2.7 Role of Government in Microeconomics

The Role of Government in the Market Economy

A **free market** is one without any government control or intervention.

However, governments may intervene to influence markets for particular goods.

Methods of intervention may include:

1. Indirect Taxes

2. Subsidies

3. Price Ceilings

4. Price Floors

5. **Nudges**

Reasons for Intervention

- To earn government revenue

- To support firms

- To support households on low incomes

- To influence level of production

- To influence level of consumption

- To correct market failure

- To promote equity

Reasons for Intervention

Top tip!

A useful way to remember the reasons for government intervention is the acronym **FETCH PM** (as in 'fetch the Prime Minister') – intervention is used to influence: **f**irms, **e**quity, **t**ax revenues, **c**onsumption, **h**ouseholds, **p**roduction and **m**arket failure.

Firms
Equity
Tax revenues
Consumption
Households

Production
Market failure

Reasons for Intervention

To earn government revenue

Do you remember…
The different ways the government raises revenue?

Tax revenue
Sale of goods and services
Privatisation
Sovereign wealth funds (SWF)
Public sector borrowing

Support firms

Correct market failure

Promote equity

Reasons for government intervention in markets

Influence the level of production

Earn government revenue

Support households on low income

Influence the level of consumption

Reasons for Intervention

To support firms

- Subsidies

- Tax concessions

- Protecting domestic infant industries

- Business development funds

- Research development funding

- Financial bailouts

Support firms

Promote equity

Correct market failure

Reasons for government intervention in markets

Earn government revenue

Influence the level of production

Support households on low income

Influence the level of consumption

Coronavirus: Hong Kong's Ocean Park needs HK$5 billion lifeline but are taxpayers being taken for a ride?

- The attraction, which has been running at a deficit for years and steadily losing visitors, could be forced to close by June if no help comes
- The legislature will review the proposal on Friday, but not all lawmakers think the money is a wise investment

Chris Lau and Ng Kang-chung
Published: 2:43pm, 11 May, 2020

Why you can trust SCMP

Ocean Park could go out of business without the government bailout, the commerce chief said. Photo: Winson Wong

Hong Kong's cash-strapped Ocean Park could go bankrupt next month unless it receives an urgent bailout of HK$5.4 billion, the government warned on Monday, even as lawmakers questioning the use of taxpayers' money looked set to make funding approval a rough ride.

The proposal, which the Legislative Council's Finance Committee will review on Friday before a possible vote, could buy the tourist attraction enough time to stay afloat for another 12 months, Secretary for Commerce and Economic Development Edward Yau Tang-wah said.

The government had considered giving the park HK$10.64 billion back in January for longer-term renovation, but given the collapse of the tourism industry caused by the Covid-19 pandemic was now weighing only half that amount, according to Yau.

