

## 2.9 Market Failure – Externalities and Public Goods



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### Positive Externalities

**Positive externalities of consumption** refer to external benefits created by consumers.

Undertaking education

Consuming vaccinations

Fire protection services

Health care service benefits



**Positive externalities of production** refer to external benefits created by producers.

Training workers

Creating nature reserves

Developing new medication

R&D into new technologies

## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities of Production

Watch the following video and answer the questions below:

1. Identify the *private benefits* of beekeepers who keep the bees for honey.
2. Identify the *social benefits* that may arise from the production of honey.
3. Suggest solutions that can correct this market failure.





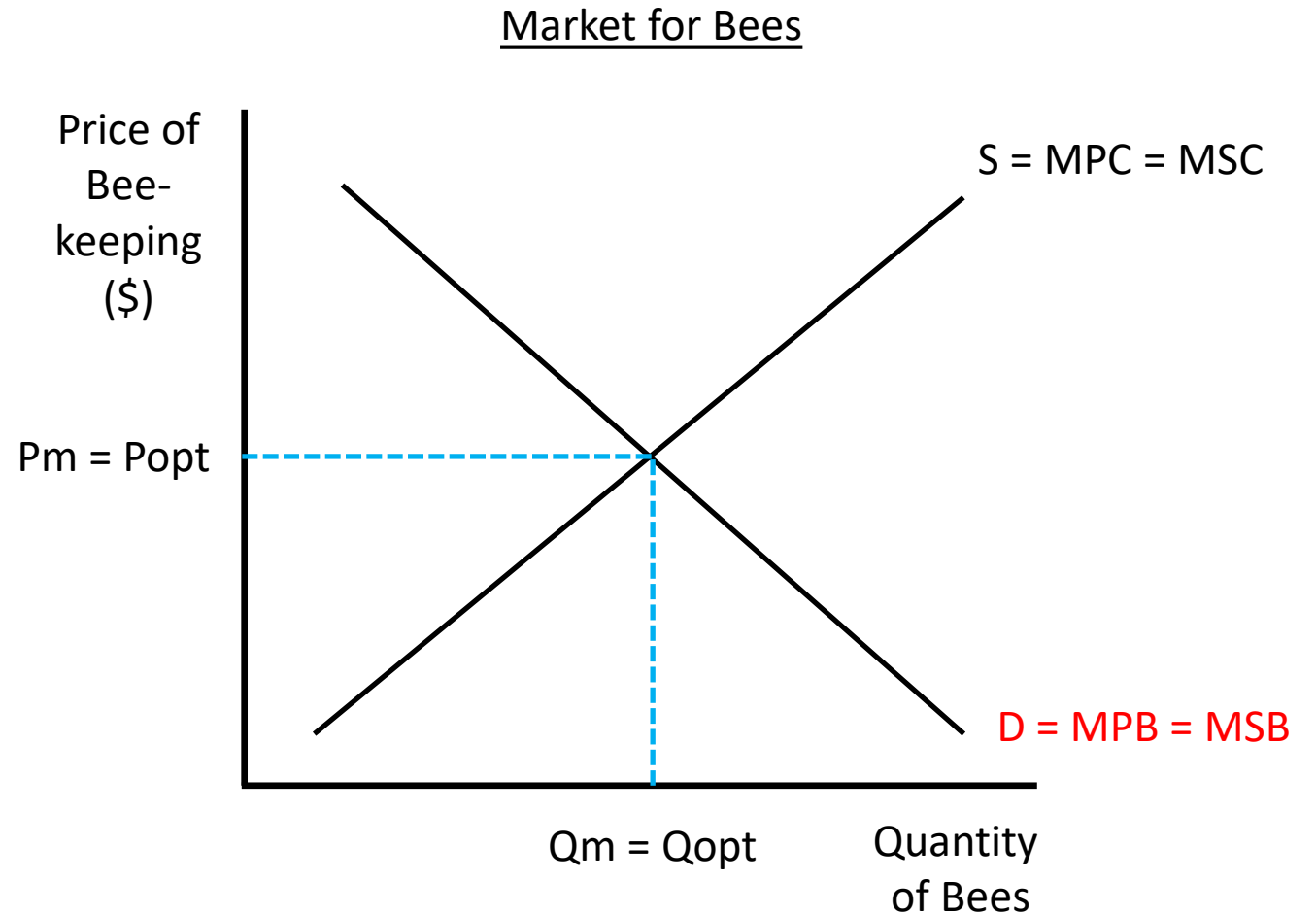
## 2.9 Market Failure – Externalities and Public Goods

### Market Efficiency

#### Diagram

If there were no externalities, the private benefits and social benefits from production should be equal -

i.e.  **$MSB = MPB = D$**



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

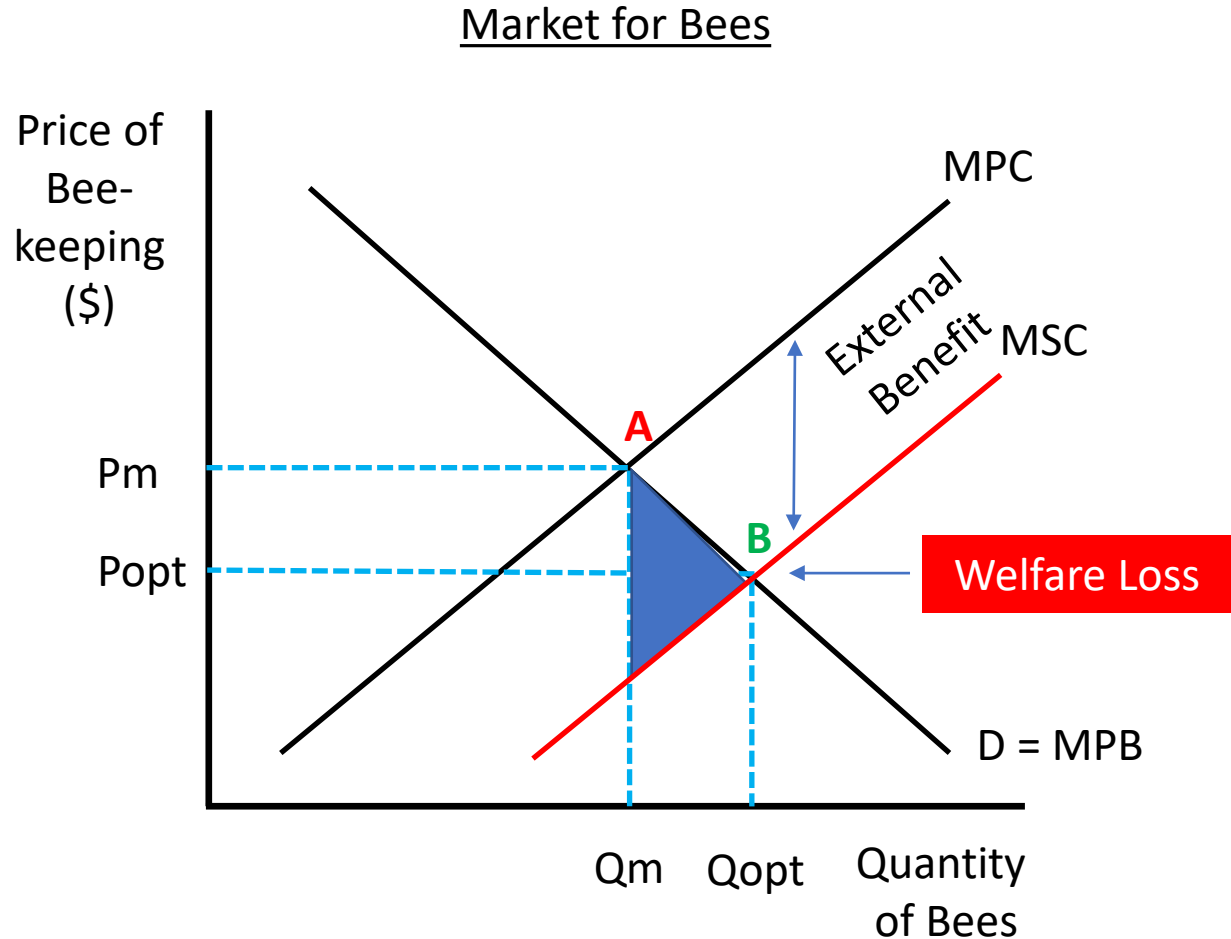
#### Production (Bee-Keeping)

Positive externalities of production occur when  $MSB > MSC$  upon production.

**MPC = Market Supply**

**MSC = Socially Optimal Market Supply**

For each level of output, the social costs of keeping bees given by **MSC** are less than the firm's private costs **MPC**.



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### Positive Externalities

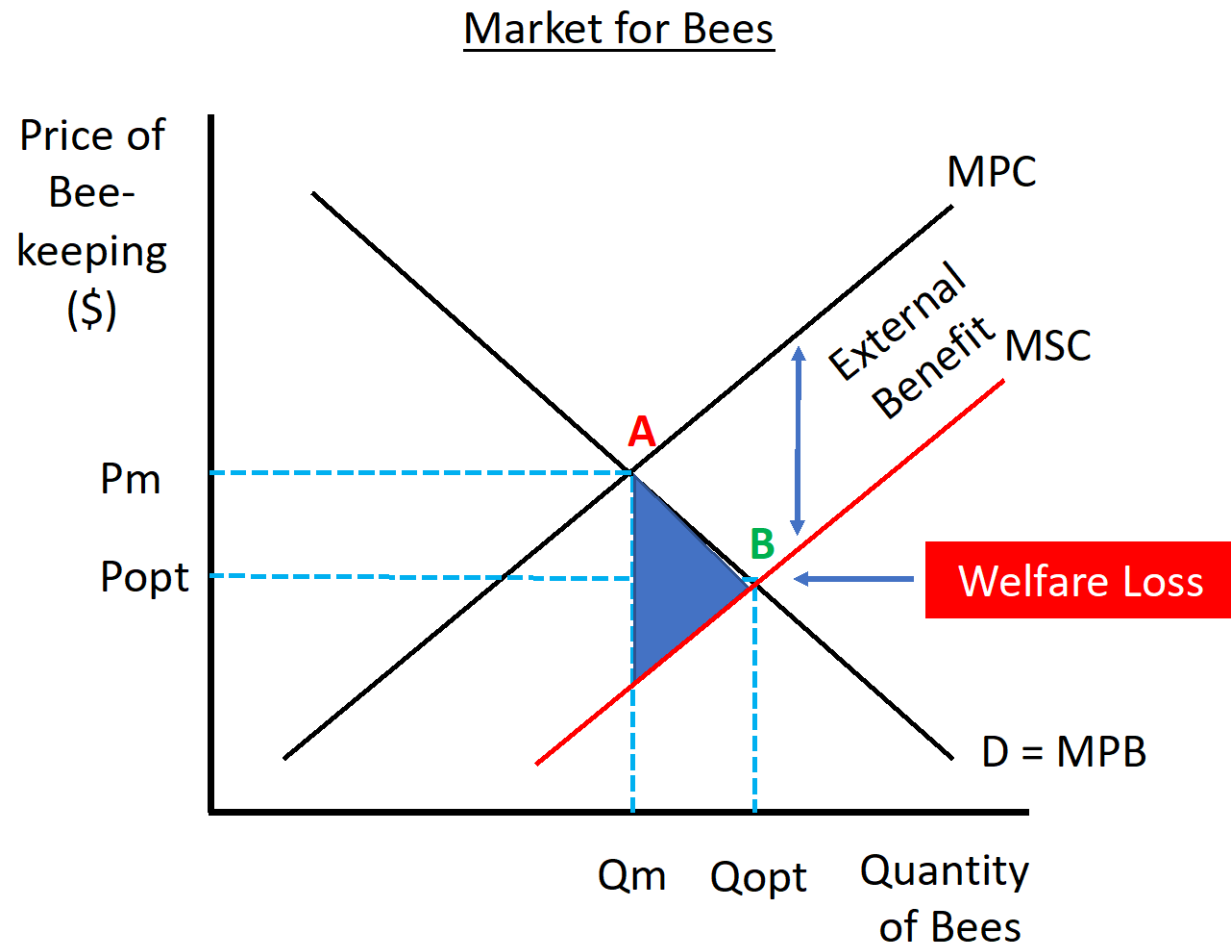
#### Production (Bee-Keeping)

**A = Market Equilibrium**

**B = Socially Optimal Equilibrium**

**Welfare loss** always lies at  $Q_{opt}$

In this situation, bees are underproduced as  $Q_{opt} > Q_m$  (social optimum output)



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### Positive Externalities

#### Policies

- Direct government provision
- Subsidies

Both of these responses  
have the same market outcomes



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Direct government provision

Solution involves direct government provision of the product creating the **positive production externality**.

