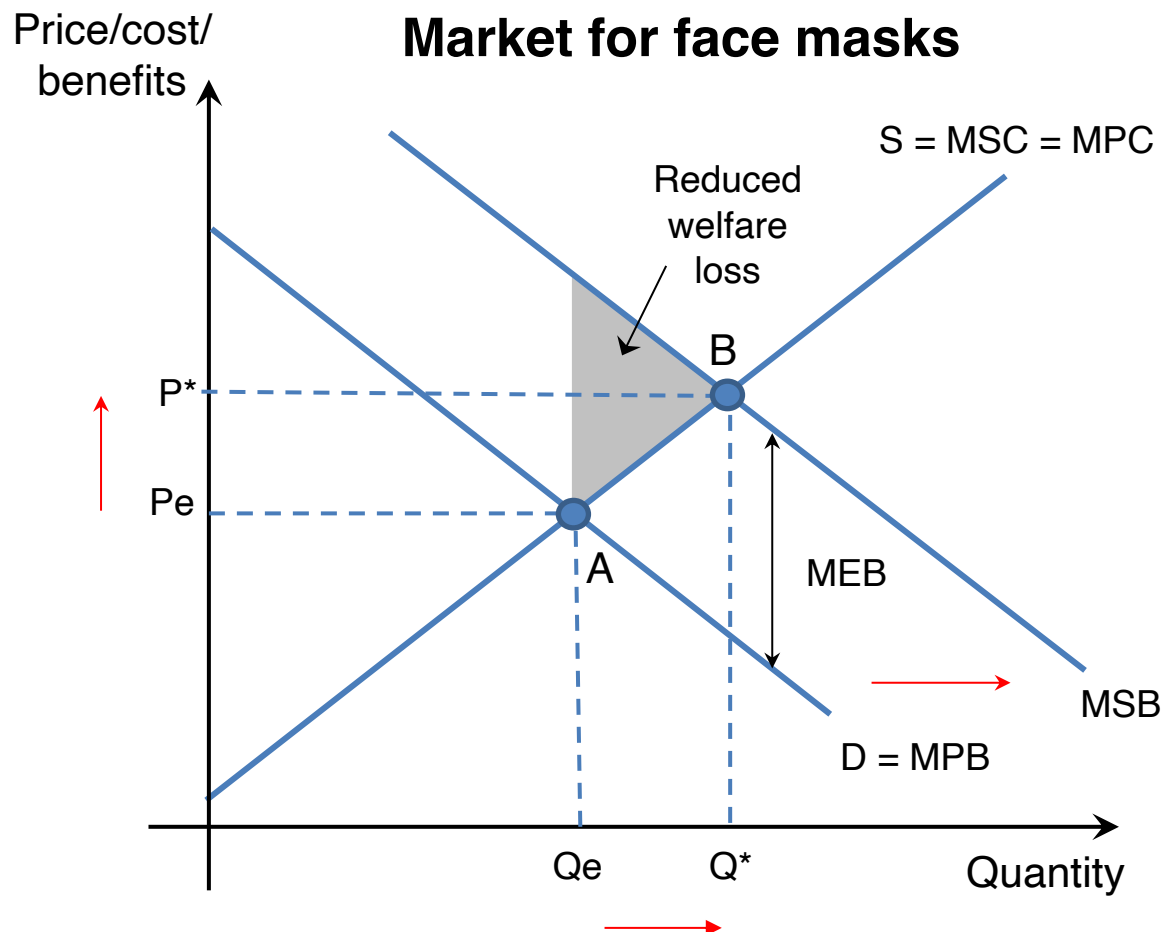
- Point A = original market equilibrium

- Point B = socially optimal equilibrium

- Government legislation requires all citizens to wear face-masks in public areas.

- MPB curve shifts towards MSB curve.

- Market output Qe increases towards socially-optimum output Q*.

- MEB and welfare loss decrease or are eliminated.

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Government intervention correcting positive externalities

Legislation and regulation

Advantages:

- Effective in reducing externalities from a command-and-control approach

Disadvantages:

- Monitoring and enforcing costs incurred by the government

- Political pushback

- People may choose to break the rules if penalties are not significant

Education – awareness creation

Governments may educate the public about the benefits of merit goods through advertisements, campaigns, and schools to encourage consumption.

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Government intervention correcting positive externalities

Education – awareness creation

Market for vaccinations
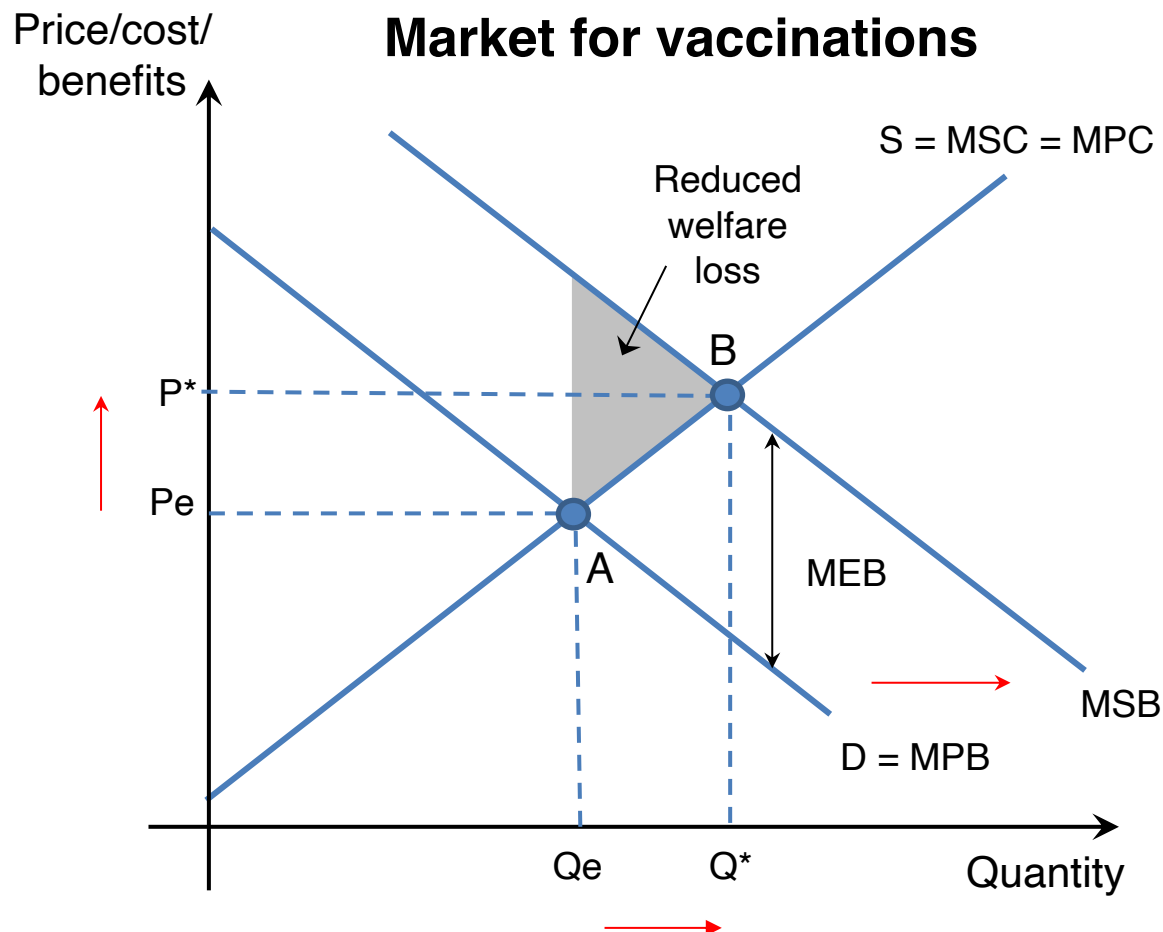
- Point A = original market equilibrium

- Point B = socially optimal equilibrium

- Public education creates awareness upon the importance of vaccinations.

- MPB curve shifts towards MSB curve.

- Market output Qe increases towards socially-optimum output Q*.

- MEB and welfare loss decrease or are eliminated.

Government intervention correcting positive externalities

Education – awareness creation

Article: Five-a-day campaign: A partial success

1. Why does the UK government advertise the "Five-a-day" message?

2. How do fruits and vegetables create positive externalities?

3. How does the campaign correct market failure?

4. What are potential limitations for the campaign?

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Government intervention correcting positive externalities

Education – awareness creation

Advantages

- Effective campaigns may change consumer behaviour for the long term

Limitations

- Education campaigns only *encourage* people to change behaviour; effectiveness may vary

- Requires time for the message to be accepted and behaviour to change

- Opportunity cost of government spending

Direct provision

Governments may directly provide goods and services in the public sector associated with positive externalities such as education, healthcare, and infrastructure.

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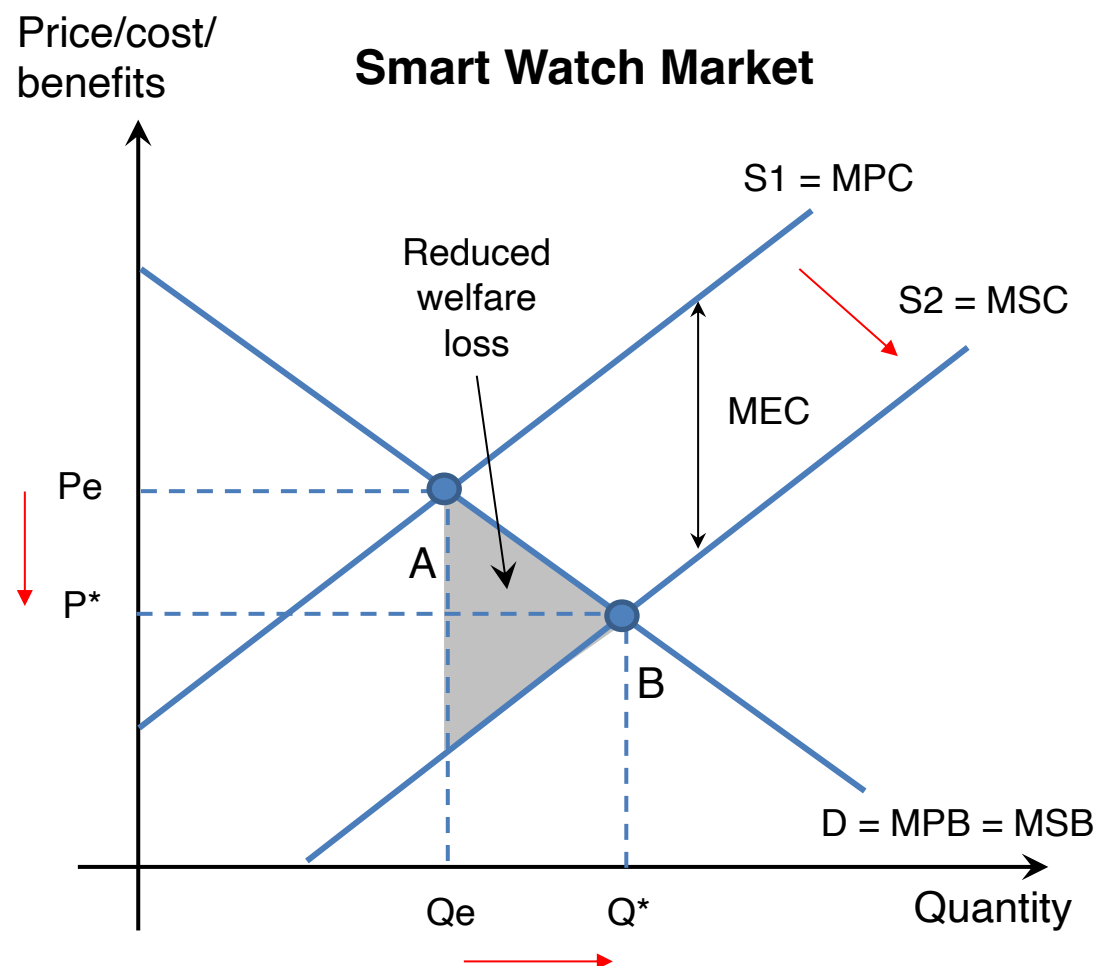
Government intervention correcting positive externalities