The emergency funding could provide a window for management to come up with a better plan for the park's survival and allow payment of HK$3 billion in commercial debt, he said, describing the operational and financial challenges the park faced as "unprecedented". Another HK$5 billion is owed to the government.
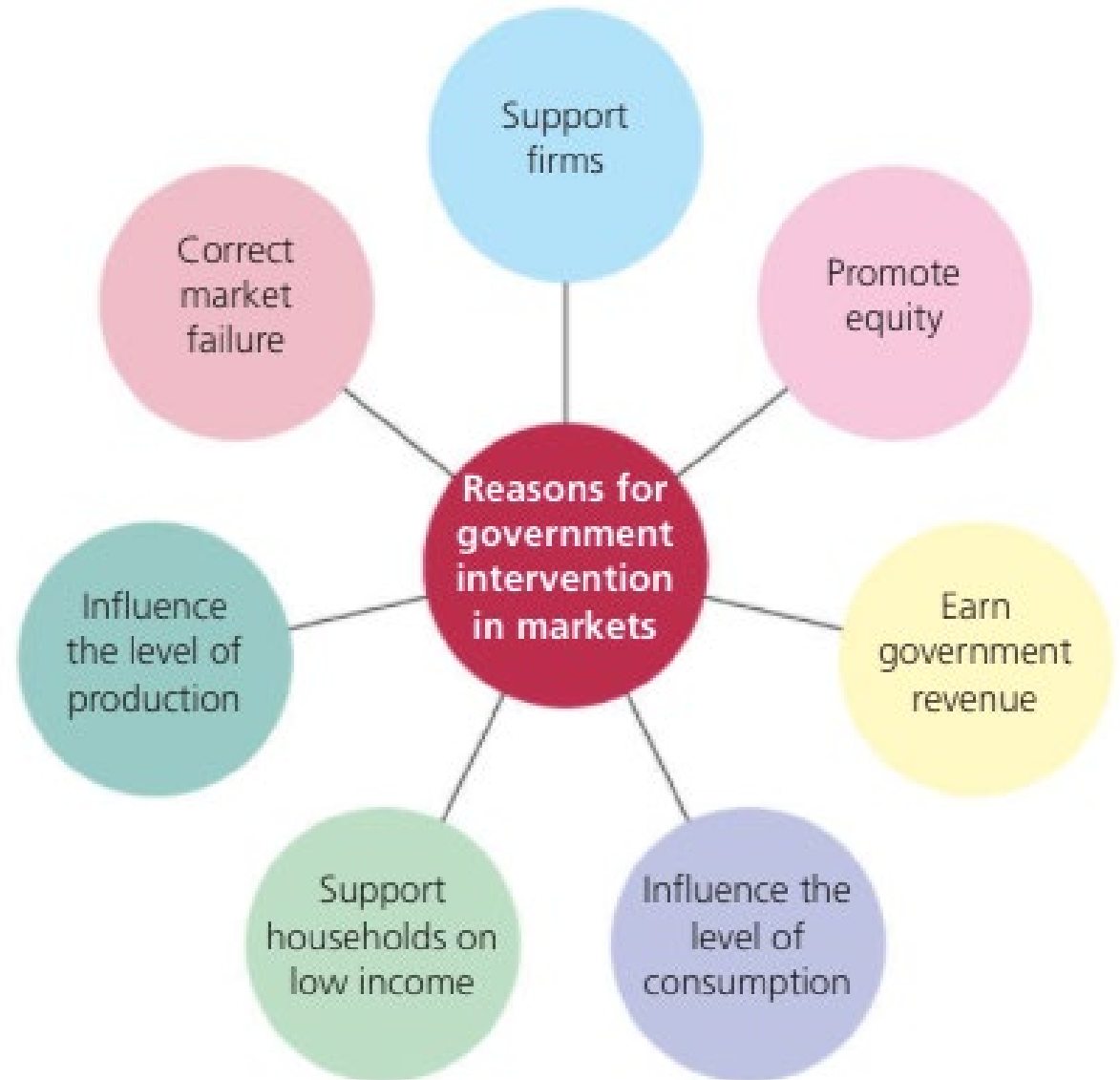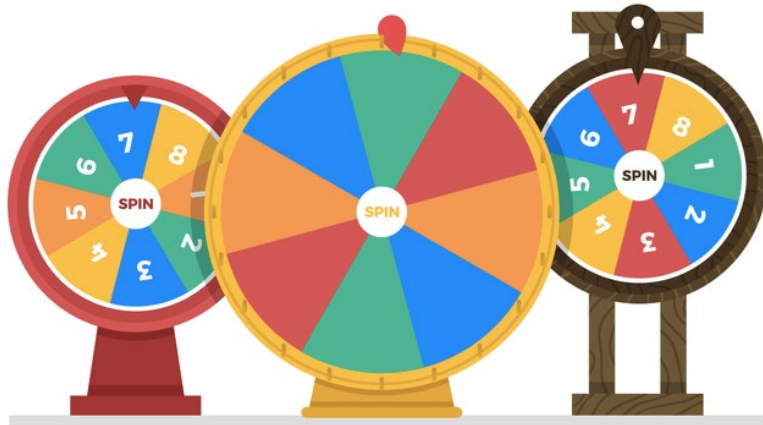
Reasons for Intervention

To support firms

In a small pair or group… Find how the governments in the following countries have supported firms during Covid-19.

Support firms

Promote equity

Correct market failure

Reasons for government intervention in markets

Earn government revenue

Influence the level of production

Support households on low income

Influence the level of consumption

Reasons for Intervention

To support low income households

Those in poverty lack basic income so are deprived of being able to meet their basic human needs necessary for survival.

Support can be give in the form of...

- Subsidies
- Price ceilings
- Direct provision
- Transfer payments

Support firms

Promote equity

Correct market failure

Reasons for government intervention in markets

Earn government revenue

Influence the level of production

Support households on low income

Influence the level of consumption

Reasons for Intervention

To influence the level of production

While the government can provide support to firms to encourage production, it can also limit the level of output to reduce **negative externalities** from arising.

Competition policy may be used to promote general economic fairness in the markets.