**This can include:**

- Engaging in research and technology
- Providing training for workers

These activities are paid through government funds.





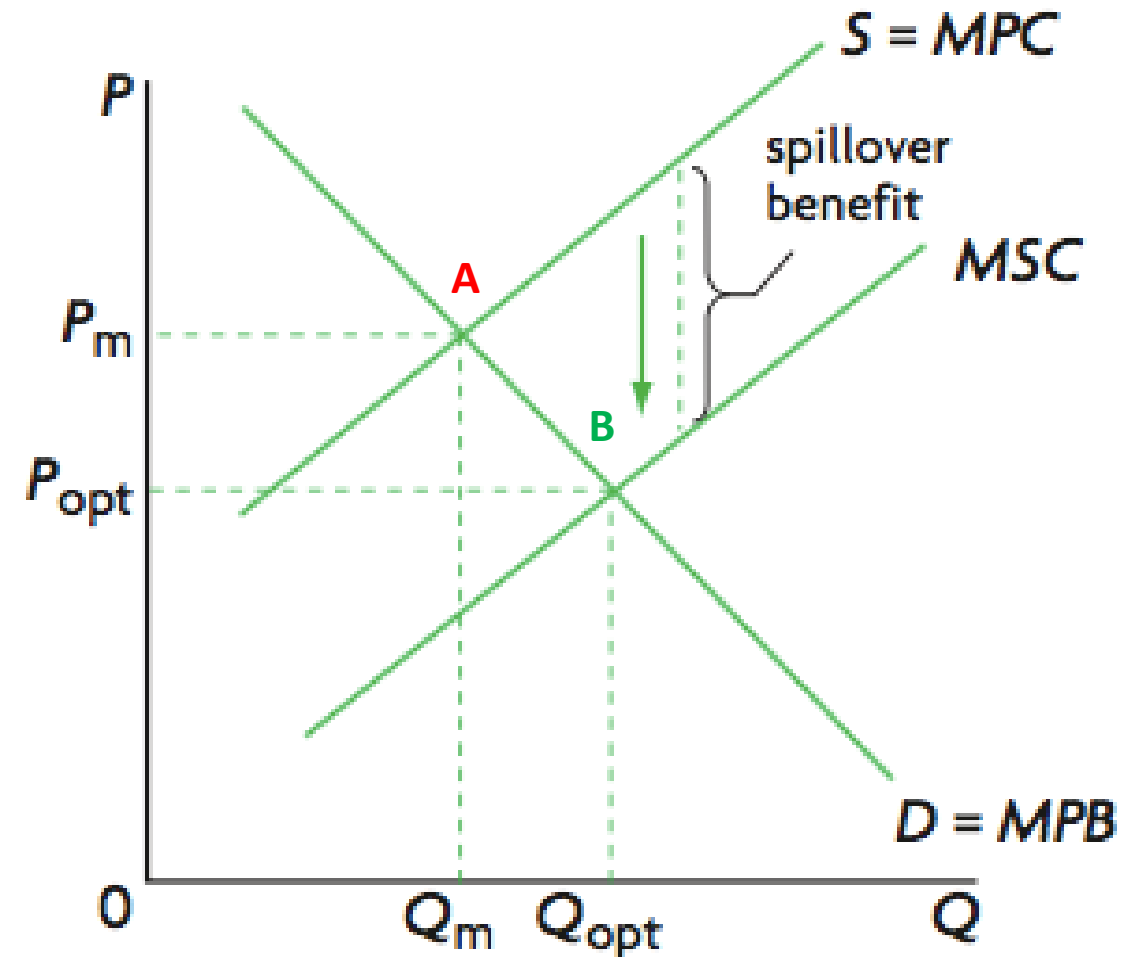
## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

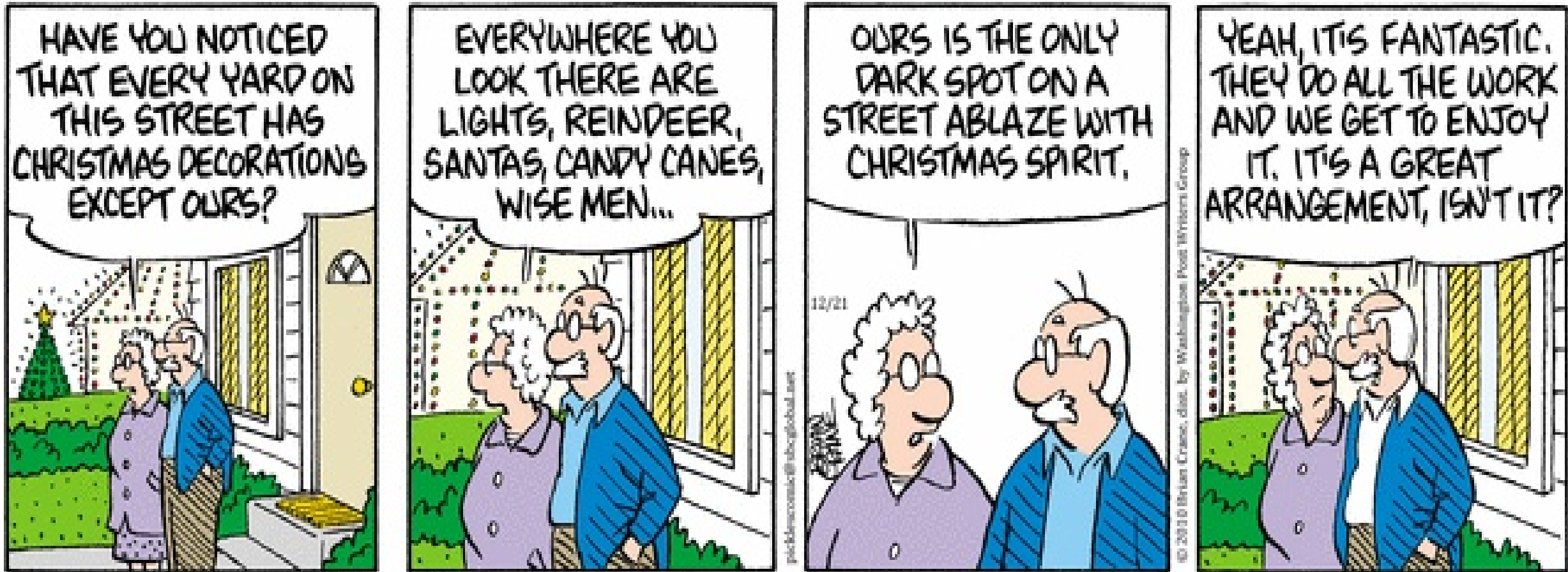
#### Direct government provision

- Supply shifts **outwards** from **MPC to MSC**
- Market equilibrium moves from **A to B**
- Market price decreases ( **$P_m$  to  $P_{opt}$** )
- Market quantity increases ( **$Q_m$  to  $Q_{opt}$** ) to the socially optimal quantity

Under-production is eliminated and  
market failure is corrected



### Positive Externalities of Consumption



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities of Consumption

**Merit goods** are products where MPB < MSB upon consumption.

#### Higher Education Consumers (MPB)

- + Increases expected salary
- + Increases knowledge
- + Higher life expectancy
- + Increases employability

#### Society (MSB) (Third Parties)

- + Poverty reduction
- + Lower murder rates
- + Less property crime
- + Lower public welfare/prison costs
- + New ideas and adaption of R&D

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### Positive Externalities of Consumption

ANNUAL RETURN TO SOCIETY PER GRADUATE	
External social benefits	Estimated value (in £)
Democracy (better civic institutions)	562
Human rights (judicial institutions)	880
Political stability	1,787
Longer life expectancy	710
Less inequality	x
Poverty reduction	956
Lower murder rates	220
Less property crime	1,515
Lower public welfare/prison costs	167
Water, air, forest, wildlife sustainability	1,724
Increased social capital	y
New ideas and adaptation of R&D	z
<b>Total social non-market benefits</b>	<b>8,521 + x, y and z</b>

Source: Walter W. McMahon, University of Illinois at Urbana-Champaign  
(x, y and z have substantial value but cannot be quantified)



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities of Consumption

**Merit goods** are products where  $\text{MPB} < \text{MSB}$  upon consumption.

Reasons for under-provision include:

- The good may have **positive externalities**
- **Low levels of income and poverty**  
People with low incomes may be willing but not able to buy something. Their desire does not show up in the market which lowers market demand.
- Consumer ignorance



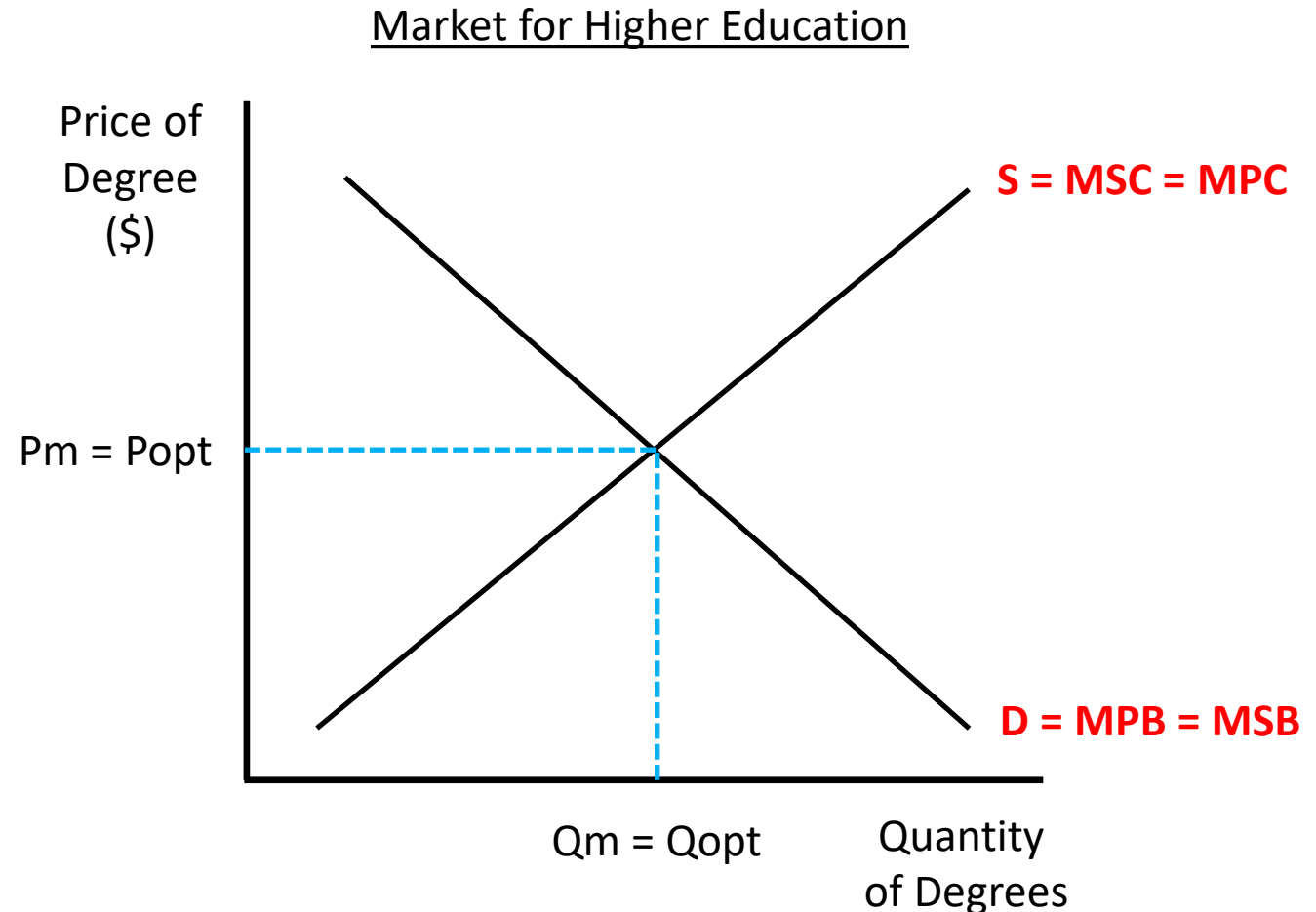
## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Consumption of education