Direct provision for positive externalities of consumption

Market for Vaccinations
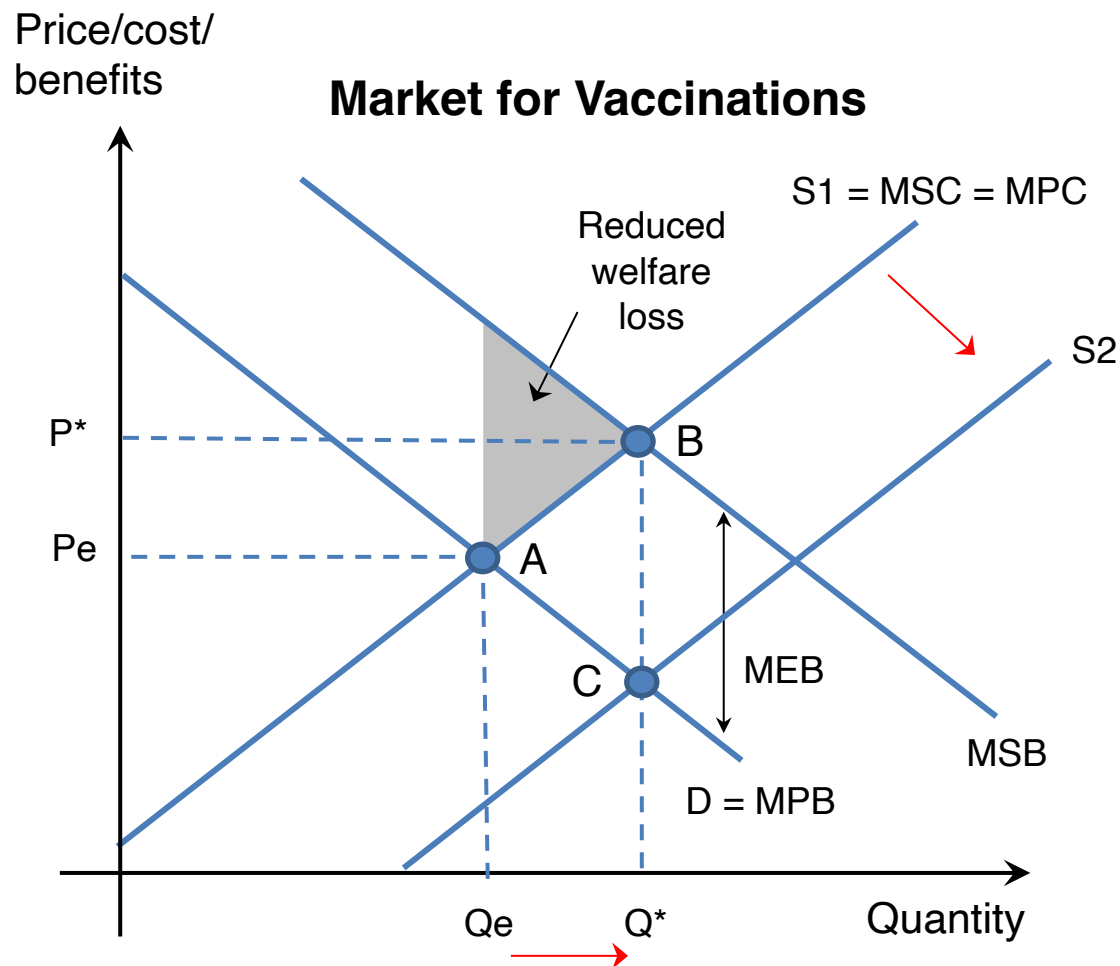
- Point A = original market equilibrium

- Point B = socially optimal equilibrium

- Direct provision by the government shifts the supply curve outwards to S2

- Market output Qe increases to socially optimal output Q*

- Point C = new market equilibrium

- MEB and welfare loss are eliminated

Government intervention correcting positive externalities

Direct provision for positive externalities of production

Smart Watch Market

- Point A = market equilibrium

- Point B = socially optimal equilibrium

- Supply increases, shifting the MPC curve to the MSC curve.

- Market output Qe increases to socially optimal output Q*

- MEC and welfare loss are eliminated, and allocative efficiency is achieved.

Government intervention correcting positive externalities

Direct provision

Limitations

- **Opportunity cost** – Direct provision requires government spending, which always involves foregone benefits of alternative uses.

- **Economic inefficiency** – Goods and services may be provided free of charge or at a very low cost, potentially resulting in overconsumption such use of A&E (accident and emergency) services for common illnesses.

- **Inequality** – If the goods provided are in shortage, the government may need to prioritize certain groups e.g., healthcare services for the elderly.

Government intervention correcting positive externalities

Subsidies

Governments may also provide subsidies to producers to reduce the cost of production to encourage consumption and production.

Examples:

- Subsidies on vaccines

- Subsidies on clean drinking water in public spaces

- State-subsidized schools

- Subsidies for renewable energy

Real world example

Article: [First 2 local face mask production lines to get subsidies](#)

1. What external benefits are created when consumers use face masks?

2. How do subsidies help to correct market failure in this market?

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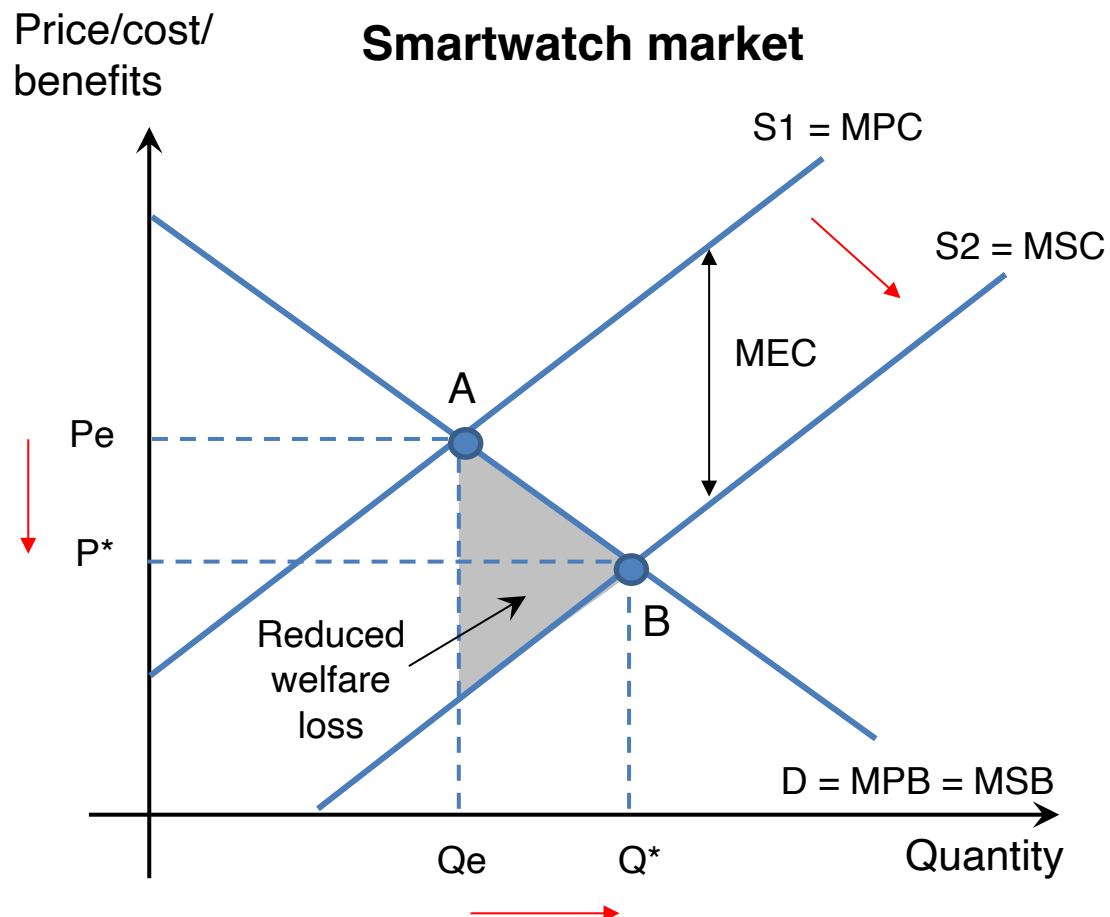# Government intervention correcting positive externalities

Subsidies for positive externalities of consumption (merit goods)