Support firms

Promote equity

Correct market failure

Reasons for government intervention in markets

Earn government revenue

Influence the level of production

Support households on low income

Influence the level of consumption
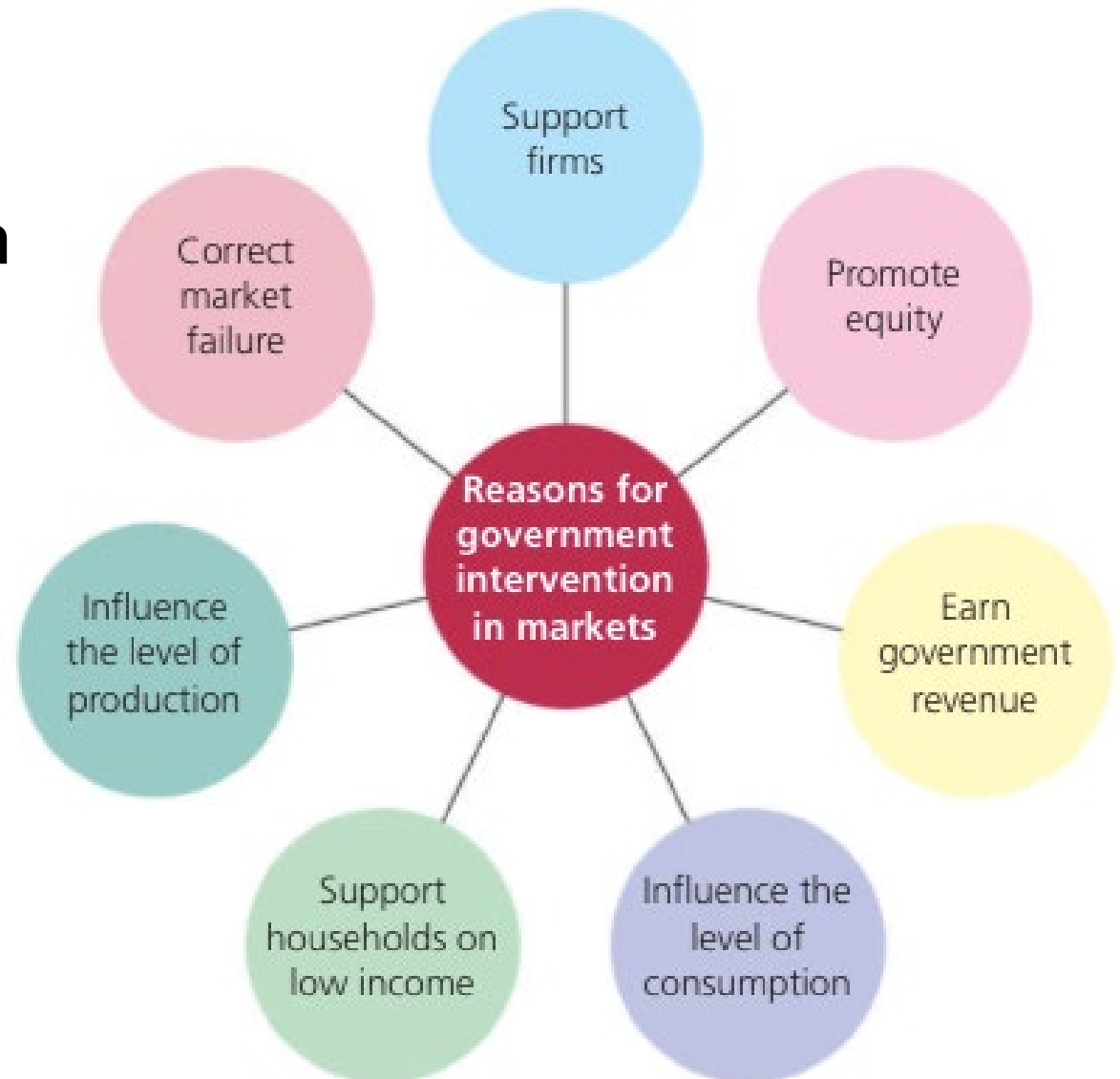
Reasons for Intervention

To influence consumption levels

Government wants to influence consumers to consume more **merit goods** and less of **demerit goods**.

This can be done by...

- Subsidies
- Direct provision of services
- Nudges
- Laws and regulations

Reasons for Intervention

To correct market failure

Market failure refers to the failure of the market to achieve allocative efficiency.

Too many or too few goods may be produced or consumed in relation to <u>what society mostly prefers</u>.

Government policies will be used to deal with issues of **market failure**.

Reasons for Intervention

To promote equity (equality)

The market system does not achieve an equitable distribution of income or wealth.

Equity is interpreted as equality.

Redistribution of income is required.

What do you think…
Are the problems of having a large wealth gap in a nation?