If there were no externalities, the private benefits and social benefits from consumption should be equal

- i.e.  **$MSB = MPB = D$**



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

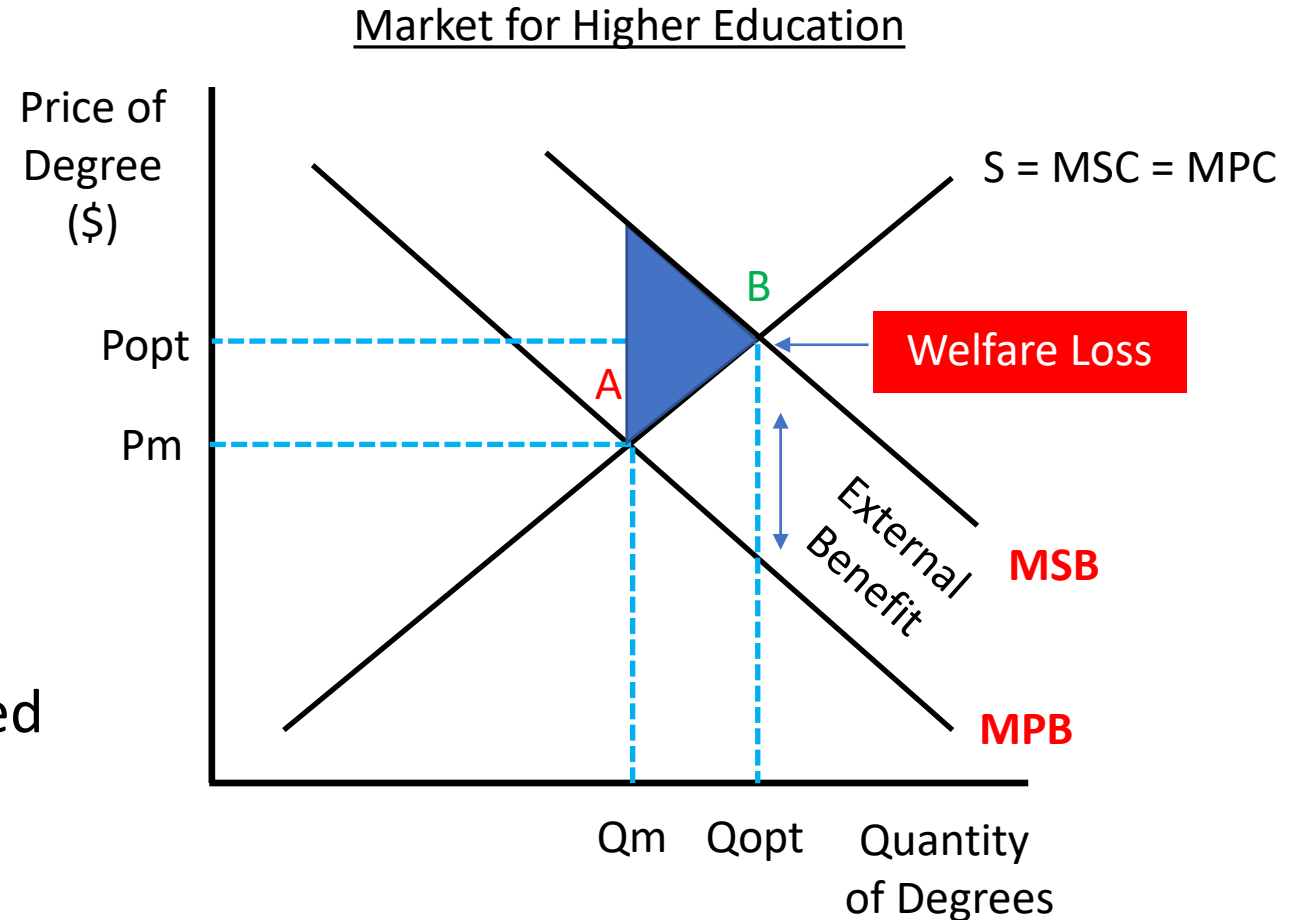
#### Consumption of education

Positive externalities of consumption occur when  $MSB > MSC$  upon consumption.

**MPC = Market Supply**

**MSC = Socially Optimal Market Supply**

In this situation, education is under consumed as  $Q_{opt} > Q_m$  (social optimum output)



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Policies

- Legislation and regulation
- Education and awareness
- Nudges
- Direct government provision
- Subsidies



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

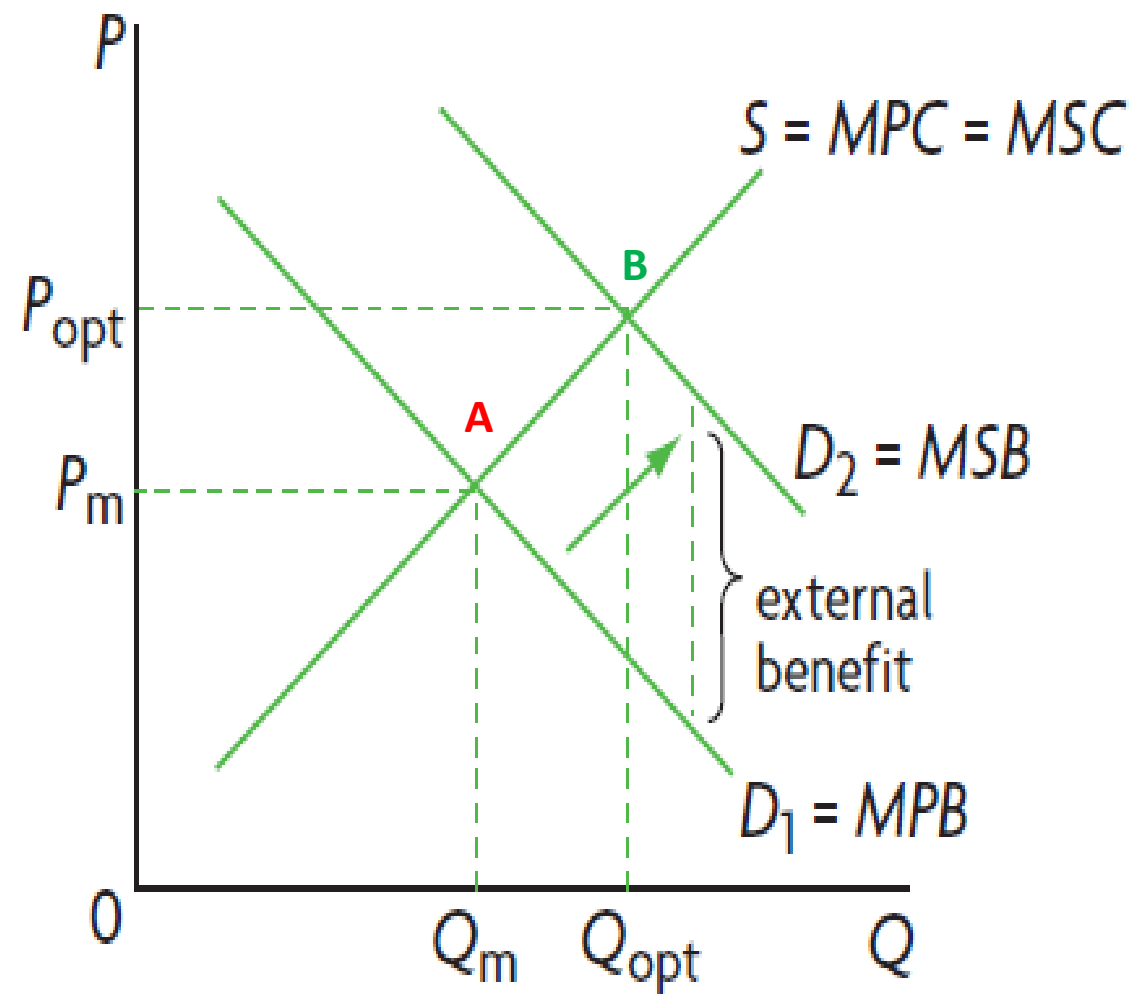
#### Legislation and regulation

The government can create **legislation** to ensure mandatory schooling until a certain age.



#### Food for Thought

Find out which countries implement mandatory schooling.