Market for face masks
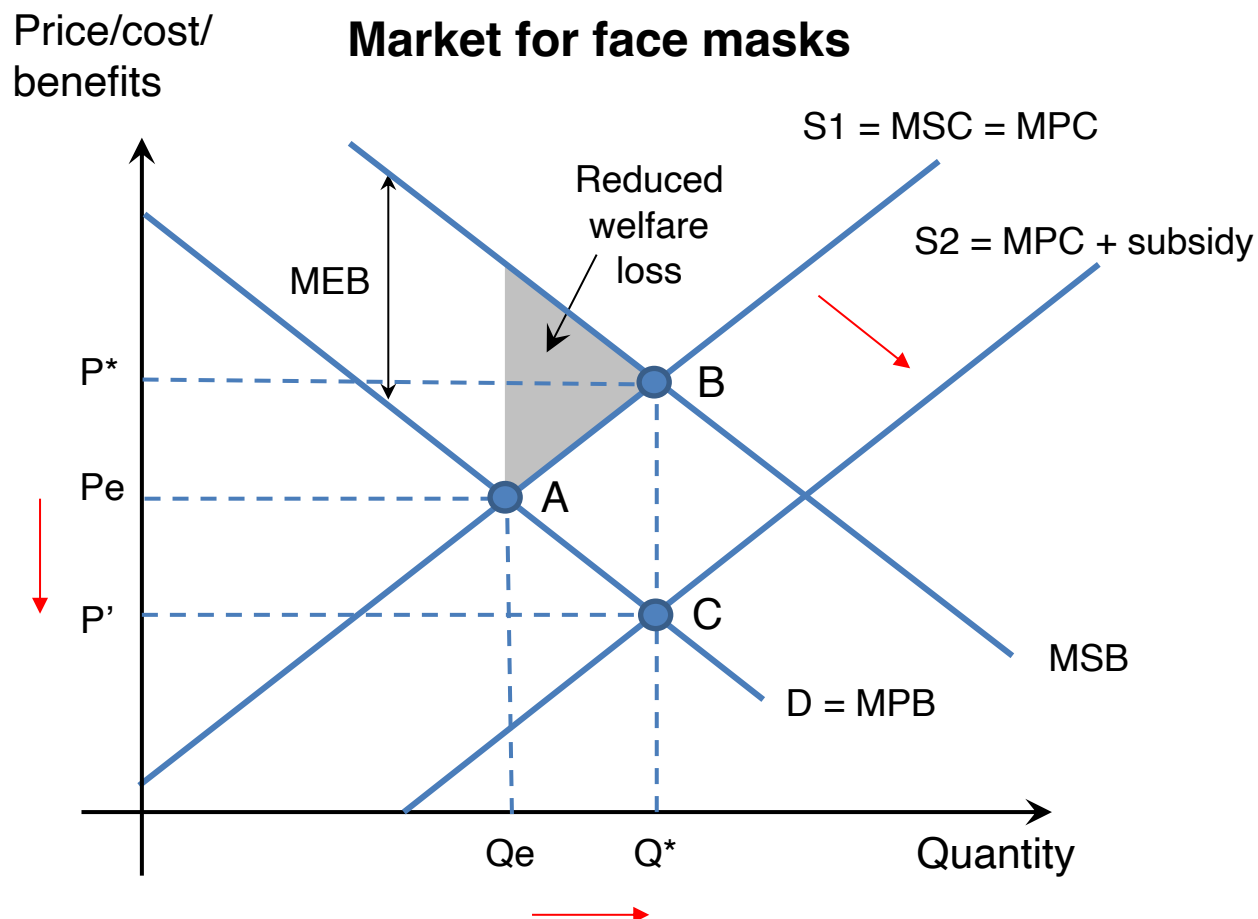
- Point A = market equilibrium

- Point B = socially optimal equilibrium

- Subsidies cause the supply curve to shifts outwards to S2

- Subsidy per unit should equal MEB

- Point C = new market equilibrium

- Output level increases to Q*

- Market price reduces to P'

- Welfare loss is eliminated.

Government intervention correcting positive externalities

Subsidies for positive externalities of production

Smartwatch market

- Point A = market equilibrium

- Point B = socially optimal equilibrium

- MPC curve shifts downwards to the MSC curve by the amount of subsidy

- Output increases to Q*

- Market price reduces to P*

- Welfare loss is eliminated.

Government intervention correcting positive externalities

Subsidies

Advantages:

- Incentivizes production and consumption.

- Reduces the price of the good, increasing its affordability to lower income groups.

Disadvantages:

- Imperfect market information – difficult to accurately calculate the level of subsidy and externalities in order to achieve the socially-optimum output.

- Effectiveness is dependent on PED – larger subsidies required for price inelastic products.

- Opportunity cost – Subsidies require government spending, which always involves foregone benefits of alternative uses.

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Negative externalities

Level7 Education
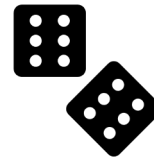
Negative externalities

Negative externalities are the external costs imposed to third parties through economic activities.

Demerit goods exclusively refer to goods associated with negative externalities of **consumption**. Due to the external costs imposed to third parties, the marginal social cost (MSC) of a demerit good is larger than the marginal private cost (MPC).

What are some examples of demerit goods?

Real world context – negative externalities of consumption

Distinguish between the private costs / benefits for alcohol consumers and the external costs / benefits for third parties.

Alcohol consumption statistics in Australia

1 in 2 women consume alcohol during their pregnancy

1 in 4 of all road fatalities can be attributed to drink driving

Top 5 causes of hospital admissions due to alcohol

1. Unintentional injuries
2. Mental illnesses
3. Heart conditions or strokes
4. Liver diseases and pancreatitis
5. Cancer

Alcohol was involved in 34% of intimate partner violence accidents

25% of all frontline police officers' time is taken by alcohol-related crime

Real world context – negative externalities of consumption

Private benefits/costs (consumers)

• Satisfaction and enjoyment

• Unintentional injuries

• Heart and liver diseases and cancer

External costs (third parties)

• Road accidents caused by drunk drivers

• Higher medical and policing costs incurred by taxpayers

• Increased medical resources allocated away from other illnesses or accidents

• Negative health impacts to the alcoholic's children

• Physical abuse to the alcoholic's partner

Negative externalities of consumption

Negative externalities of consumption refer the spill-over costs generated to third parties by consumers during consumption activities.

Negative externalities of consumption

Alcohol market
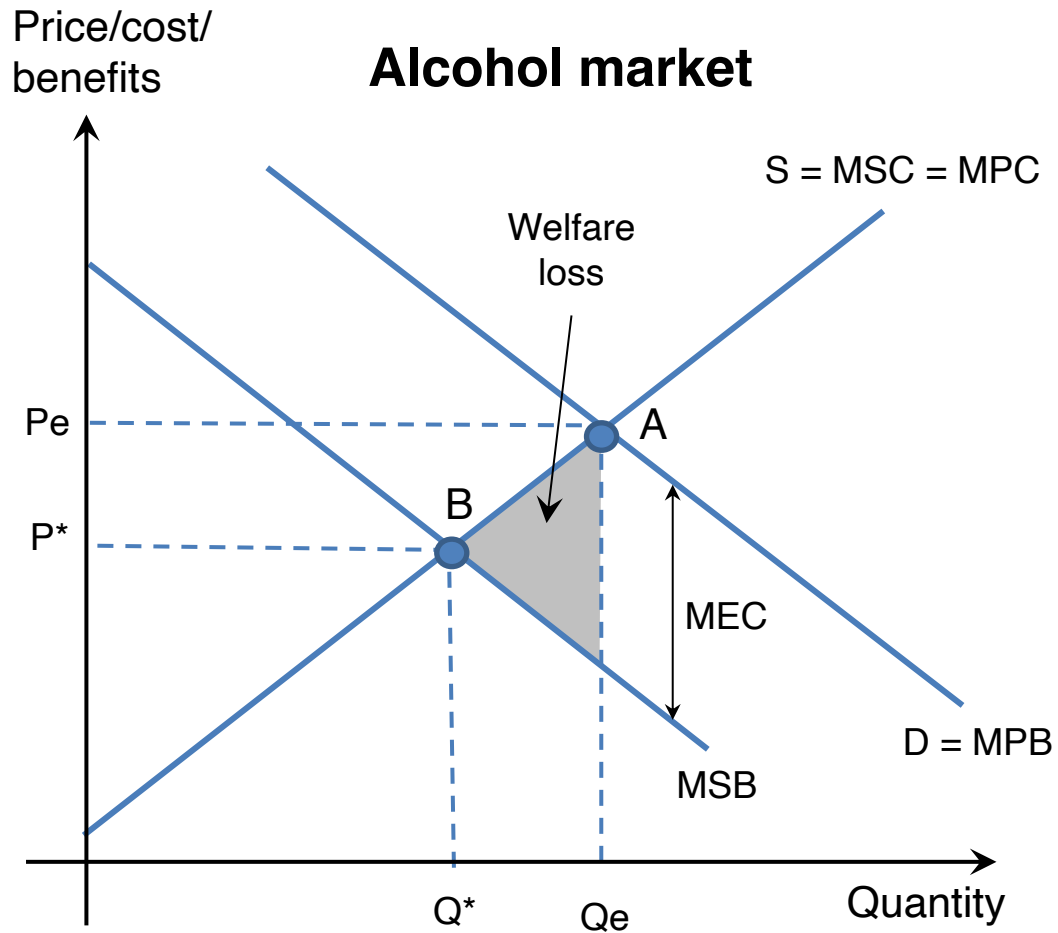
Negative externalities of consumption occur when

MPB > MSB, where MPB = MSB + MEC.

Market equilibrium (A) occurs where MPC = MPB
Socially optimal equilibrium (B) is where MSB = MSC.

Since MPB > MSB, the market equilibrium quantity is larger than the socially optimal quantity, Qe > Q*.

Over-allocation of resources resulting in welfare loss and market failure.

Negative externalities of consumption
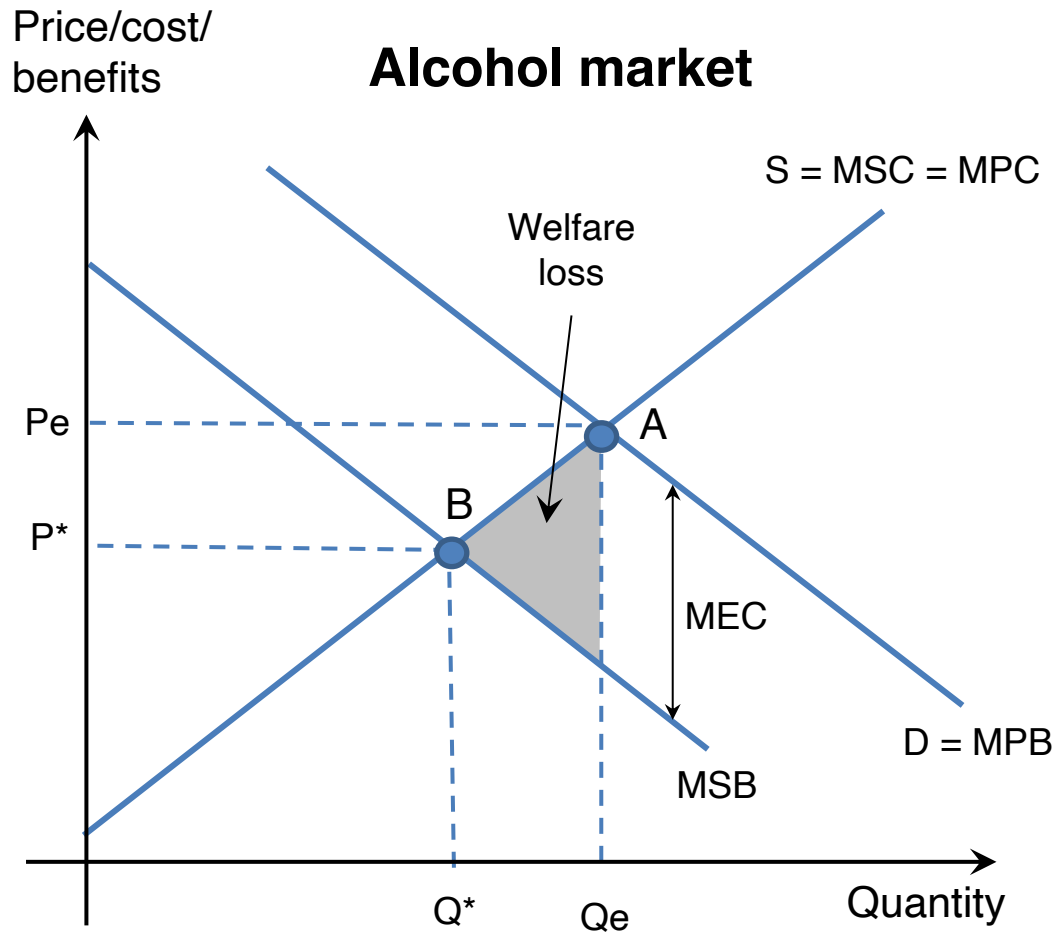
Alcohol market

MPB = market demand curve

MSB = socially optimal demand curve

MPC = market supply curve

MSC = socially optimal supply curve

Point A = market equilibrium, MPB = MPC

Point B = socially optimal equilibrium, MSC = MSB

Q* = socially optimal quantity

Qe = market equilibrium quantity

Real world context – negative externalities of production

Identify the private and external costs which may arise from meat production.