Correct market failure

Support firms

Promote equity

Reasons for government intervention in markets

Influence the level of production

Earn government revenue

Support households on low income

Influence the level of consumption
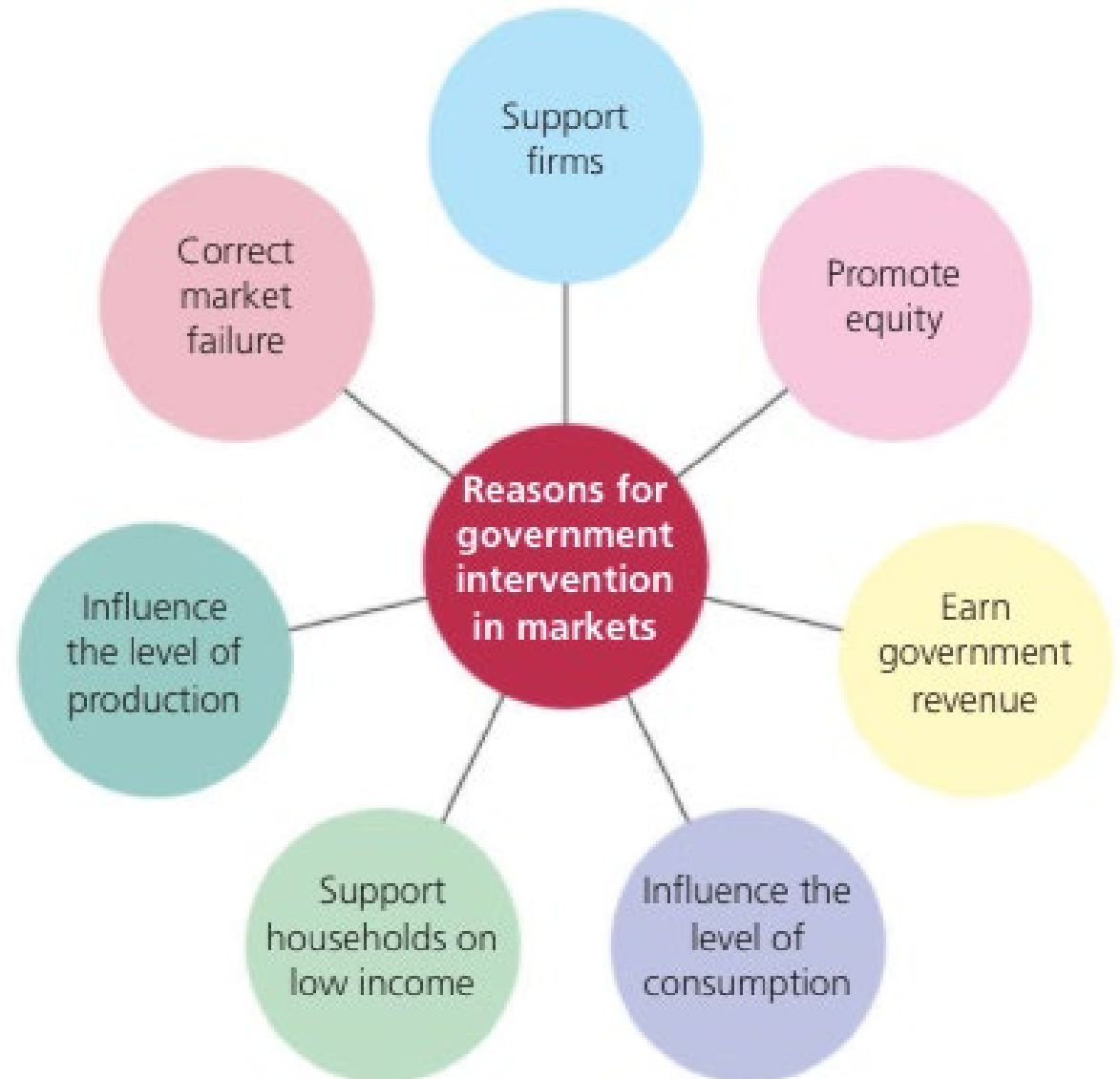
Forms of Intervention

The following forms are undertaken at the microeconomic level:

- Price controls

- Indirect taxes

- Subsidies

- Direct provision

- Regulation and legislation

Price Controls

Price controls refer to the setting of minimum or maximum prices by the government (or firms) so that prices are unable to adjust their equilibrium level.

How do price controls differ from indirect taxes and subsidies?

Price controls result in shortages or surpluses – i.e. persisting market disequilibrium.

Misallocation of resources may occur.

Types of price controls

1. Price ceiling

2. Price floors

Price Ceilings

A **price ceiling** is a <u>legal maximum price</u> that the government sets for a particular product. This is done when the government believes the prices are too high.

Example: Price ceiling may be placed on food, utilities and rent.
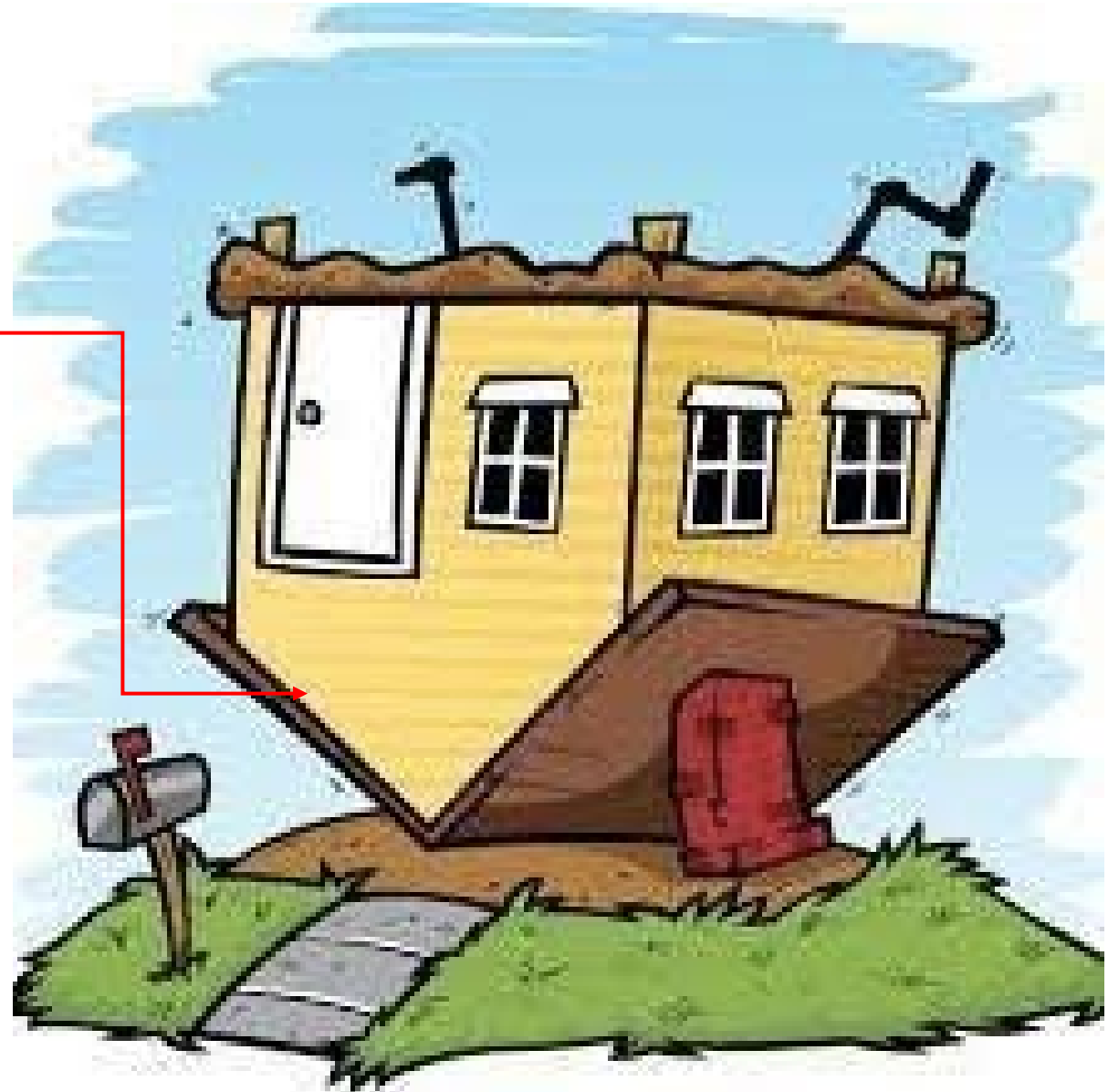
Price Ceilings Diagram