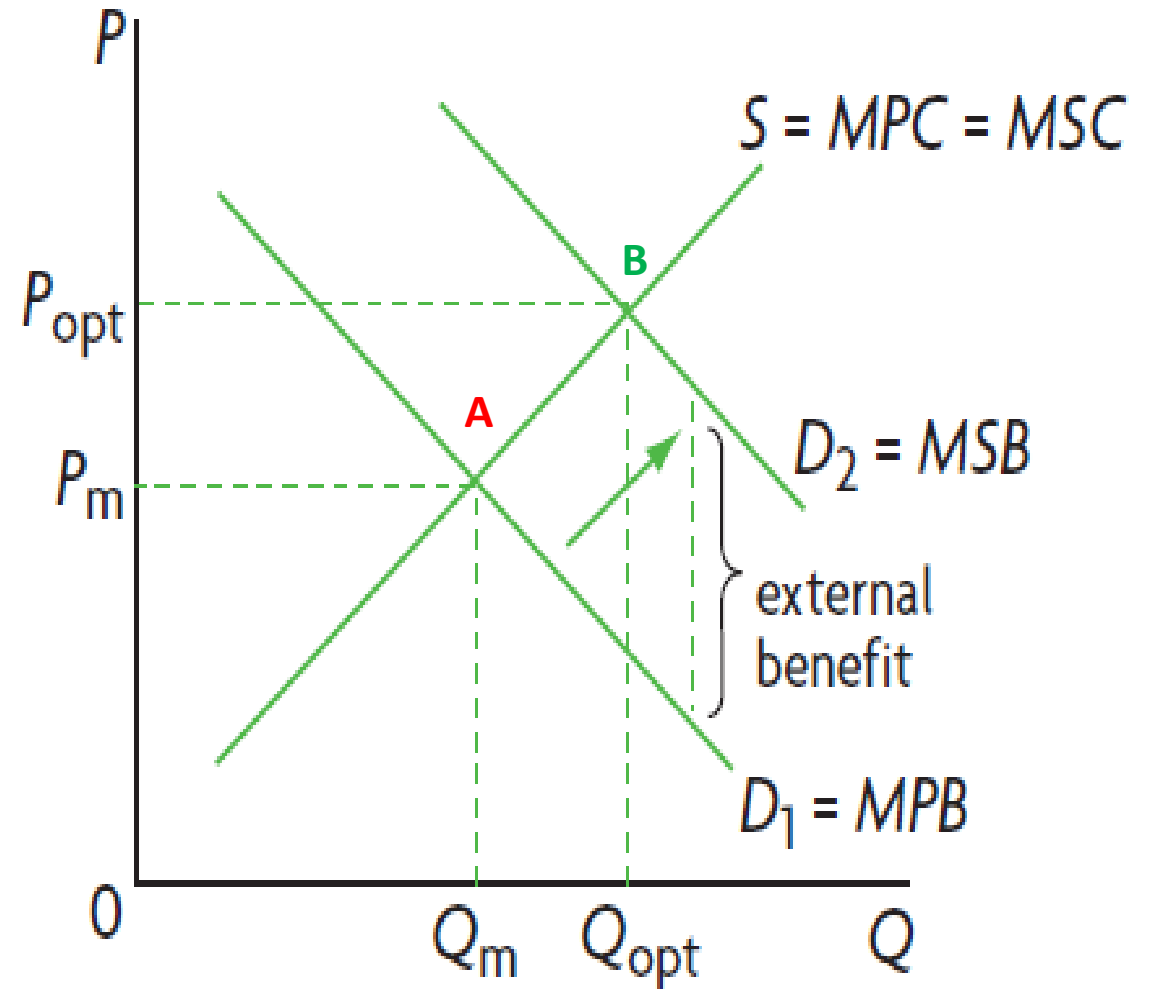
## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Legislation and regulation

- Demand shifts **outwards** from **MPB to MSB**
- Market equilibrium moves from **A to B**
- Market price increases ( **$P_m$  to  $P_{opt}$** )
- Market quantity increases ( **$Q_m$  to  $Q_{opt}$** ) to the socially optimal quantity

Under-consumption is eliminated and  
market failure is corrected





## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Education and awareness

The government can try to encourage students to stay in school by holding university fairs.



**On your own paper...**

Draw the diagram that shows how awareness helps to correct the **positive externality** for education.



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

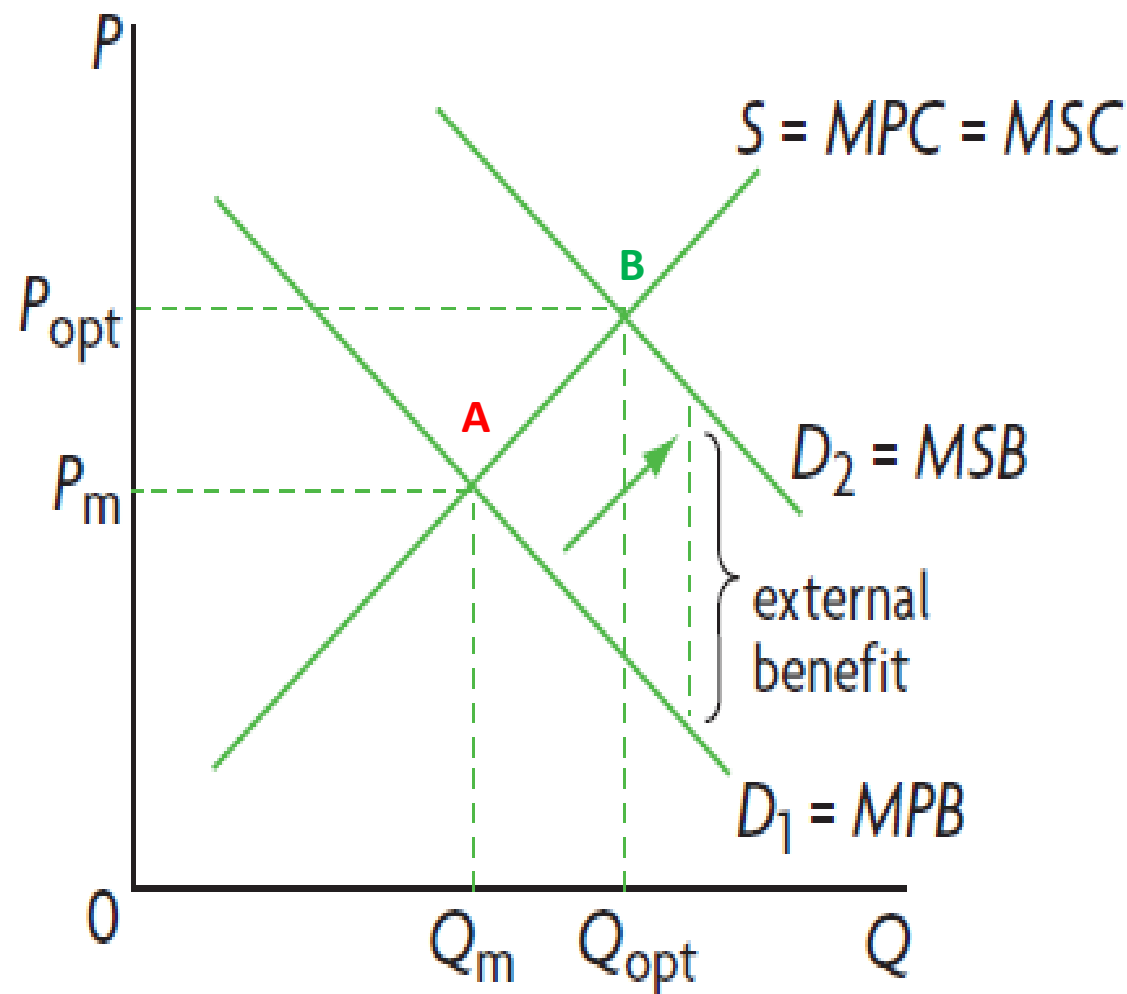
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## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Education and awareness

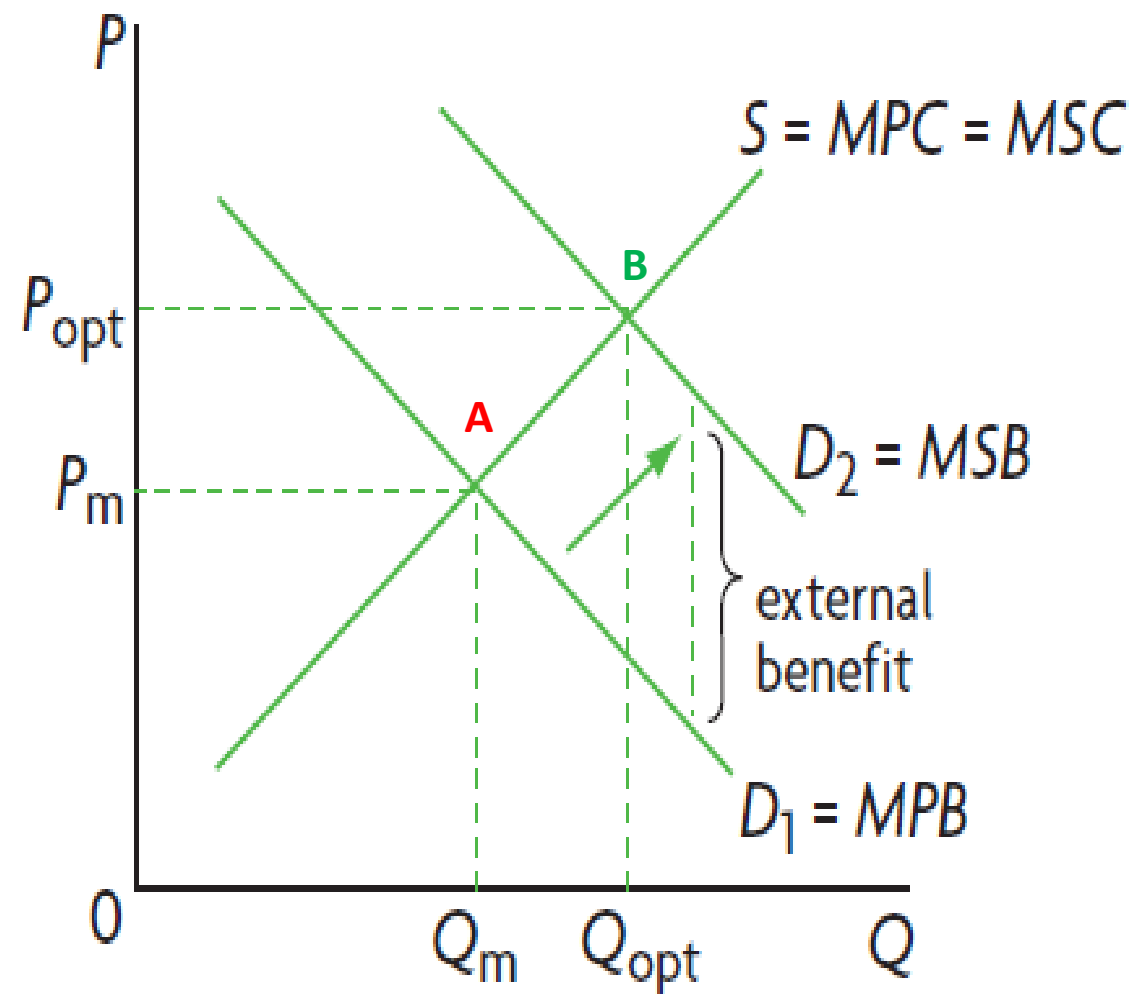
The government can try to encourage students to stay in school by holding university fairs.

#### Nudges



**In a pair or small group...**

Brainstorm ideas of nudges which can be used to correct the **positive externality** for education.



## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Direct government provision

The government can **directly provide additional supplies** of the good or service (e.g. public schools, universities and vocational training programmes).



#### **On your own paper...**

Draw the diagram that shows how government provision helps to correct the **positive externality** for education.