Real world context – negative externalities of production

Private costs (producers)

- Cost of purchasing factors of production e.g., farmland, feed, labour, machinery, medicine.

External costs (third parties)

- Greenhouse gas emissions released in the environment

- Overuse of antibiotics resulting in antibiotic resistant bacteria

- Animal cruelty

- Opportunity cost: high freshwater consumption

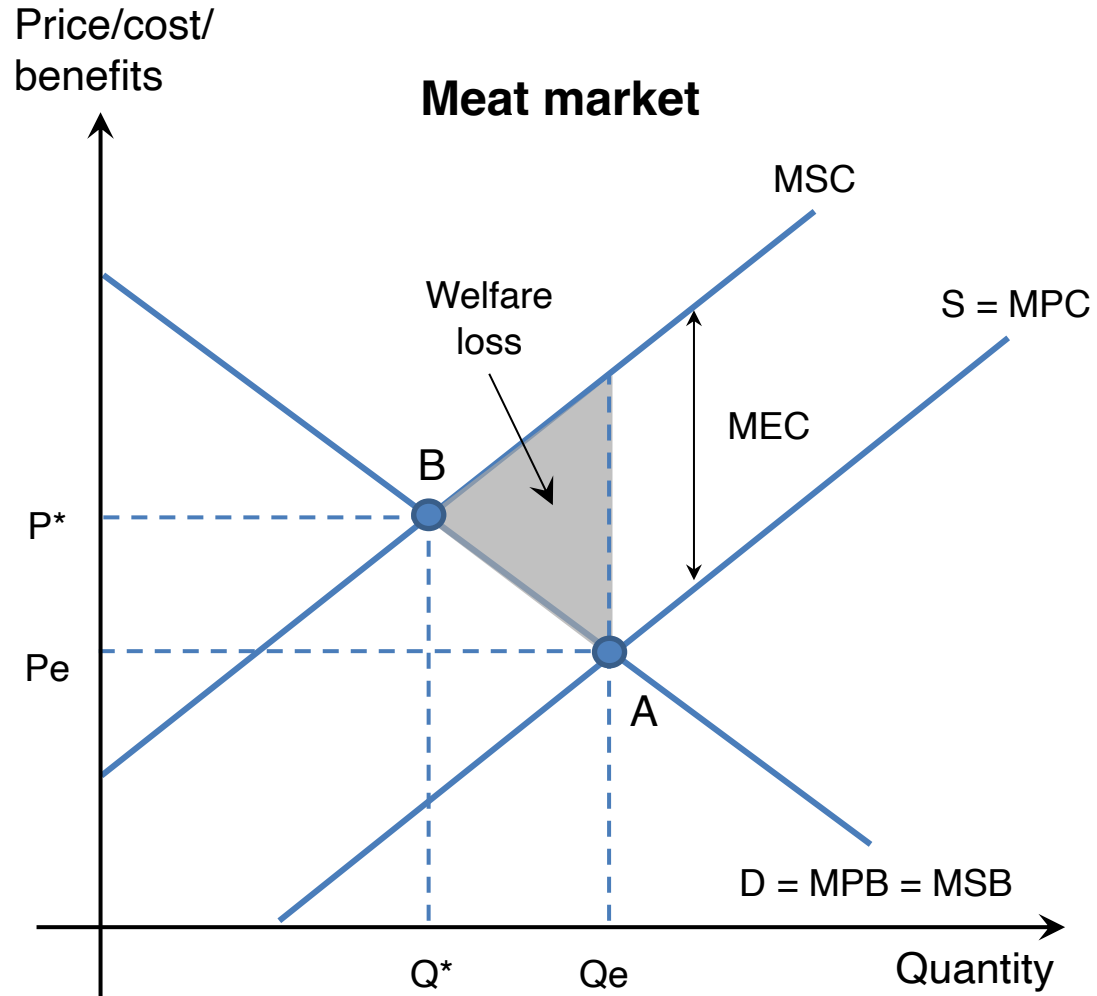- Opportunity cost: large amount of grain used for feeding

Social costs = Private costs + External costs

Negative externalities of production

Negative externalities of production refer the spill-over costs generated to third parties by producers during production activities.

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Negative externalities of production

Negative externalities of production occur when MSC > MPC, where MSC = MPC + MEC.

Market equilibrium (A) occurs where MPC = MPB. Socially optimal equilibrium (B) is where MSB = MSC.

Since MSC > MPC, the market equilibrium quantity is larger than the socially optimal quantity, Qe > Q*.

Over-allocation of resources resulting in dead weight loss and market failure.

Real world context - negative externalities of production

1. What are some examples of human activities that involve the burning of fossil fuels?

2. What are possible external costs for the burning of fossil fuels?

Test your knowledge on this unit: Kahoot!

Level7 Education

Government intervention correcting negative externalities

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Government intervention correcting negative externalities

Markets associated with negative externalities of consumption or production suffer from an **over-allocation** of resources leading to market failure.

Governments usually **intervene** in such markets by decreasing the allocation of resources to correct the market failure. This may involve:

1. Indirect tax

2. Legislation and regulation

3. Education – awareness creation

4. Collective self-governance

5. Carbon taxes

6. Tradable permits

7. International agreements

Government intervention correcting negative externalities

Indirect (Pigouvian) tax

An **indirect tax** is placed on the expenditure of goods or services, paid by producers to the government. This helps to **internalize** the external costs within the market participants i.e., consumers and producers pay towards the external costs.

Government intervention correcting negative externalities

Indirect (Pigouvian) tax

Alcohol market
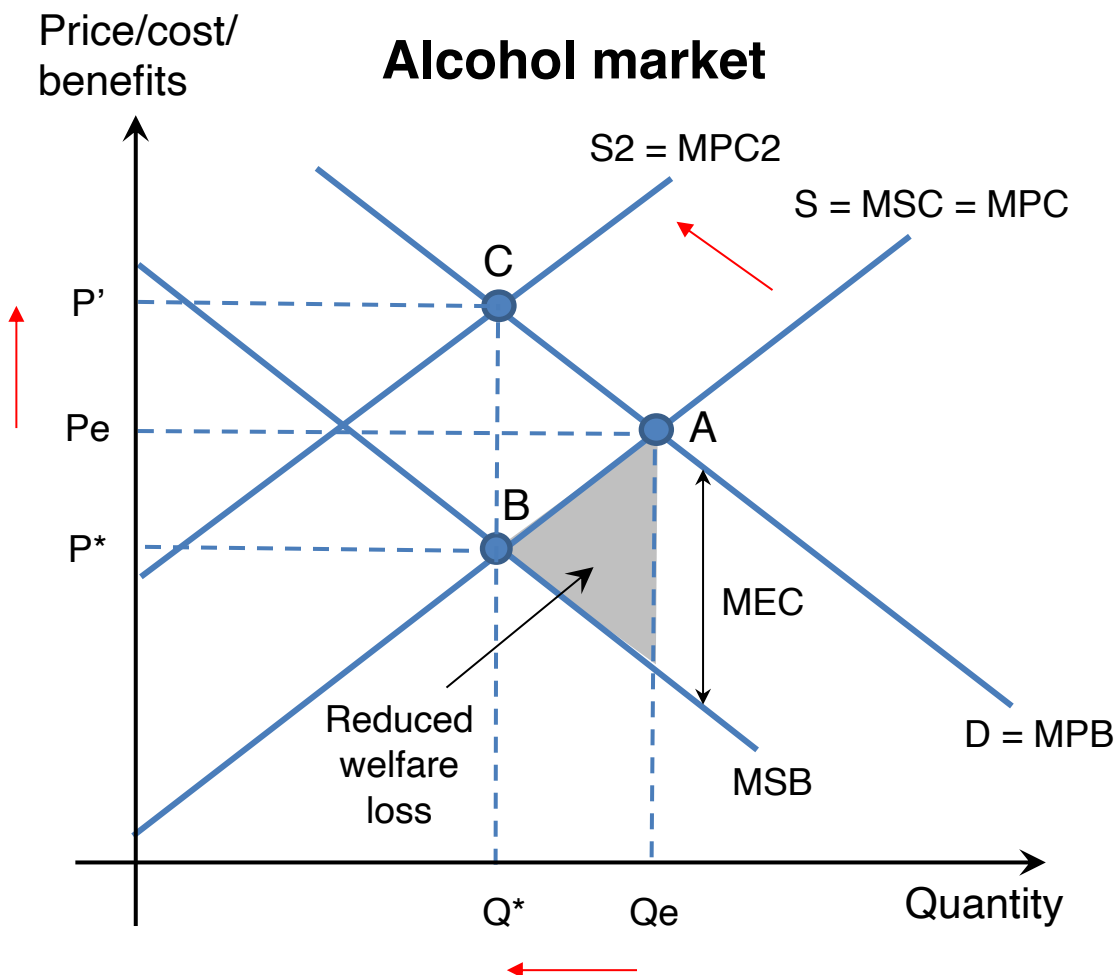
- Point A = market equilibrium

- Point B = socially optimal equilibrium

- The MPC curve shifts upwards by the amount of tax, which equals to MEC

- Point C = new market equilibrium

- Quantity reduces to socially-optimum level Q*

- Market price increases to P'

- Welfare loss is eliminated.

Government intervention correcting negative externalities

Indirect (Pigouvian) tax

Advantages

- The price increase discourages consumption.

- The higher cost discourages production.

- Tax revenue is generated for the government.

Disadvantages

- Regressive – low-income groups pay a higher portion of their income for the tax.

- Relatively ineffective for goods with inelastic PED

- Imperfect market information means the size of the tax is unlikely equal to the external cost.

- Emergence of parallel markets – smuggling activities for demerit goods.

Government intervention correcting negative externalities

Legislation and regulation

Laws enforced by the government to ensure certain behaviour from consumers and producers.

Examples:

- Smoking banned indoors and in public areas.

- Age restrictions for gambling and drinking..

- Limit the level of pollutant emissions.

- Require firms to install emission-reducing technologies.