The government in South Korea has announced that it will implement a **price ceiling** on privately built apartment in extended efforts to stabilize the real estate markets.

This is the strongest measure ever taken by the government to clamp down on housing prices.

Illustrate the effect of this price ceiling on the property market in South Korea.

Price Ceilings Diagram

Property Market

The price ceiling **must be below the equilibrium price** in order for it to be effective i.e. **Pe > Pc**

As a result of the price ceiling:

- Quantity supplied decreases from **Qe to Qs**

- Quantity demanded increases from **Qe to Qd**

- Quantity demanded **(Qd)** > Quantity Supplied **(Qs)**

- At the price ceiling **(Pc)**, there is a **market disequilibrium**
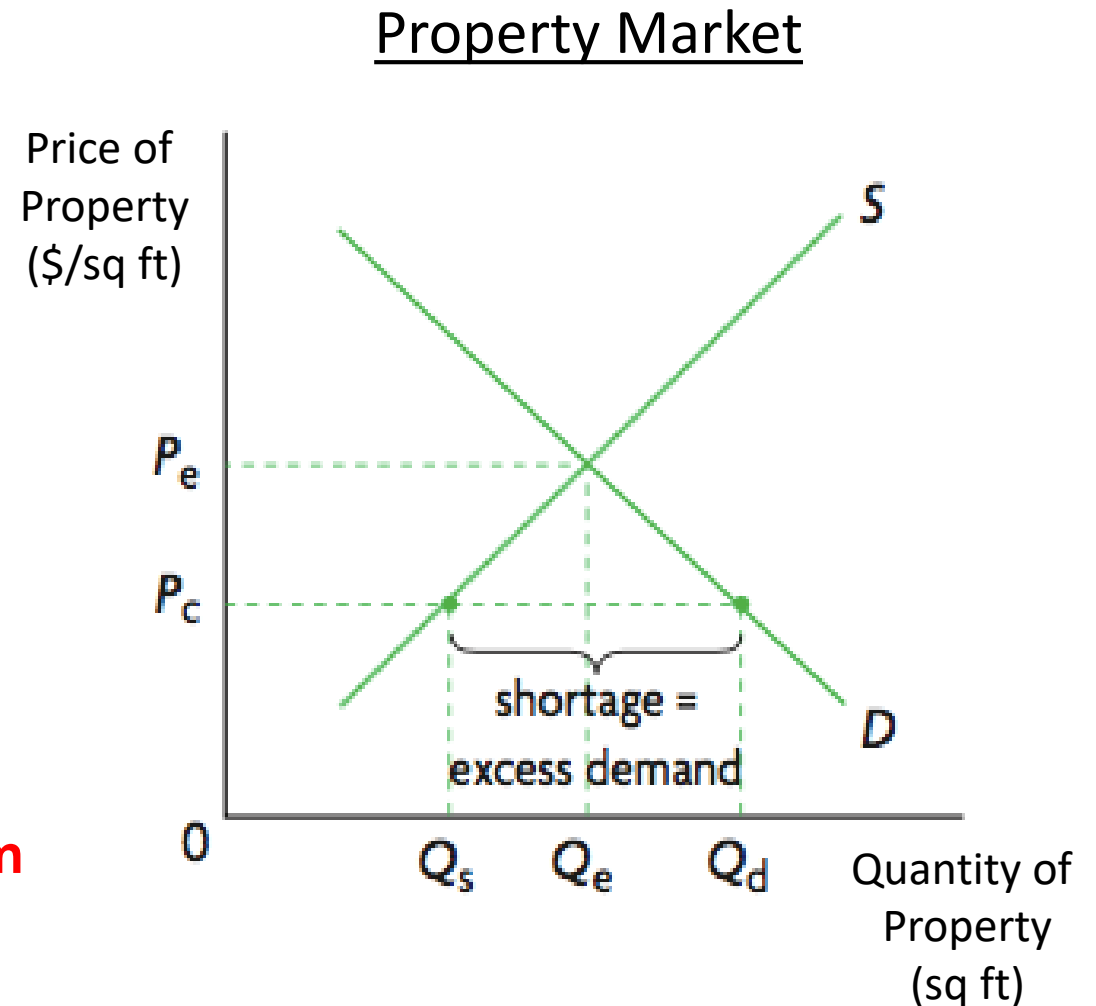
Price of Property ($/sq ft)