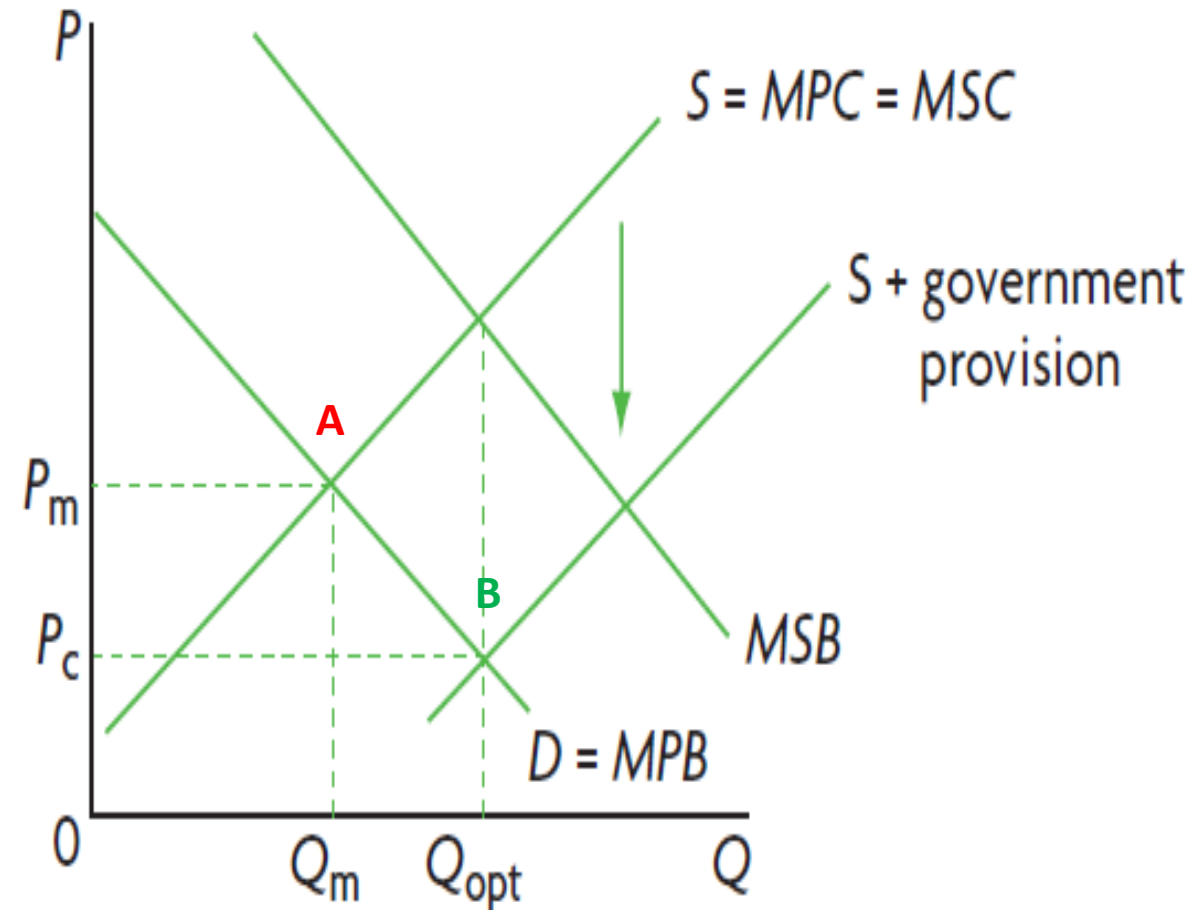
## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Direct government provision

- Supply shifts **outwards** from **MSC** to **S + Gov Provision**
- Market equilibrium moves from **A** to **B**
- Market price decreases (**P<sub>m</sub>** to **P<sub>c</sub>**)
- Market quantity increases (**Q<sub>m</sub>** to **Q<sub>opt</sub>**) to the socially optimal quantity

Under-consumption is eliminated and  
market failure is corrected





## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Subsidies

The government can **provide subsidies** to producers of the good and services in order to encourage production and lower the market price (e.g. DSS Schools in Hong Kong).



**On your own paper...**

Draw the diagram that shows how subsidies helps to correct the **positive externality** for education.



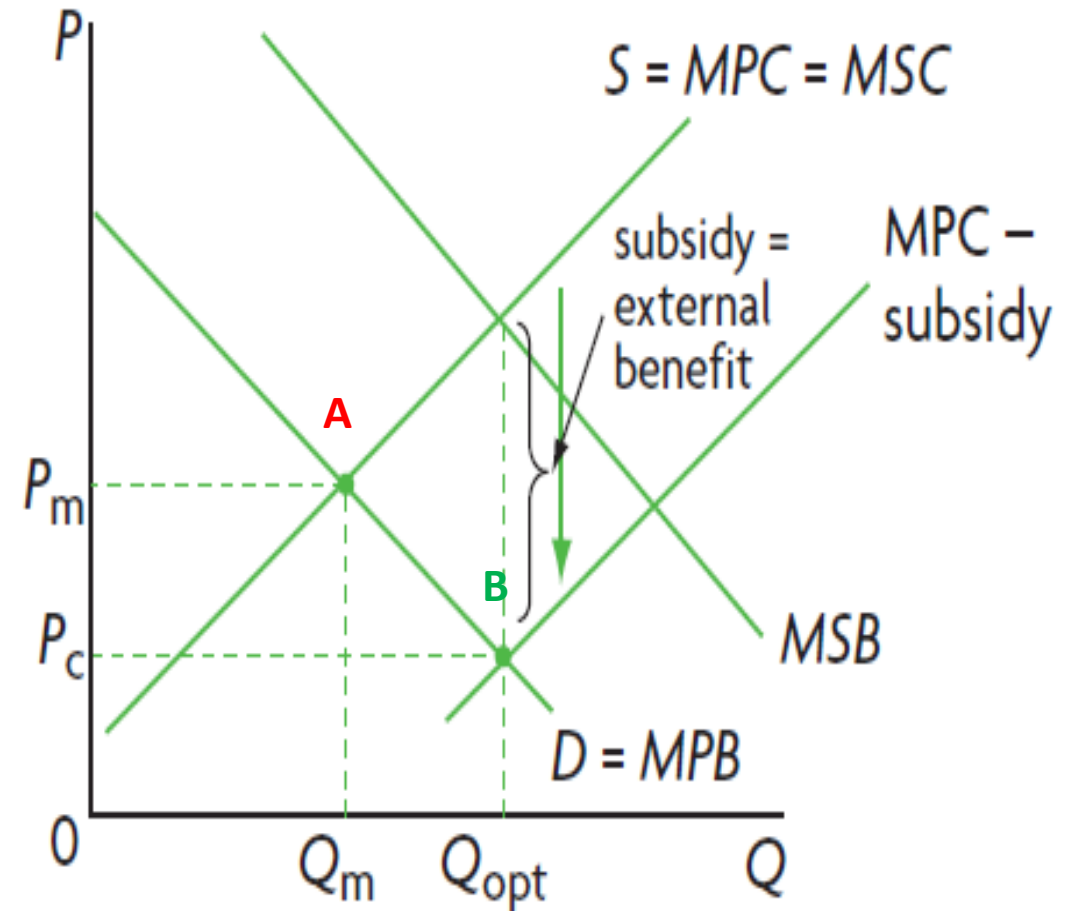
## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

#### Subsidies

- Supply shifts **outwards** from **MSC** to **S - Subsidy**
- Market equilibrium moves from **A** to **B**
- Market price decreases ( **$P_m$  to  $P_c$** )
- Market quantity increases ( **$Q_m$  to  $Q_{opt}$** ) to the socially optimal quantity

Under-consumption is eliminated and  
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## 2.9 Market Failure – Externalities and Public Goods

### Direct Provision and Subsidies

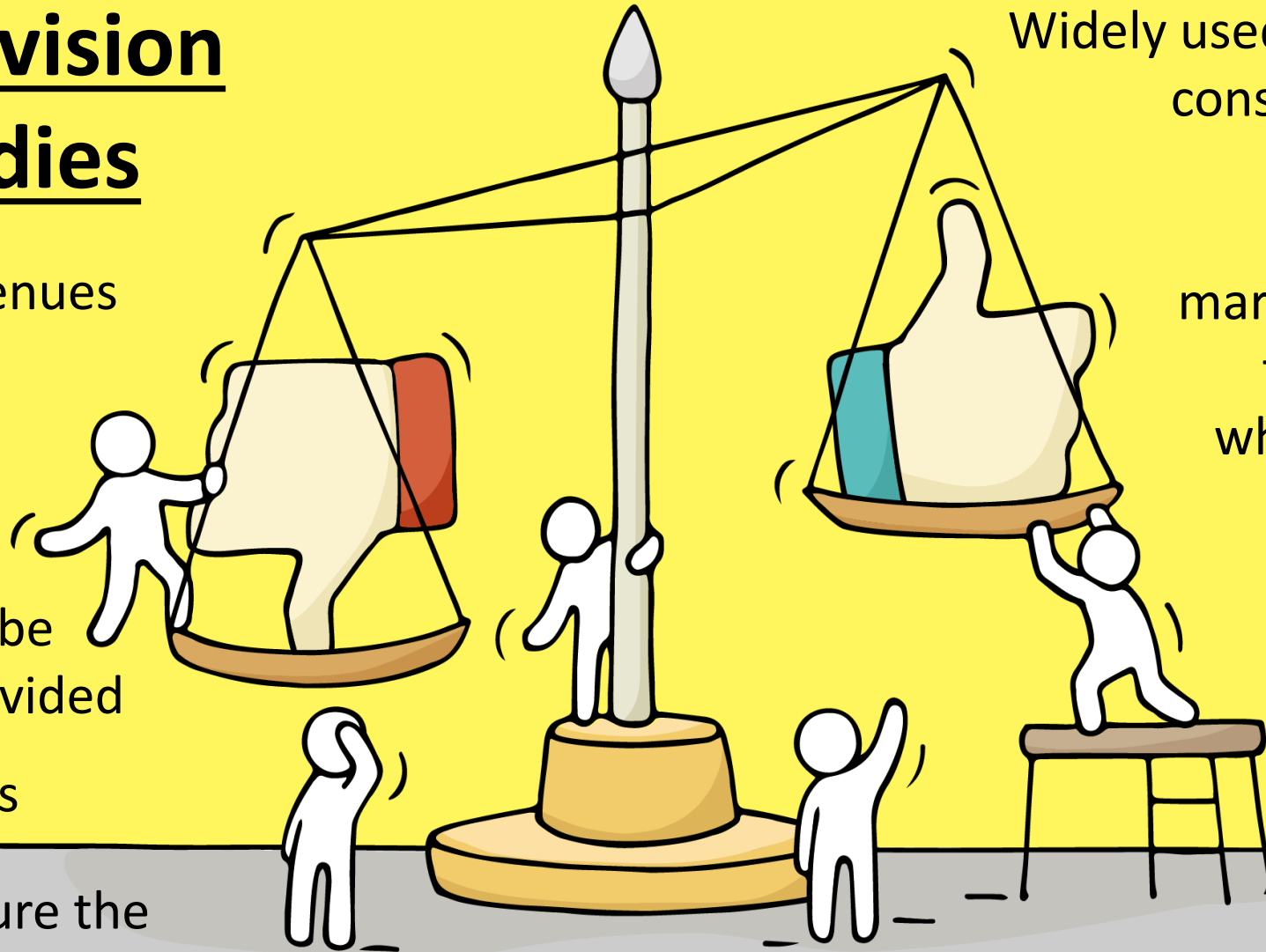
Relies on tax revenues

Opportunity cost

Not all products  
with positive  
externalities can be  
subsidized or provided

Political pressures

Difficult to measure the  
size of external benefits



Widely used to deal with positive  
consumption externalities

Effective in increasing  
market quantity closer to  
the optimum quantity  
while lowering the price