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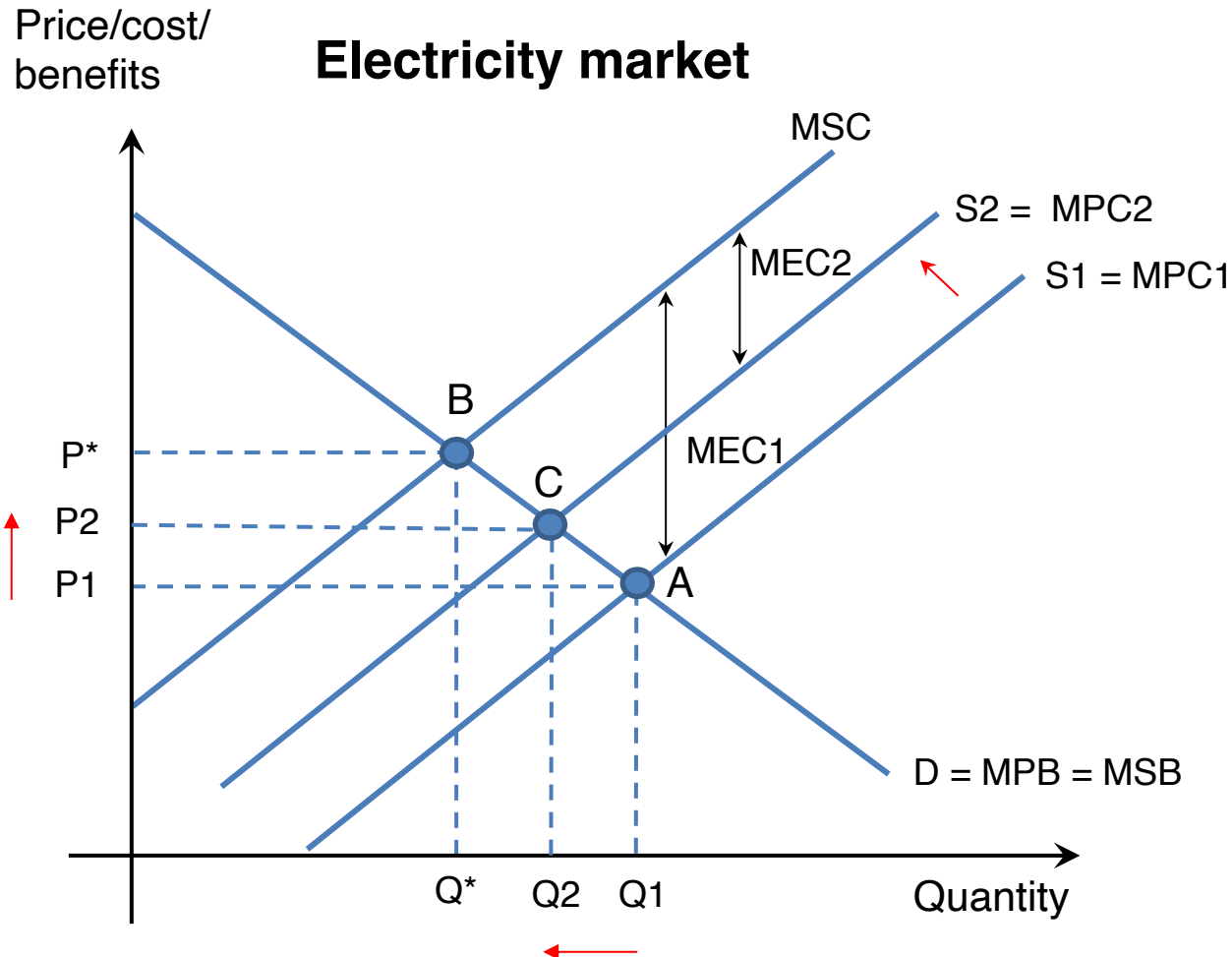# Government intervention correcting negative externalities

Legislation and regulation for negative externalities of consumption
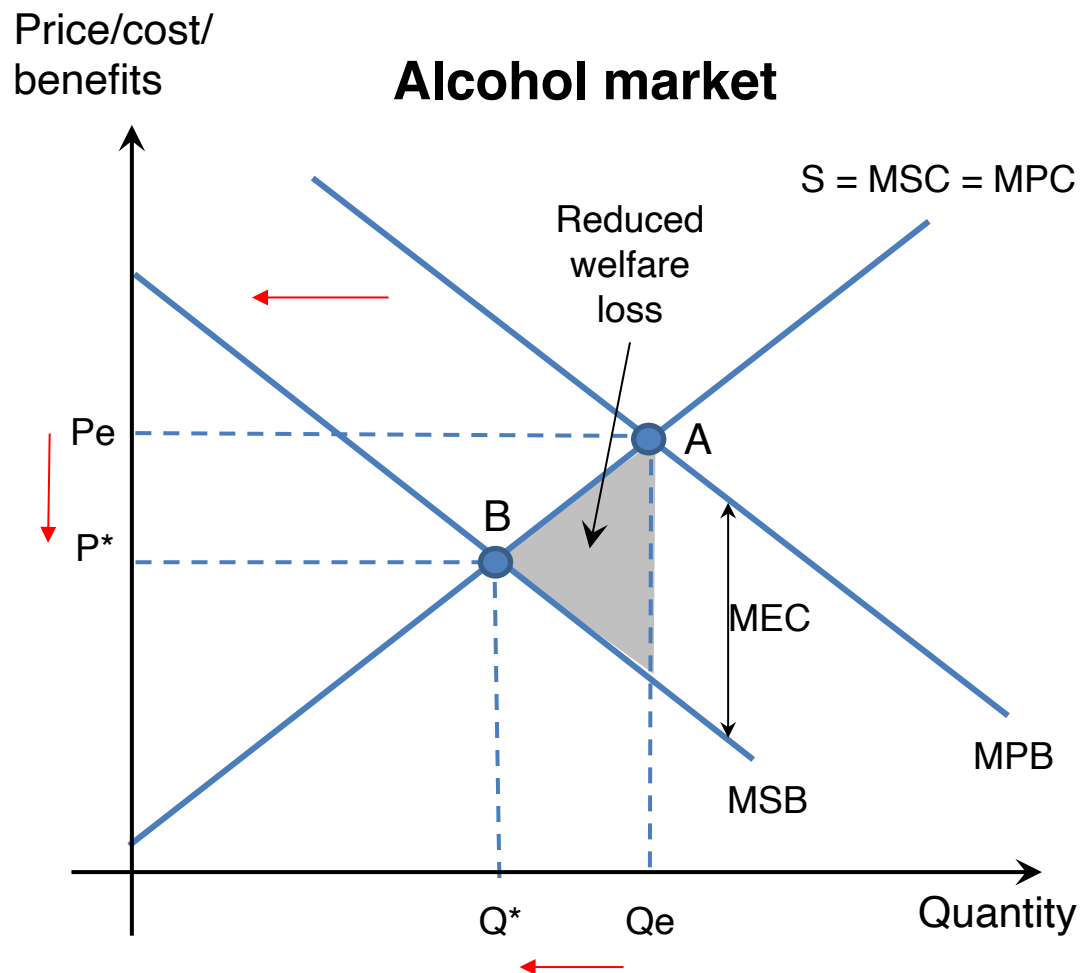
Alcohol market

- Point A = market equilibrium

- Point B = socially optimal equilibrium

- A minimum drinking age reduces the number of alcohol consumers

- MPB curve shifts towards MSB

- Market quantity reduces to the socially-optimum output (Q*)

- Welfare loss is eliminated

Government intervention correcting negative externalities

Legislation and regulation for negative externalities of production

Electricity market

- Point A = market equilibrium
- Point B = socially optimal equilibrium
- Government requires firms to use emission-reducing technologies to produce electricity
- MPC of producers increases to MPC2
- Point C = new market equilibrium
- Output reduces from Q1 to Q2 and price increases from P1 to P2
- Overproduction and MEC is reduced

Government intervention correcting negative externalities

Legislation and regulation

Advantages:

- Effective in reducing externalities from a command-and-control approach

Disadvantages:

- Monitoring and enforcing costs incurred by the government

- Political pushback

- People may choose to break the rules if penalties are not high enough.

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Government intervention correcting negative externalities

Education – awareness creation

The government may also discourage the consumption of demerit goods through education and awareness campaigns so that the public is more aware of the negative effects of the good.

For example:

- Anti-drug campaigns

- Warning ads on cigarette packaging

- School-based education on climate change, and negative effects of smoking, and drinking.

Government intervention correcting negative externalities

Education – awareness creation

Cigarette market

Price/cost/benefits

S = MSC = MPC

Reduced welfare loss

Pe   A

B   P*

MEC

MPB

MSB
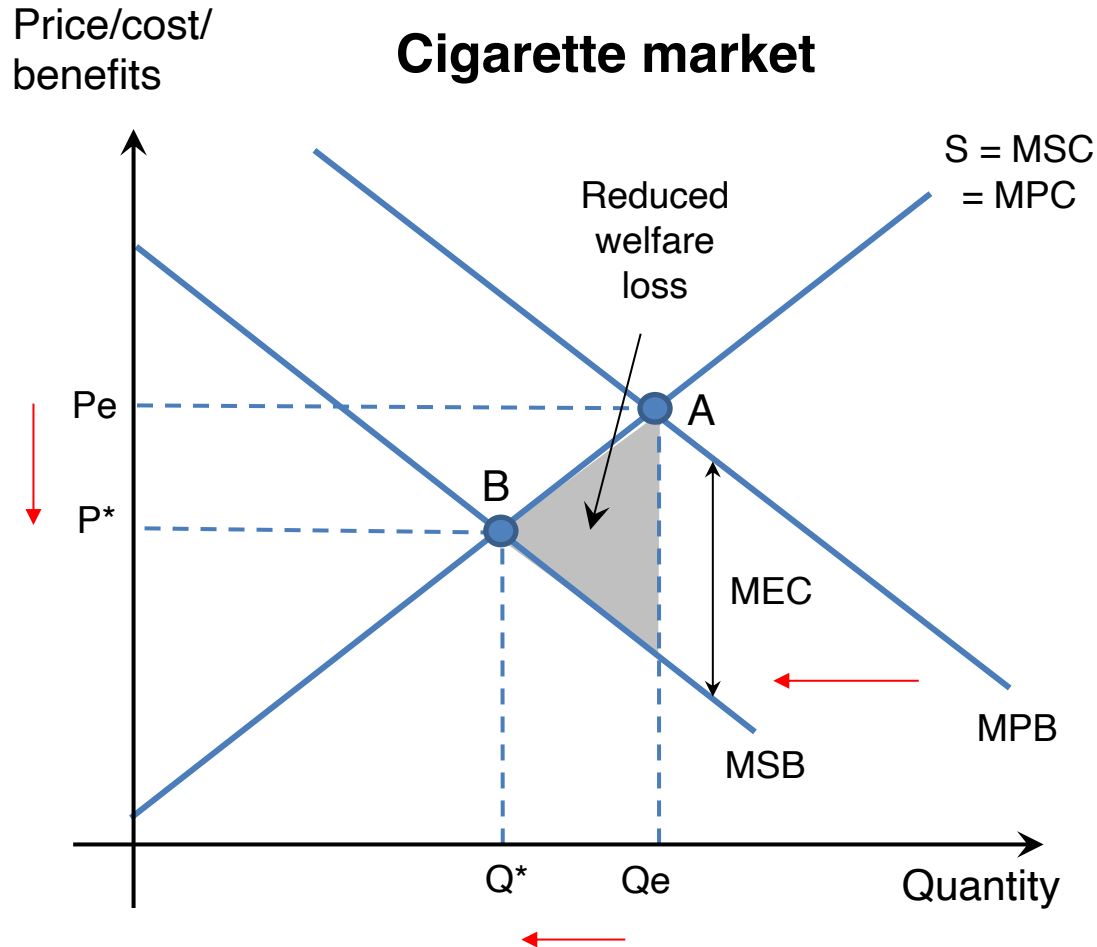
Q*   Qe   Quantity

- Point A = market equilibrium.