P_e

P_c

S

D

shortage = excess demand

0

Q_s Q_e Q_d

Quantity of Property (sq ft)

Price Ceilings

Consequences for the economy:

1. **Shortages**
   Quantity demanded (Qd) > Quantity supplied (Qs)

2. **Non-price rationing**

Price rationing is a method of rationing that allocates the limited quantities of goods and services <u>using markets and prices</u>.

Price Ceilings

Consequences for the economy:

1. **Shortages**
   Quantity demanded (Qd) > Quantity supplied (Qs)

2. **Non-price rationing**

   ▪ Waiting in line/First-come-first-served.

   ▪ Distribution of coupons to purchase a fixed amount of products.

   ▪ **Favouritism:** Sellers can sell to their **preferred customers.**

Price Ceilings

Consequences for the economy:

3. **Underground (or parallel) markets** involve buying/selling transactions that are unrecorded and are usually illegal.

- Buying a good at the maximum legal price and then illegally reselling at a higher price.

- Dissatisfied buyers who were not able to purchase the product at the price ceiling are **willing to pay more** than the legal price to obtain it.

Price Ceilings

Property Market

Consequences on various stakeholders:

Consumers

Price of
Property
($/sq ft)

<div style="background-color: yellow">

Consumer surplus is the difference between the total amount that **consumers** are willing and able to pay for a good and the total amount that they actually do pay (i.e. the market price).

</div>

welfare loss $S = MC$

a

P_e

b

c

d

P_c

e

$D = MB$

- Consumer surplus changes from **(a + b)** to **(a + c)**

0

Q_s Q_e Q_d Quantity of Property (sq ft)

- Consumers <u>partly gain and partly lose</u> depending on whether they were able to purchase the product.
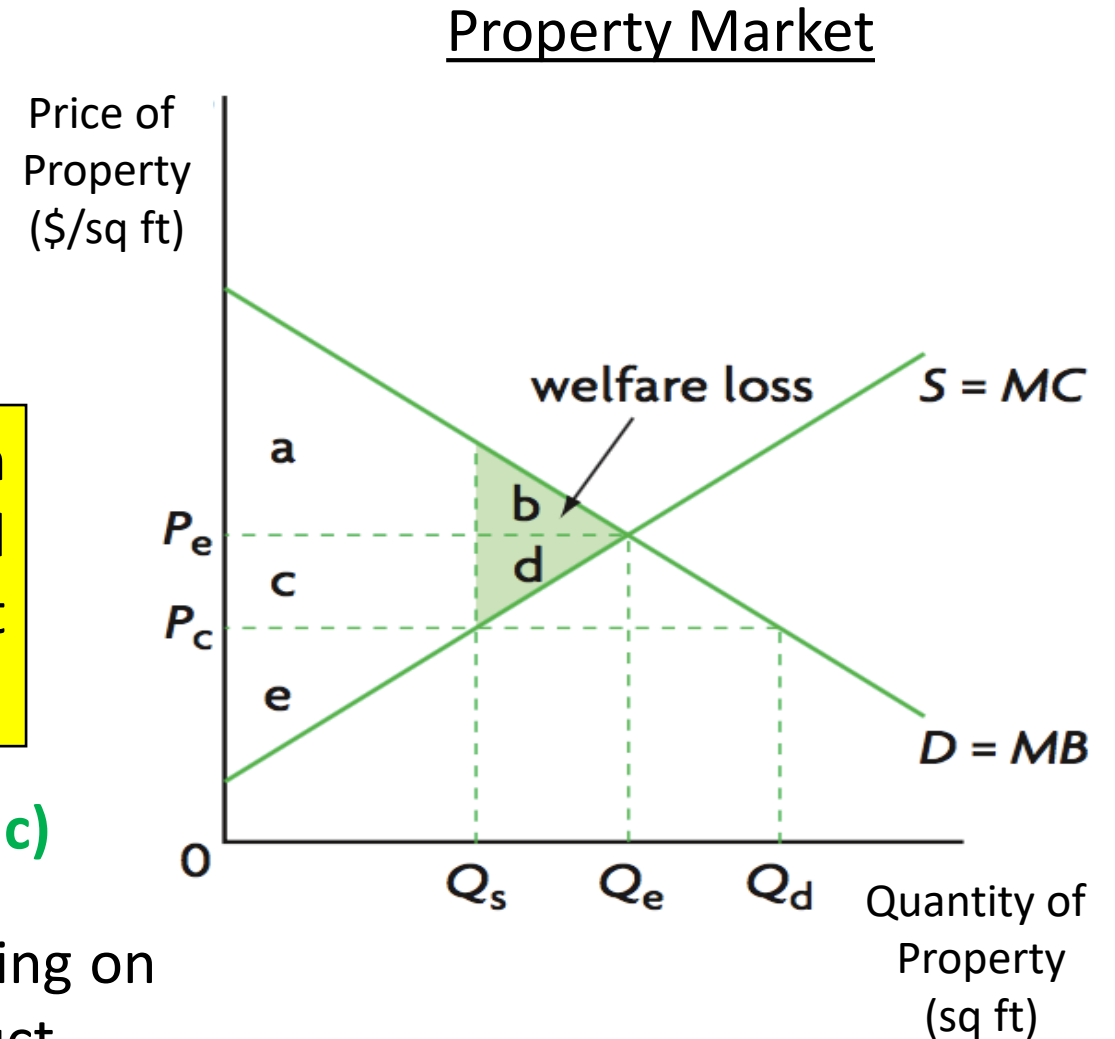
Price Ceilings