## 2.9 Market Failure – Externalities and Public Goods

### Positive Externalities

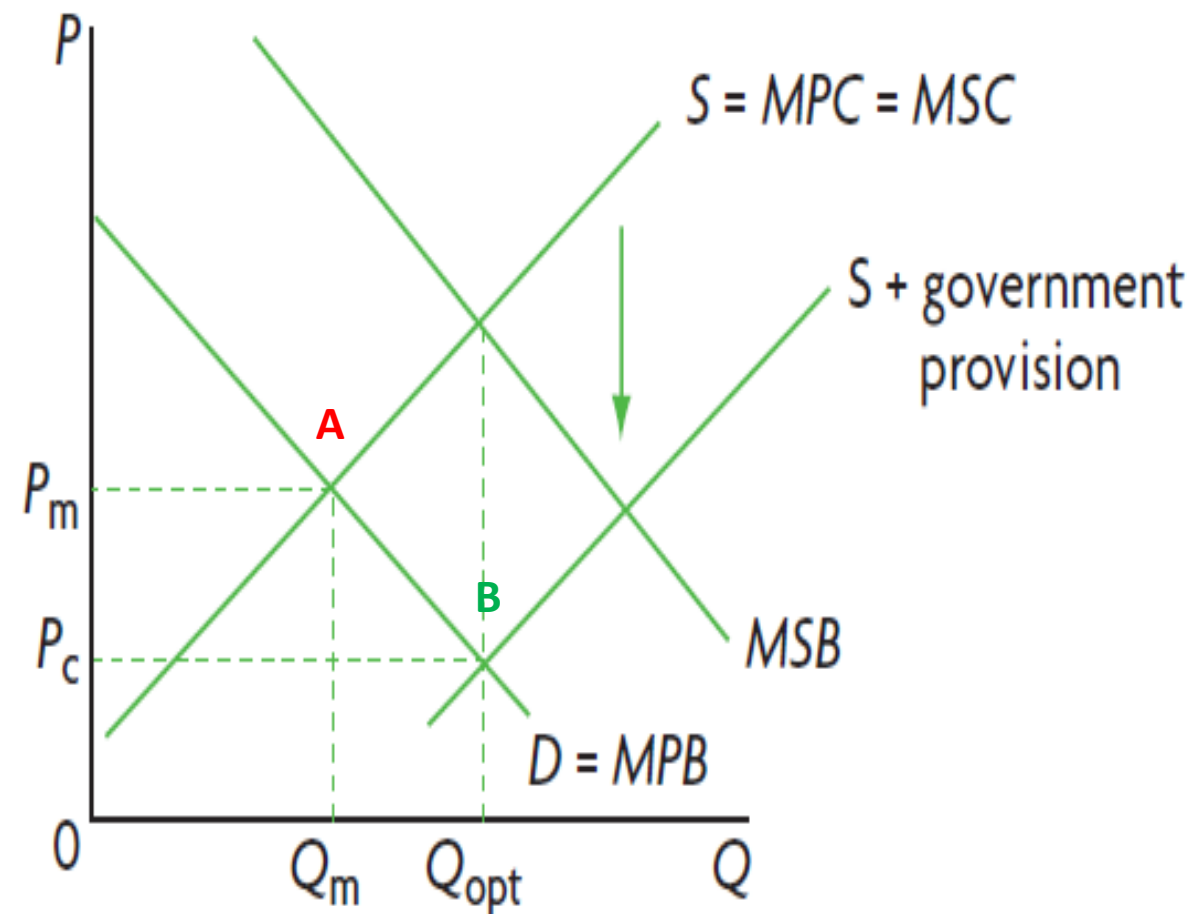
#### Direct government provision and subsidies

In the real world, it is unlikely that governments can eliminate the **market failure** entirely as it is difficult to determine the accurate amount.



#### On your own paper...

Illustrate what the diagram would look like if the direct provision or subsidies is not accurately determined to be equalled to **social optimum outcome**.

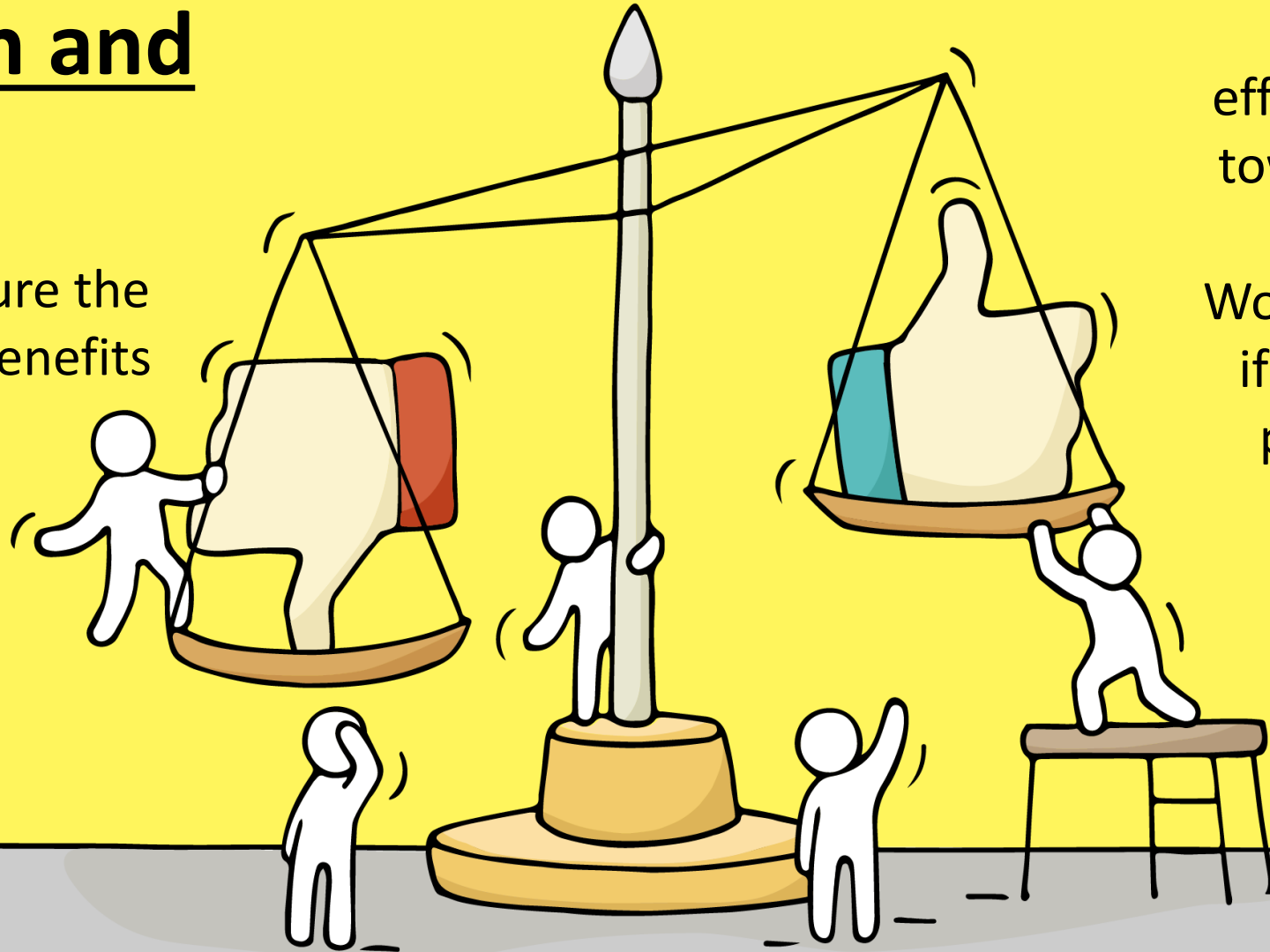


## 2.9 Market Failure – Externalities and Public Goods

### Legislation and education

Difficult to measure the size of external benefits

Raises prices

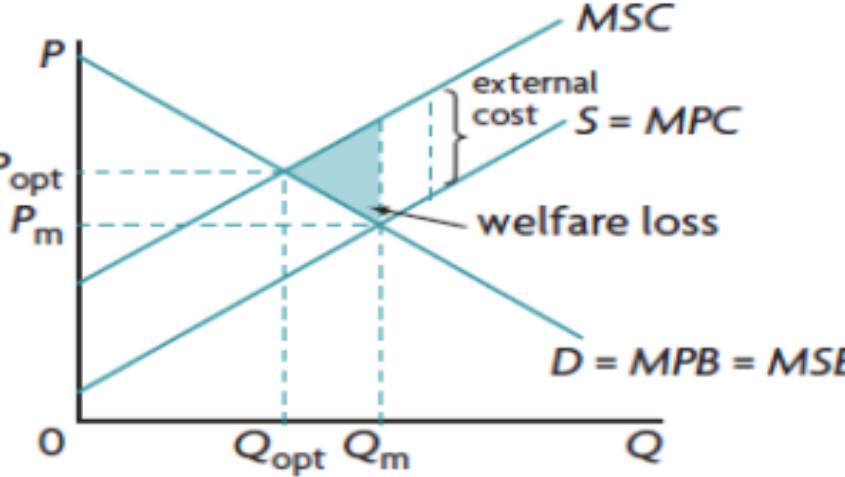
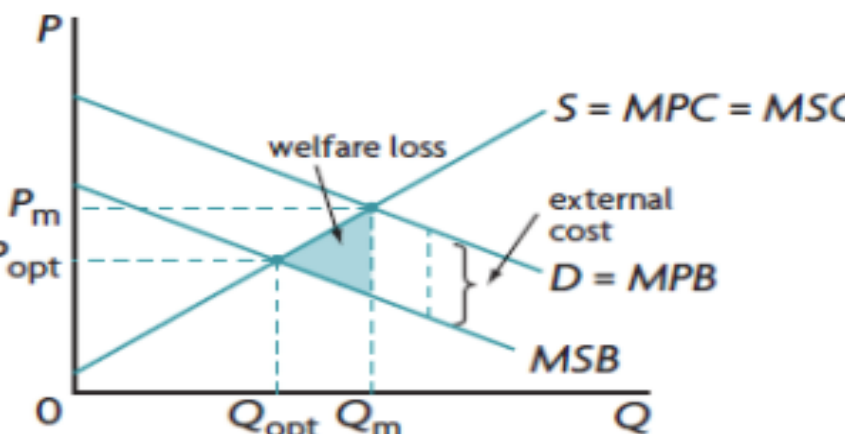


Can sometimes be effective in shifting MPB towards social optimum

Would be more effective if used alongside direct provision or subsidies.

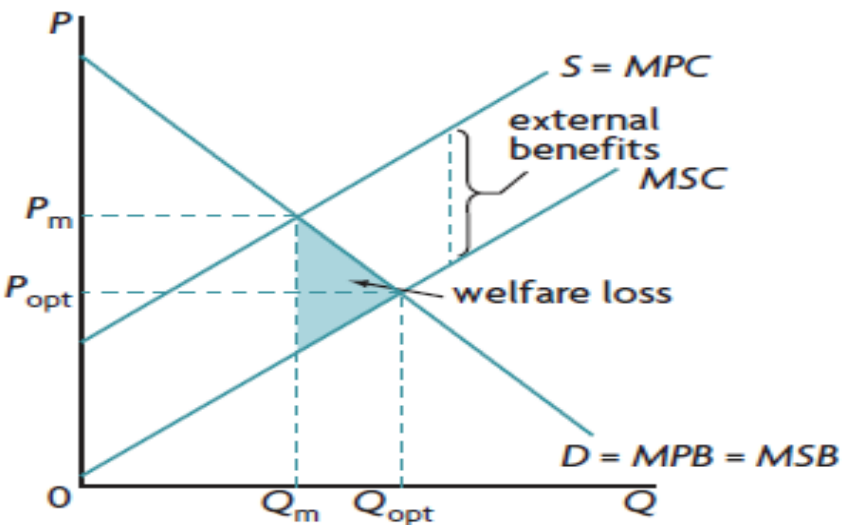


# 2.9 Market Failure – Externalities and Public Goods

Type of externality	Examples	Policies
<p><b>Negative production and many common pool resources</b></p> 	<p>Producers impose external costs on society</p> <p>Production by use of fossil fuels; external costs include global warming, negative effects on health, environmental pollution</p>	<ul style="list-style-type: none"> <li>• Indirect (Pigouvian) taxes</li> <li>• Carbon taxes</li> <li>• Tradable permits</li> <li>• Legislation, regulation</li> <li>• Collective self-governance</li> <li>• Education, awareness creation</li> <li>• International agreements</li> </ul>
<p><b>Negative consumption</b></p> 	<p>Consumers impose external costs on society</p> <p>Use of cars and heating using fossil fuels; external costs include global warming, negative effects on health, environmental pollution</p>	<ul style="list-style-type: none"> <li>• Indirect (Pigouvian) taxes</li> <li>• Legislation, regulation</li> <li>• Education, awareness creation</li> <li>• Nudges (HL only)</li> </ul>