- Point B = socially optimal equilibrium.

- Through education, the negative effects of cigarettes are introduced to the public.

- MPB (demand) curve shifts towards MSB.

- Market quantity reduces to the socially-optimum output (Q*).

- The welfare loss is eliminated.

Collective self-governance

Collective self-governance refers to the voluntary communal actions that combat negative externalities. Successful campaigns may change social norms and cultural behaviours.
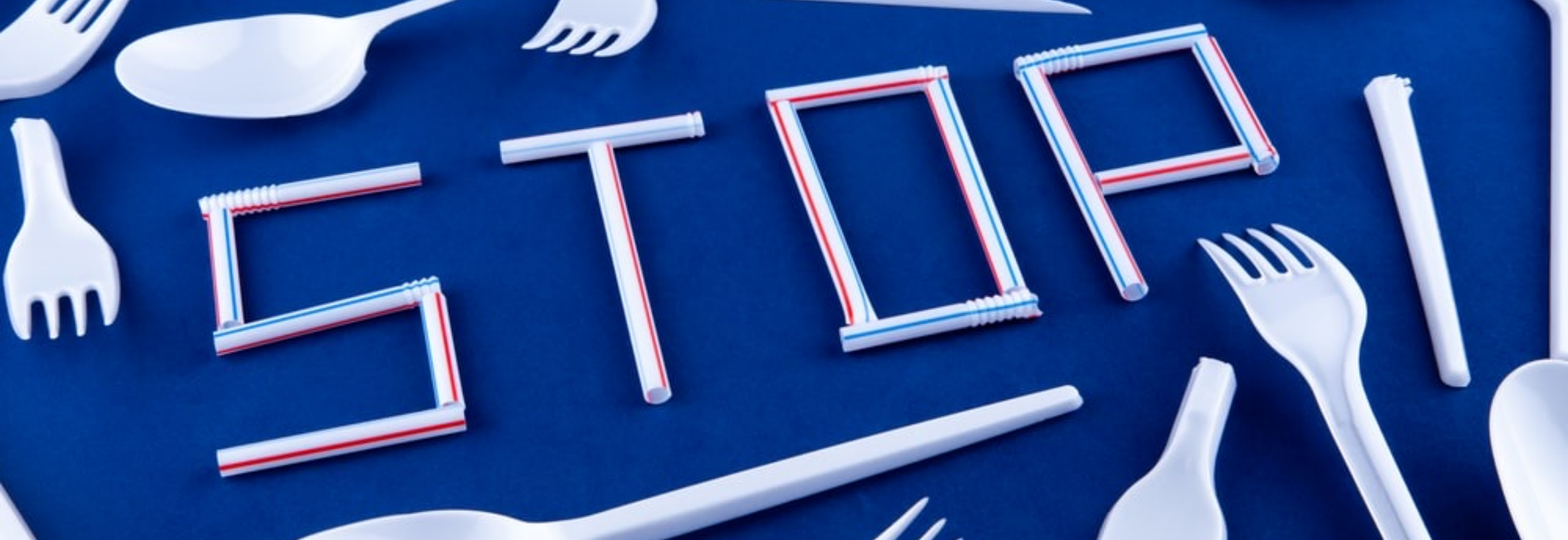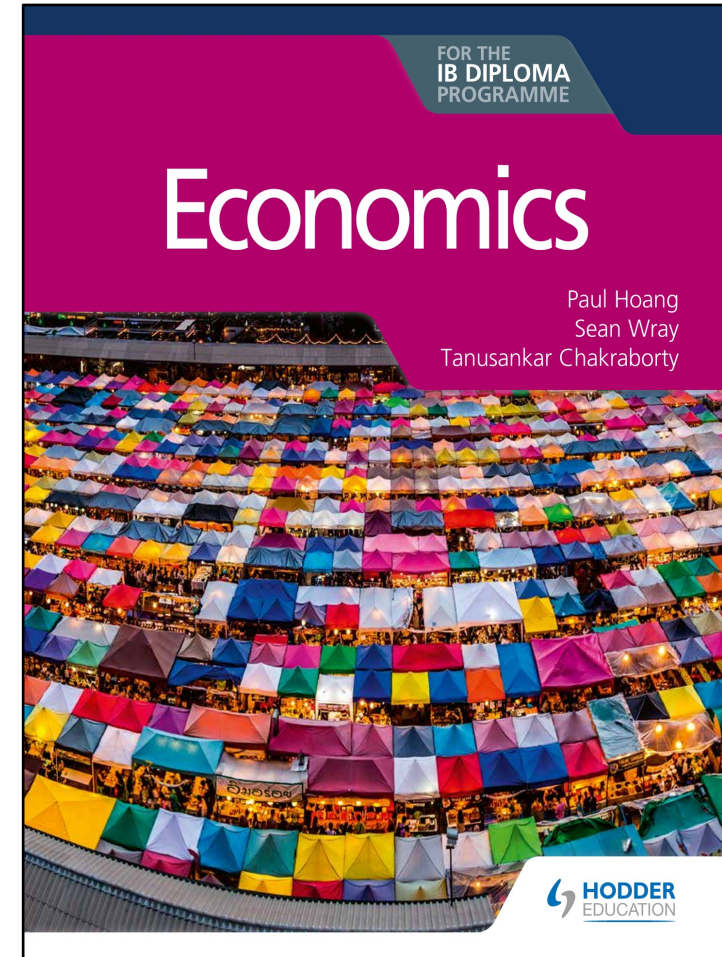
Real world example

The Plastic Free Challenge uses social media to encourage people to voluntarily reduce plastic usage. For additional information, visit: http://www.plasticfreechallenge.org/

Level7 Education

Over to you…

Hoang, Wray, & Chakraborty (2020)

Economics for the IB Diploma Programme

- Page 147

- Paper 3 Exam Practice Question 11.2

- [7 marks]

Carbon emissions

Carbon emissions refer to the release of carbon into the atmosphere and is one of the most common and significant negative externalities which occur from economic activity.

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Real world example - data analysis

Source 1: [Which Companies Are Responsible For the Most Carbon Emissions?](#)

Source 2: [All the World's Carbon Emissions in One Chart](#)

Data Analysis Questions

1. What do you notice from the data?

2. What questions do you wonder about the data?

3. Research information that may help you answer your questions from Q2.

4. What conclusions can you make from Q1, Q2, and Q3?

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Carbon taxes

Carbon taxes are imposed on producers for carbon emissions from production activities with the aim of minimizing environmental pollution.

# Government intervention correcting negative externalities

Carbon taxes

Since market failure occurs in production activities when fossil fuels are used, carbon taxes are imposed to encourage producers to reduce carbon emissions.

Explore examples of different countries imposing different levels of carbon taxes.

Source: How the World Puts a Price on Carbon

Government intervention correcting negative externalities

Carbon taxes

Electricity market
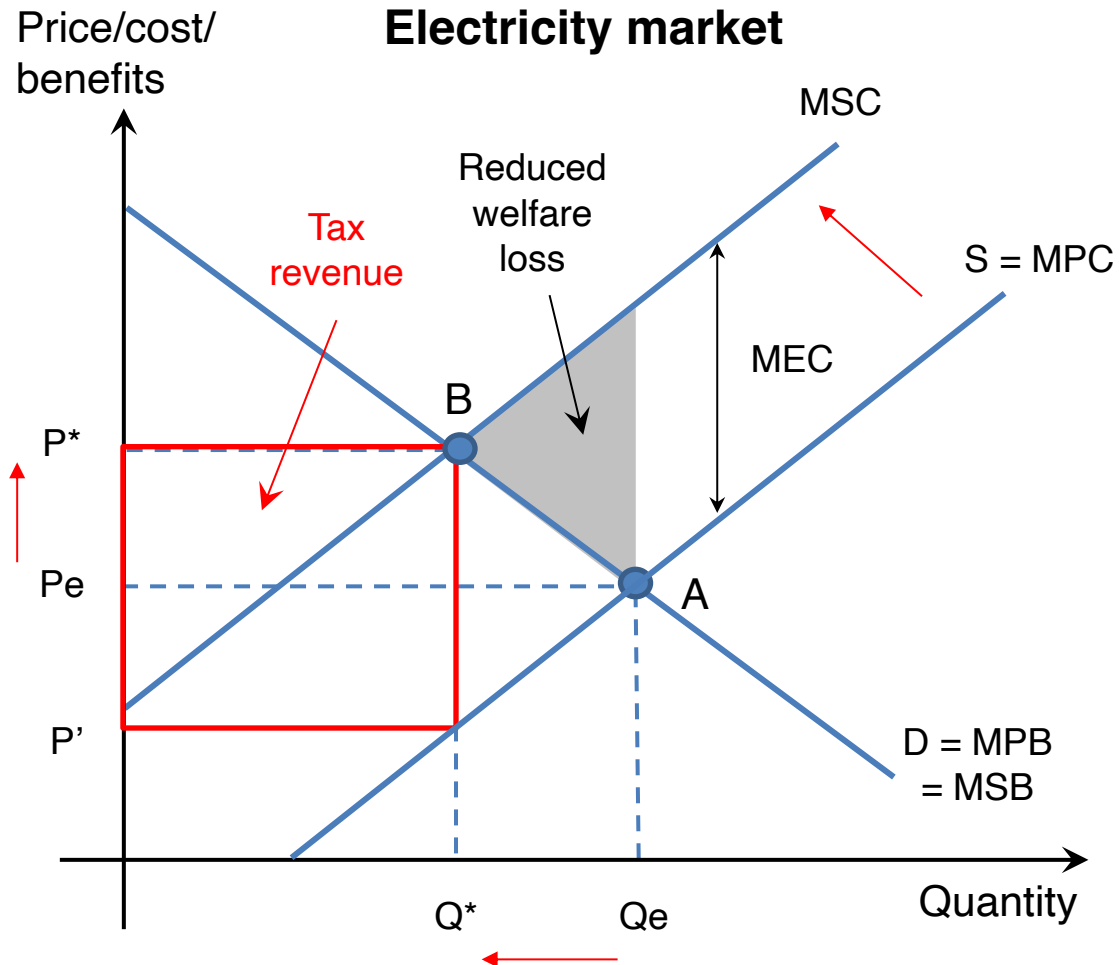
- Point A = market equilibrium

- Point B = socially optimal equilibrium

- Carbon tax increases the production cost for electricity firms

- MPC curve shifts upwards to MSC curve, as producers pay for carbon emissions

- Market quantity reduces to optimal quantity Q*

- Market price increases to P*

- Producers receive the price P'

- The welfare loss is eliminated

- Tax revenue is generated

Real world example – carbon taxes

1. How do carbon taxes reduce carbon emissions?

2. How might carbon taxes make low-income consumers worse-off?

3. What are possible alternative policies to carbon taxes?

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Government intervention correcting negative externalities

Carbon taxes - advantages

- Long term benefits – create incentives for firms to use cleaner technologies in production

- Internalize externality – producers and consumers pay for the environmental costs

- Tax revenue generated

- Easily implemented

Carbon taxes - disadvantages

- Regressive – low-income groups pay a higher portion of their income for the tax

- Ineffective for products with inelastic PED

- Imperfect market information – difficult to accurately calculate the level of externalities and carbon tax in order to achieve the socially-optimum output.