# 2.9 Market Failure – Externalities and Public Goods

## Positive production

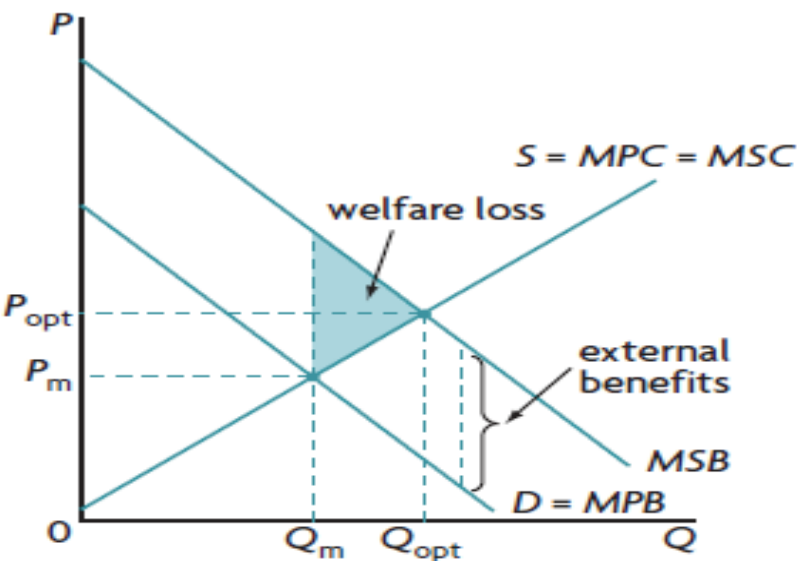


Producers create external benefits for society

Research by private firms leads to development of new technologies that benefit the whole of society

- Government provision
- Subsidies

## Positive consumption



Consumers create external benefits for society

Education and health care lead to benefits for the whole of society, including lower unemployment, lower crime rates, higher economic growth

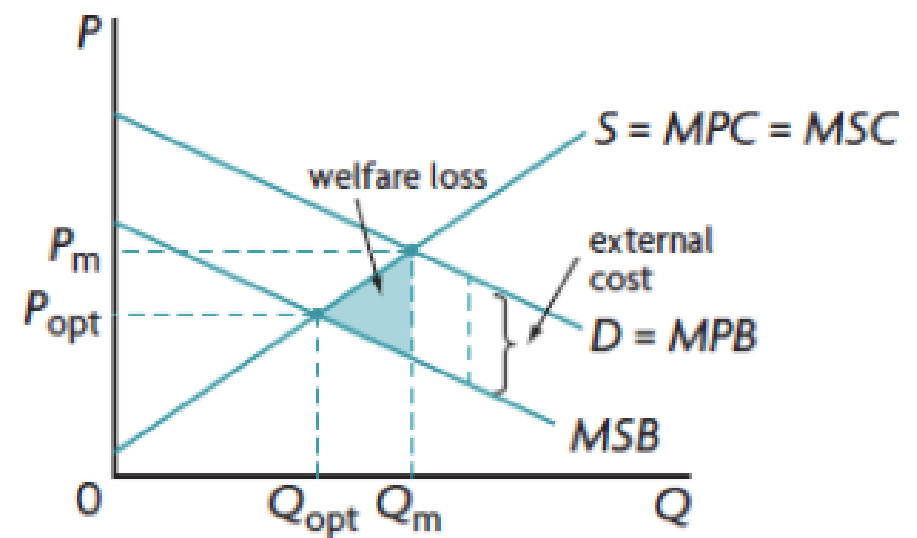
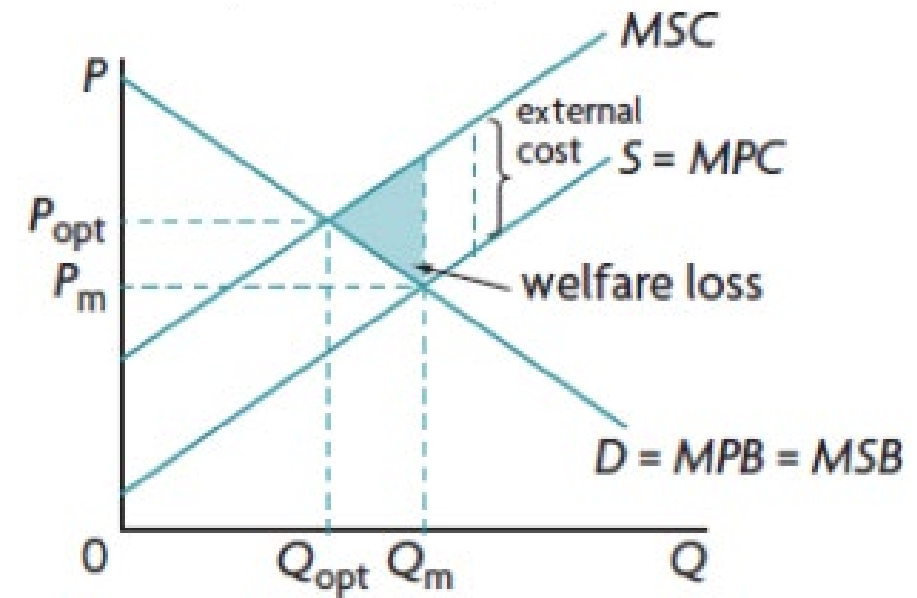
- Legislation, regulation
- Education, awareness creation
- Nudges (HLOnly)
- Government provision
- Subsidies

## 2.9 Market Failure – Externalities and Public Goods

### Market Failure Diagrams

#### Rules and Tips

1. In **production** externality, the \_\_\_\_\_ curve splits into two; in a **consumption** externality, the \_\_\_\_\_ curve splits into two.
2. \_\_\_\_\_ reflects costs; \_\_\_\_\_ reflects benefits.
3. The market equilibrium quantity  $Q_m$  corresponds to private costs and benefits, MPC and MPB; the social optimum reflects social costs or social benefits.



## 2.9 Market Failure – Externalities and Public Goods

### Market Failure Diagrams

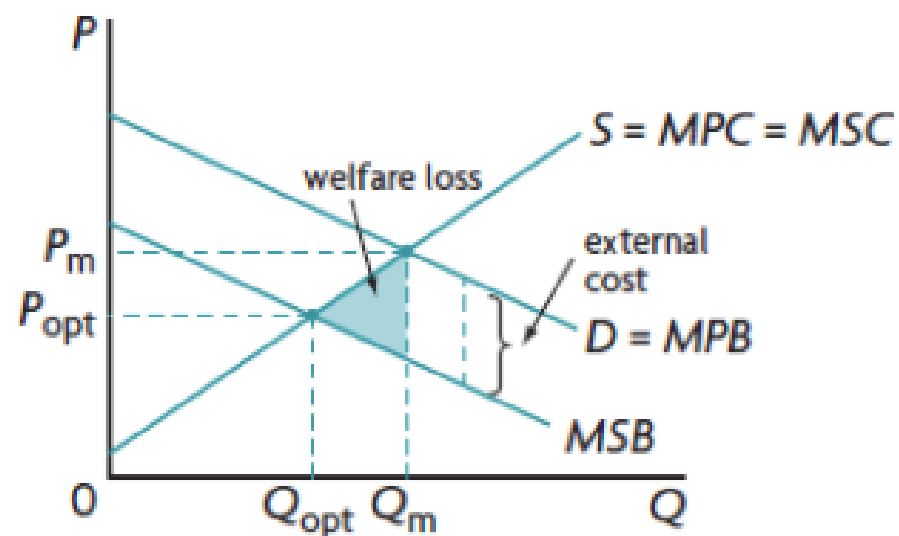
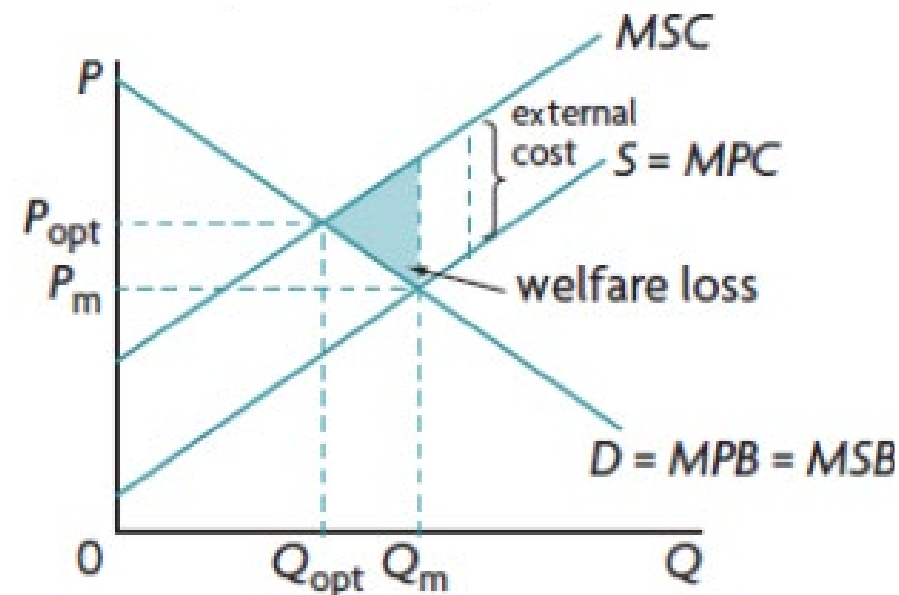
#### Rules and Tips

4. In a negative externality  $Q_m > Q_{opt}$ , meaning that the market provides too much of a \_\_\_\_\_ thing.

$Q_m$  will always be the \_\_\_\_\_ figure while  $Q_{opt}$  will always be the \_\_\_\_\_ figure.

5. In a positive externality \_\_\_\_\_, meaning that the market provides too little of a \_\_\_\_\_ thing.

$Q_m$  will always be the \_\_\_\_\_ figure while  $Q_{opt}$  will always be the \_\_\_\_\_ figure.



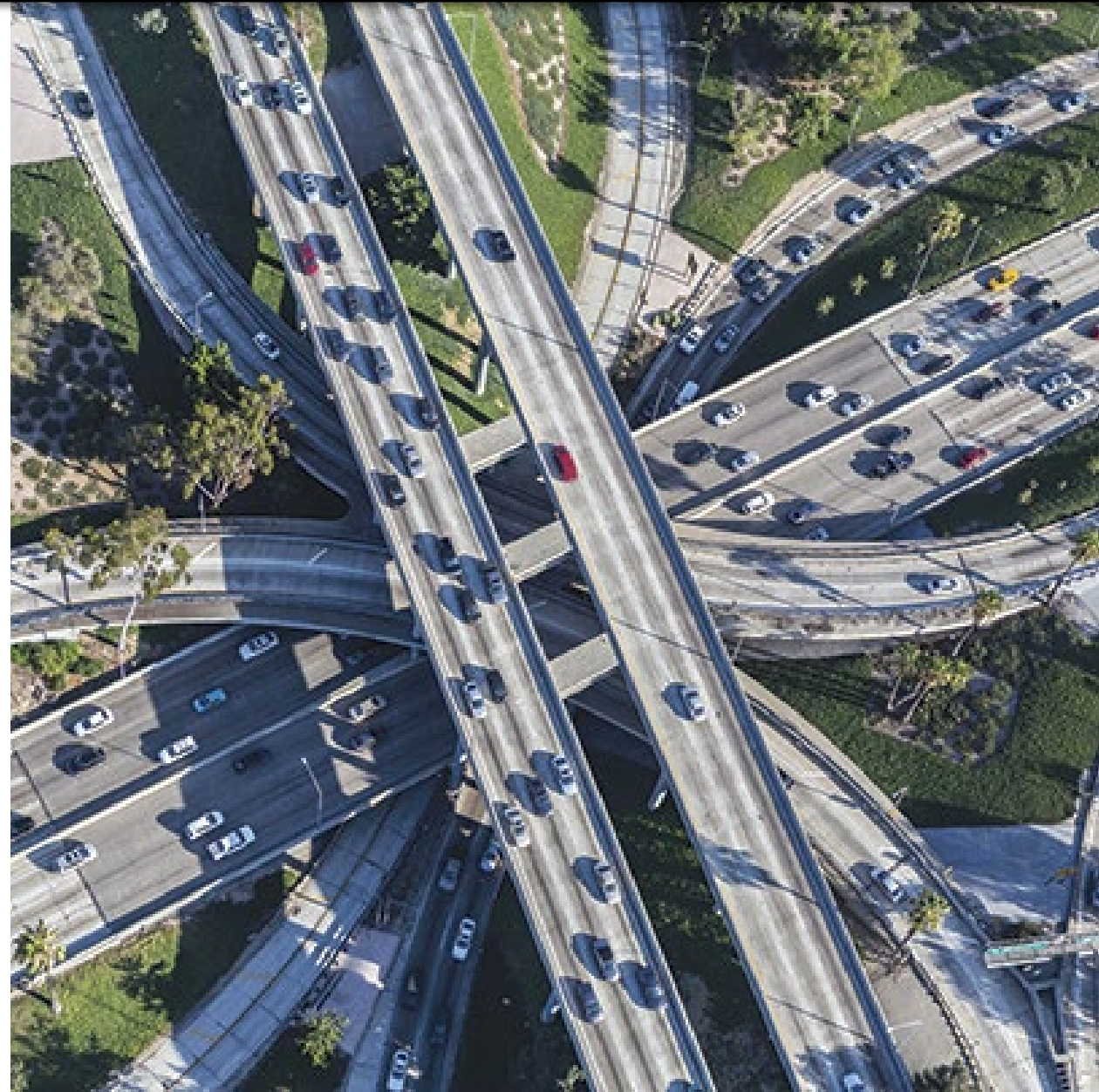
## 2.9 Market Failure – Externalities and Public Goods

### Public Goods

**Public goods** have the two characteristics:

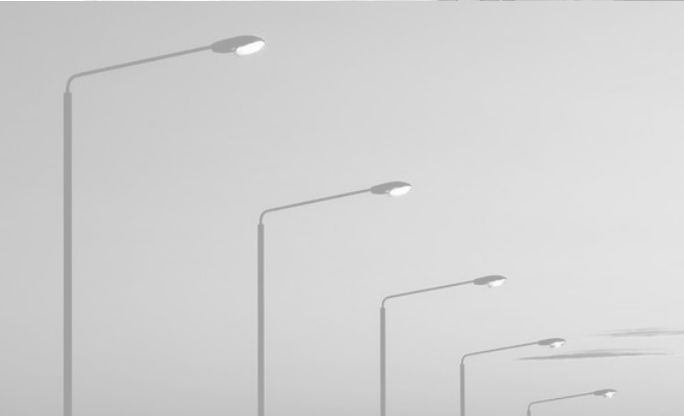
- **Non-rivalrous**  
Its consumption by one person does not reduce consumption by someone else
- **Non-excludable**  
It is not possible to exclude someone from using the good or service

**Private goods** are rivalrous and excludable.





## 2.9 Market Failure – Externalities and Public Goods



## 2.9 Market Failure – Externalities and Public Goods

	Rivalrous	Non-rivalrous
<b>Excludable</b>	<p>Private goods</p> <p>Goods with or without positive or negative externalities (both production and consumption) sold for a price. Merit goods (as long as they are produced by the market) and demerit goods</p> <p>Examples: computers, books, clothes, education, petrol (gasoline)</p>	<p>Quasi-public goods</p> <p>Goods that do not fall neatly into the other three categories; often (but not always) have large positive externalities so may be provided by the government</p> <p>Examples: uncrowded toll roads, museums, public swimming pools that charge entrance fees, cable TV</p>
<b>Non-excludable</b>	<p>Common pool resources</p> <p>Natural resources that are not owned by anyone, not sold in markets and not having a price; their lack of a price makes them subject to overuse (unsustainable use), depletion and degradation</p> <p>Examples: forests, rivers, lakes, soil quality, fish in the oceans</p>	<p>Public goods</p> <p>See the section below for an explanation of quasi-public goods.</p> <p>Socially desirable goods not produced by private firms because it is not possible to charge a price; they are subject to the <i>free rider problem</i>: people use them without having to pay; since they are socially desirable they are produced by the government and provided free of charge</p> <p>Examples: national defence, street lighting</p>



## 2.9 Market Failure – Externalities and Public Goods

### Public Goods – Free Rider Problem

**Free rider problem** occurs when people can enjoy the use of a good without paying for it.

The **free rider problem** arises from non-excludability: people cannot be excluded from using the good.

As such, public goods are a type of **market failure**.

Private firms would not want to produce these goods as firms are unable to charge consumers.

**Public goods** become underprovided in the free market.



## 2.9 Market Failure – Externalities and Public Goods



## 2.9 Market Failure – Externalities and Public Goods

### Public Goods

#### Policies

- Direct government provision
- Contracting out to private sector

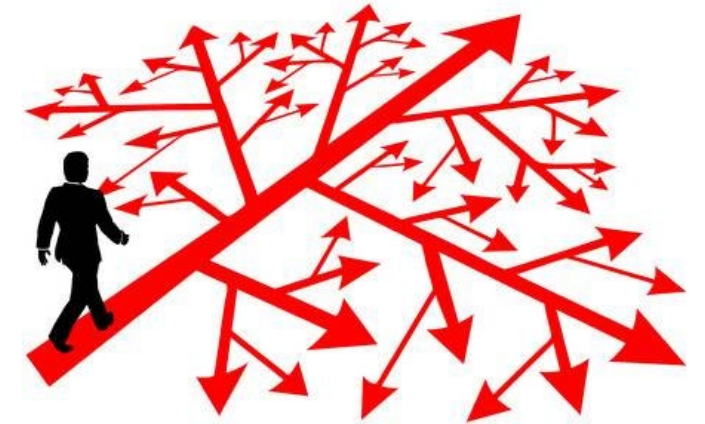


## 2.9 Market Failure – Externalities and Public Goods

### Implications of Direct Government Provision

Limited government funds force choices on what public goods to produce and each choice has an **opportunity cost**.

**Economic criteria** is used to decide which public goods will provide the greatest social benefits for the money spent.



**Votes or surveys** are conducted to estimate the expected benefits of public goods. **Problems with this method?**

**Cost-Benefits analysis** is a very rough and approximate method to make choices about public goods.



## 2.9 Market Failure – Externalities and Public Goods

### Contracting Out to the Private Sector

**Contracting out** by the public sector occurs when a government makes an agreement with a private firm to carry out an activity that the government was previously doing itself.

This will also be financed by tax revenues.

**Examples in Hong Kong includes:**

Public works, environmental hygiene, transportation, leisure and culture, security and property management



“Who checked the references on Bobby?”

## 2.9 Market Failure – Externalities and Public Goods

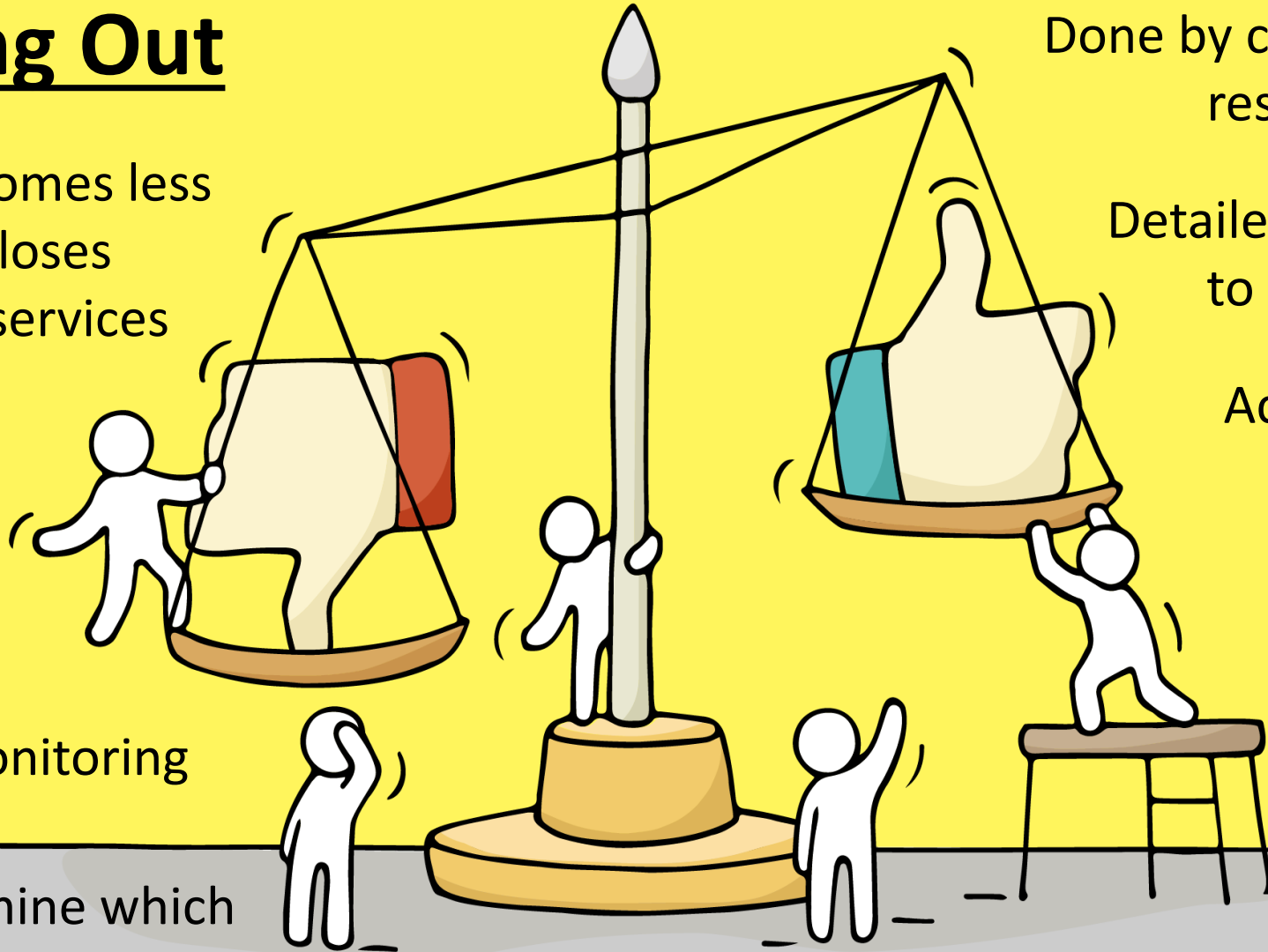
### Contracting Out

Government becomes less accountable and loses control over the services

Contracting out could be more costly than direct provision

Added cost of monitoring

Difficult to determine which goods should be contracted out



Done by competitive tendering resulting in lower prices

Detailed specifications leads to better quality control

Access to broader skills and technology

Private firm may be more flexible and innovative