Government intervention correcting negative externalities
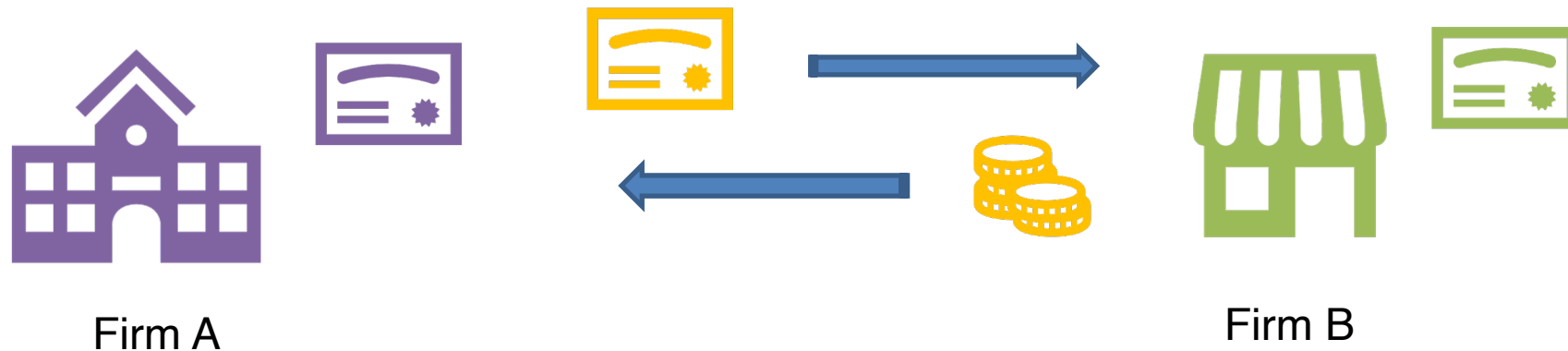
Tradable permits (Cap and trade schemes)

Cap and trade schemes limits the level of pollutants to a level pre-determined by the government. Firms are issued with **tradable permits** and have the right to pollute up to the level permitted. For example, the European Union's Emissions Trading Scheme is one of the largest cap and trade schemes covering more than 11,000 factories over 27 EU countries.

Government intervention correcting negative externalities

Tradable permits (Cap and trade schemes)

- Tradable permits can be freely traded between firms.

- The more pollutants producers create, the more permits they will need to purchase.

- More environmentally-friendly producers may sell their excess permits to gain revenues.

- In the long run, this creates incentives for firms to switch to cleaner production technologies.

Firm A   Firm B

Government intervention correcting negative externalities

Tradable permits (Cap and trade schemes)

Tradable permits market
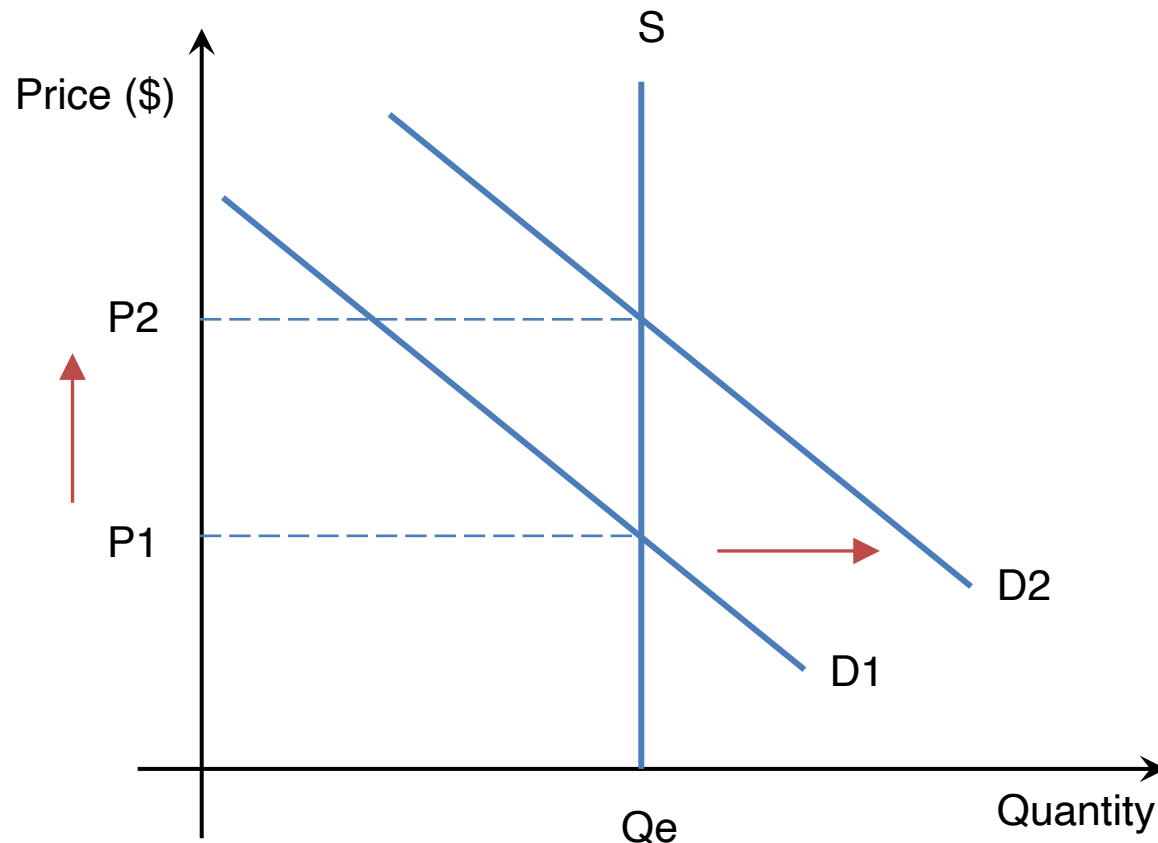
- Supply of permits is perfectly inelastic as the number is fixed by the government.

- Over time, there may be higher demand for goods and services resulting in higher demand for tradable permits.

- The market price of permits increases from P1 to P2 increasing the cost of carbon emissions and pollution.

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Government intervention correcting negative externalities

Tradable permits (Cap and trade schemes)

Tradable permits market
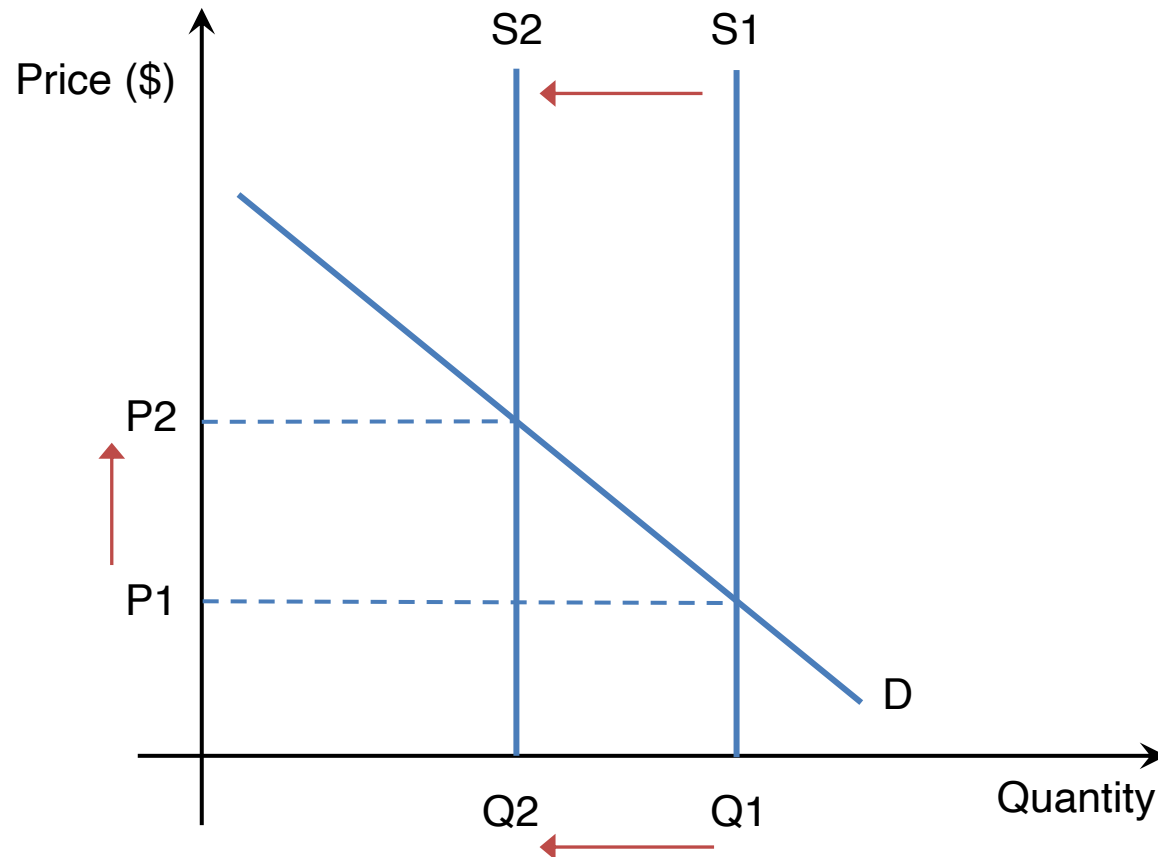
- If the government reduces the number of permits, the supply of permits decreases
- Supply curve shifts from S1 to S2
- Market price increases (P1 to P2)
- Quantity decreases (Q1 to Q2)
- Reduces the level of carbon emissions

Government intervention correcting negative externalities

Tradable permits (Cap and trade schemes)

Watch the video: <u>What is carbon trading?</u>

1. Why do some environmentalists consider cap and trade schemes effective?

2. How may some countries with financial difficulties cheat with the scheme?

3. How may the effects of the scheme differ between developed and developing countries?

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Government intervention correcting negative externalities

Tradable permits (Cap and trade schemes) - advantages

- Limits carbon emissions to a predetermined level.

- Greater incentives for firms to switch to cleaner technologies.

- Internalize externality – consumers and producers pay for external costs.

- Flexibility for firms – firms may choose to switch to clean technologies or pay for permits.

Tradable permits (Cap and trade schemes) - disadvantages

- Potential job losses due to increased production costs.

- Multinational companies may shift production to other countries to avoid permit constraints.

- Demands for permits are highly price inelastic.

- Difficult to determine the socially optimal level of pollutants and permits allowed per year.

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Government intervention correcting negative externalities

Carbon taxes	Tradable permits
More predictable and transparent energy prices	More volatile and unpredictable permit prices
Easily and quickly implemented	Greater time lag
More equitable as carbon taxes revenues can be redistributed	Might be manipulated by large firms as prices are based on demand and supply
Lower flexibility	Greater flexibility – firms can decide their own response to the scheme
Lower monitoring cost	Higher monitoring cost – to measure the pollution level of firms

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Government intervention correcting negative externalities

International agreements

Nations often develop international agreements to combat negative externalities of production.

Examples include:

- The Kyoto Protocol (2005) required developed countries to reduce carbon emissions by 5%.

- The Paris Agreement (2015) required member countries to set emission-reduction targets, preventing the global temperature from rising 2 °C.

Government intervention correcting negative externalities

International agreements

International agreements recognize that individual countries have their own resources and abilities to deal with climate change, requiring a joint commitment from all countries. With international agreements, nations work together to solve global sustainability issues.

Video: The History of Climate Change Negotiations in 83 seconds

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Government intervention correcting negative externalities

International agreements

Barriers preventing the success of international agreements:

- Countries are more concerned with their economic interests instead of environmental costs

- The reluctance of some major countries to join the agreements limits the effectiveness

- High-income countries may exploit low-income countries

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Over to you…

Hoang, Wray, & Chakraborty (2020)

Economics for the IB Diploma Programme

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- Paper 1 Exam Practice Question 11.3

- [10 marks]
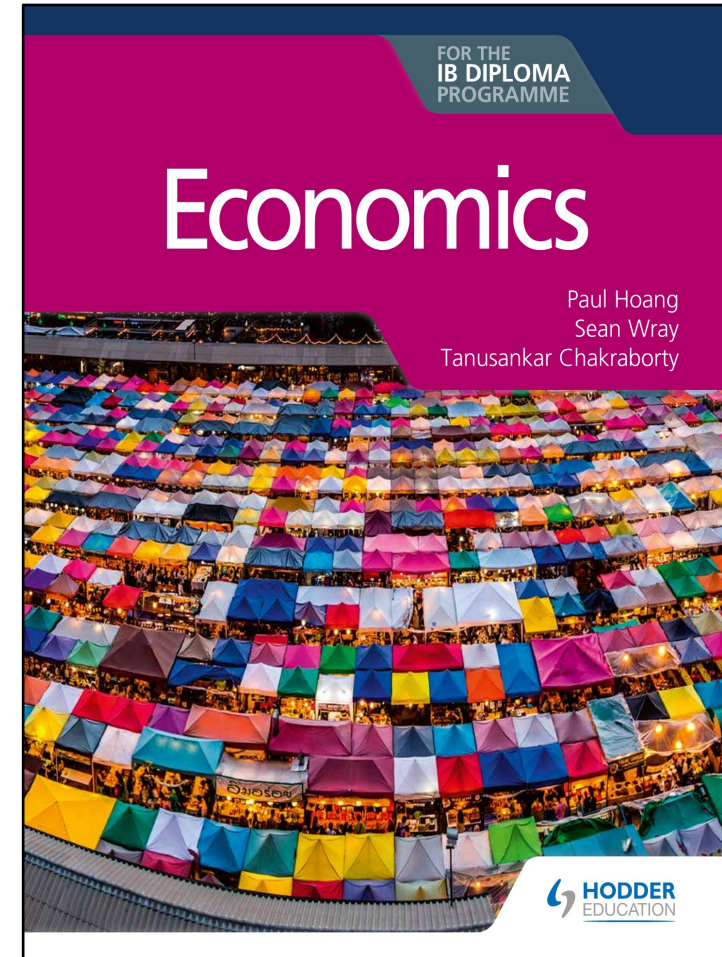
Overall Limitations of government policies

Challenges involved in the measurement of externalities

Revisit this source: [Post 2015 Copenhagen Consensus](#)

Questions

1. To what extent are these values accurate?

2. How do we measure the social benefits of the targets achieved?

Overall Limitations of government policies

**Challenges involved in the measurement of externalities**

It is not possible to accurately quantify externalities. For example, we cannot measure the true cost of noise pollution or accurately convert benefits of education into monetary values.

Despite this, government intervention aims to steer markets in the right direction by reducing the level of under-allocation or over-allocation or resources.

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Overall Limitations of government policies

Degree of effectiveness

Economists often use the ceteris paribus assumption to evaluate the effectiveness of government policies. However, many factors simultaneously affect the demand and supply of markets.
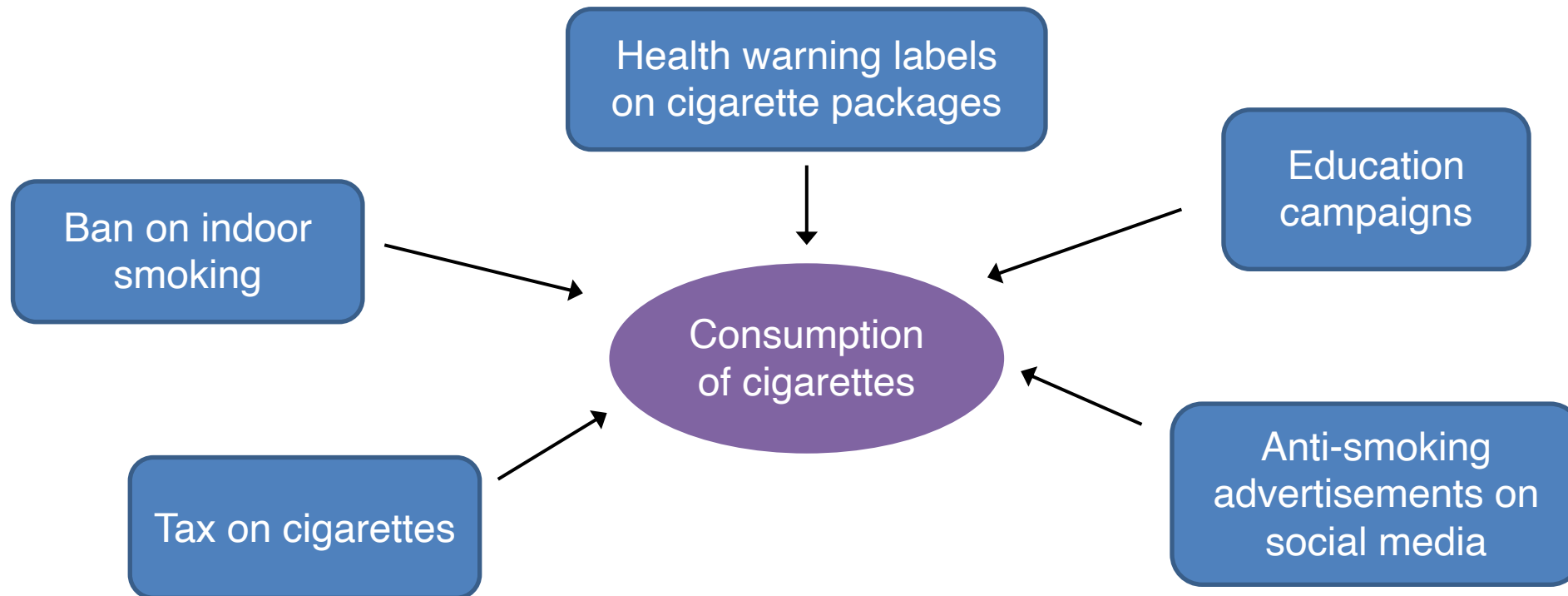
Overall Limitations of government policies

Degree of effectiveness

- Since there are many factors affecting the market quantity, it is difficult to evaluate the effect of one particular policy on the market.

- Policies may also be limited by time lags or costs of the government. For example, education or awareness creation programmes require a long period to influence the market; monitoring costs and enforcement costs are required for legislations.

Overall Limitations of government policies

Consequences for stakeholders

Government interventions create scope of exploitation. For example:

- Multinational firms relocate to lower-income countries for more lenient regulations on environmental pollutions.

- Legislations and regulations favour large firms that have the financial powers to comply, while small firms operate at a higher cost in switching to cleaner energies.

- Indirect taxes are regressive, which has larger impact on low-income earners or small firms.

Common access resources

Common access resources are rivalrous and non-excludable resources such as clean air, fish stocks, and trees. Without government intervention, these resources are likely to be overused.

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Real world example

1. What are the possible causes of overfishing?

2. How can the government reduce overfishing?

3. How might overfishing pose a threat to sustainability?

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Characteristics of common access resources

Non-excludable

It is impossible to prevent non-payers from benefitting from the resource. The non-excludability nature of common access resources means that they are over-used.

Rivalrous

The consumption of a resource reduces the amount available for others to use. Common access resources are rivalrous due to scarcity.

Tragedy of the commons

The **tragedy of the commons** is a situation where degradation, depletion or destruction of a common access resource is caused by rivalry and over-consumption.

Characteristics of common access resources

Tragedy of the commons example

- Firms face the temptation to catch as many fish as possible to maximize profits.

- Eventually, fish stocks become depleted over time.

- Firms have reduced or no fish left in the long term.

- Tragedy of the commons occurs due to overfishing.
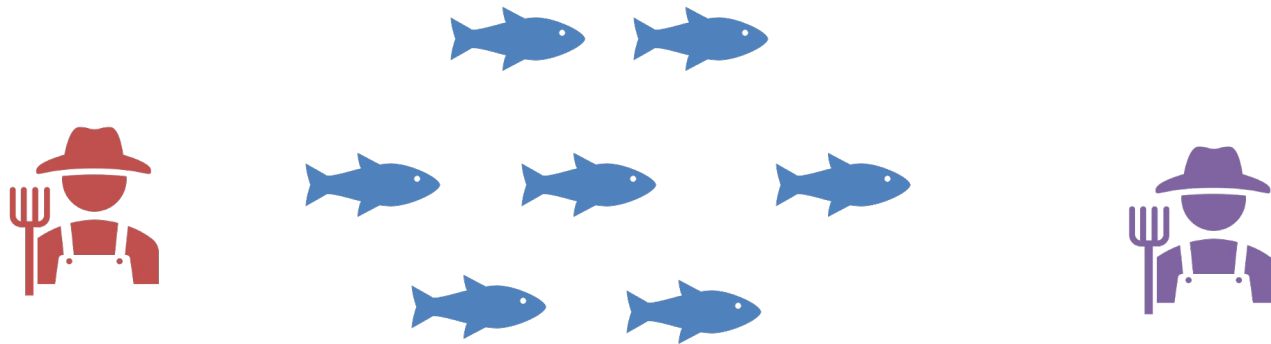
Unsustainable production

Due to the **non-excludable and rivalrous** nature of **common access resources**, producers will likely over-produce products using such resources. This results in **threats to sustainability** such as deforestation, air pollution, soil erosion, congestion, overfishing etc.

Common access resources are related to **negative externalities of production**, where the external cost refers to the threats to sustainability.

Role of international co-operation

Owing to the escalating global demand for scarce resources, international co-operation between nations is vital to combat market failures and threats to sustainability on a global level.

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Global nature of sustainability issues

The Sustainable Development Goals (SDGs) of the United Nation's Development Programme (UNDP) is an international agreement between 193 countries.

Visit: UN Sustainable Development Goals

What global issues do the SDGs cover?

Why is international co-operation necessary to achieve these goals?

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Real world example

Article: [Canada pulls out of Kyoto protocol](#)

1. Why did Canada pull out of Kyoto protocol?

2. The Kyoto Protocol did not cover the two largest emitters, the US and China. What does this imply about the effectiveness of the agreement?

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Test your knowledge on this unit: Kahoot!

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