Property Market

Consequences on various stakeholders:

Firms (Producers)

Producer surplus is the difference between what producers are willing and able to supply a good for and the price they actually receive.

- Producer surplus changes **(c + d + e)** to **(e)**

- Firms are worse off as their revenues changes from **(Pe x Qe)** to **(Pc x Qs)**
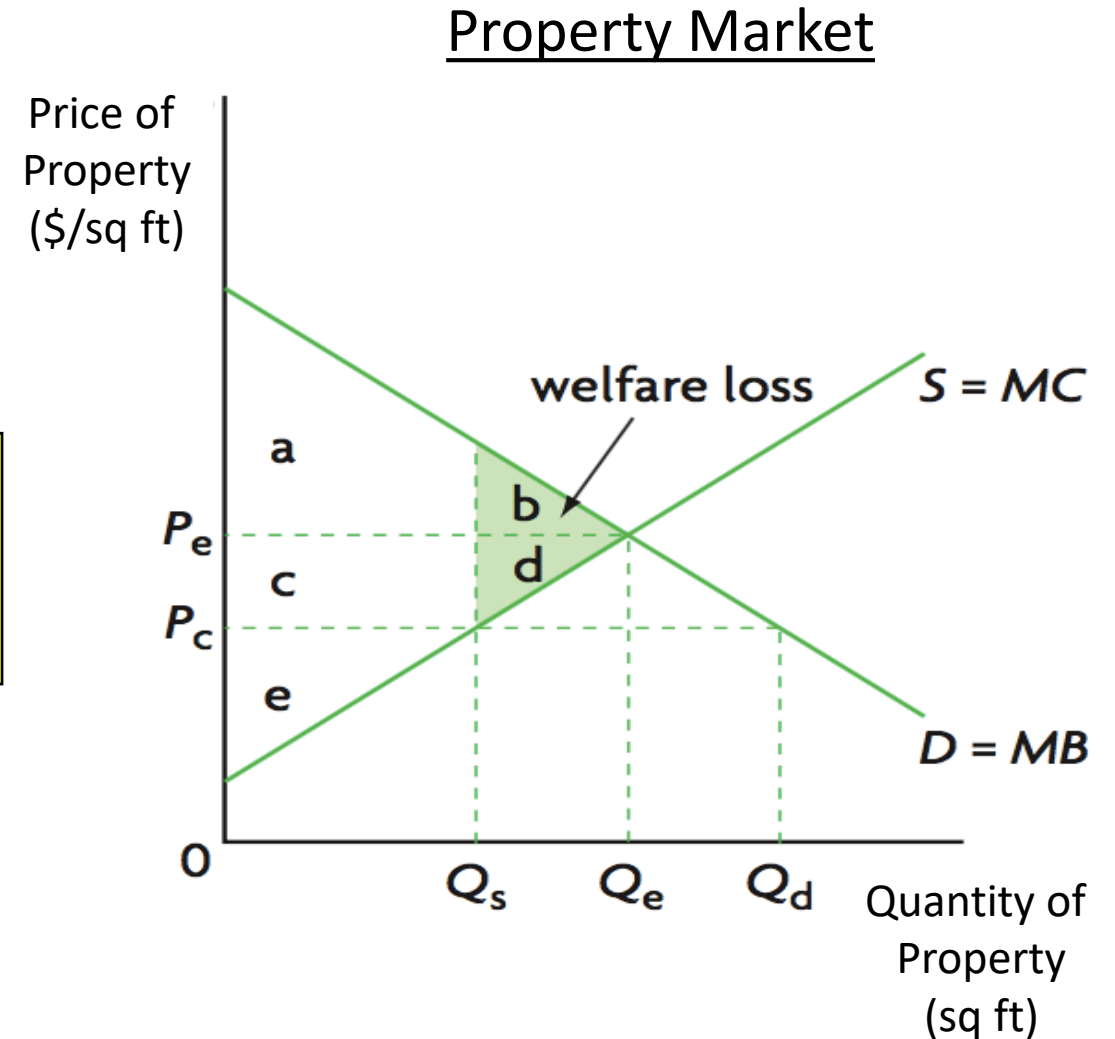
Price of Property ($/sq ft)

welfare loss   S = MC

a

P_e

c   b   d

P_c

e

D = MB

0   Q_s Q_e Q_d Quantity of Property (sq ft)

Price Ceilings

Consequences on various stakeholders:

Government

- May improve political popularity

Workers

- Result in unemployment as fewer workers are needed when firms produce less **(Qe to Qs)**
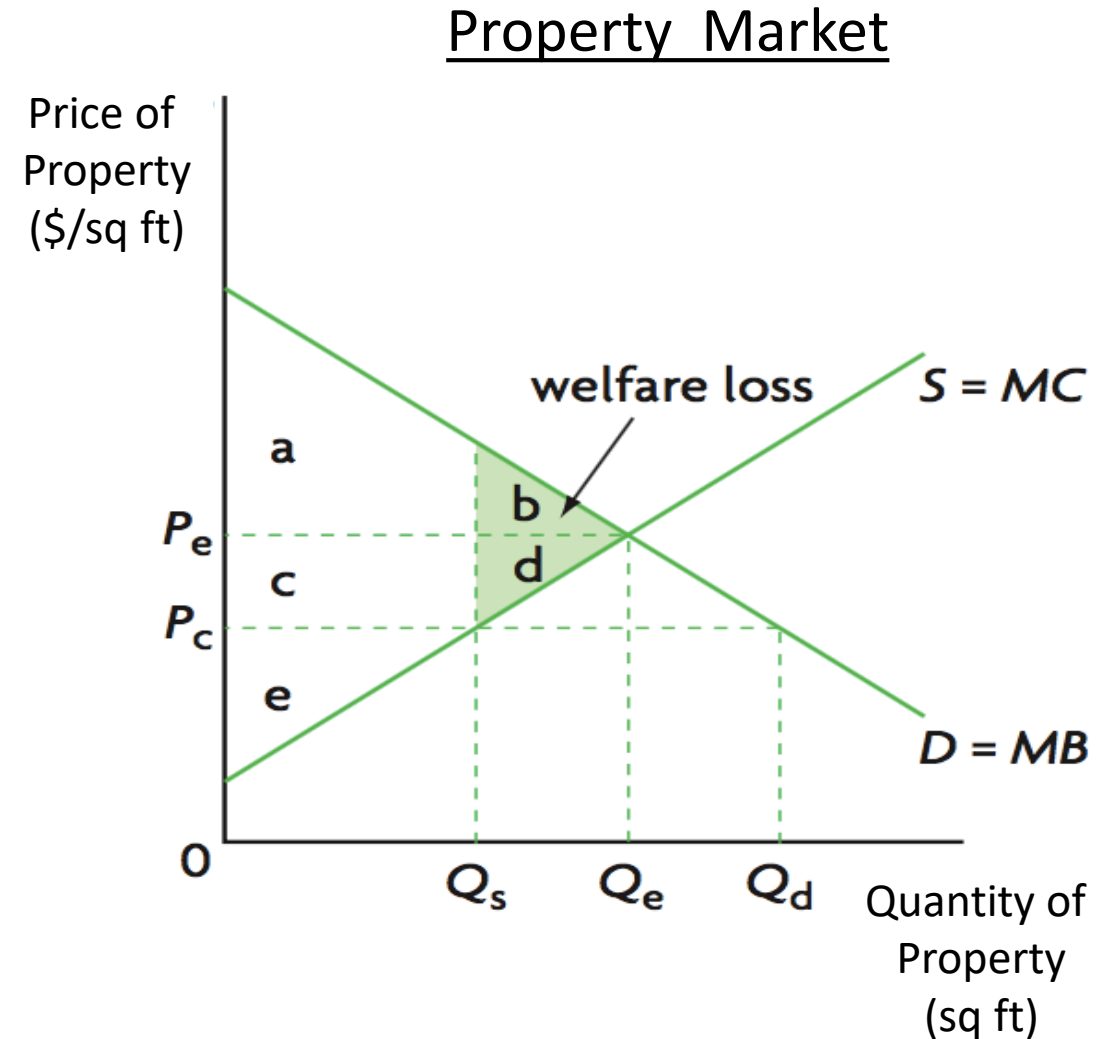
Property Market

Price Ceilings

Consequences on various stakeholders:

Society as a whole

- Society is worse off as a result of the price ceiling as there is now <u>welfare loss</u> **(b + d)**

Welfare loss represents the benefits that are lost to society because of resource misallocation.

- There is resource misallocation as **MB > MC at Qs**

Price of Property ($/sq ft)

welfare loss $S = MC$

a

P_e

b

c   d

P_c

e

$D = MB$

0   Q_s Q_e Q_d Quantity of Property (sq ft)
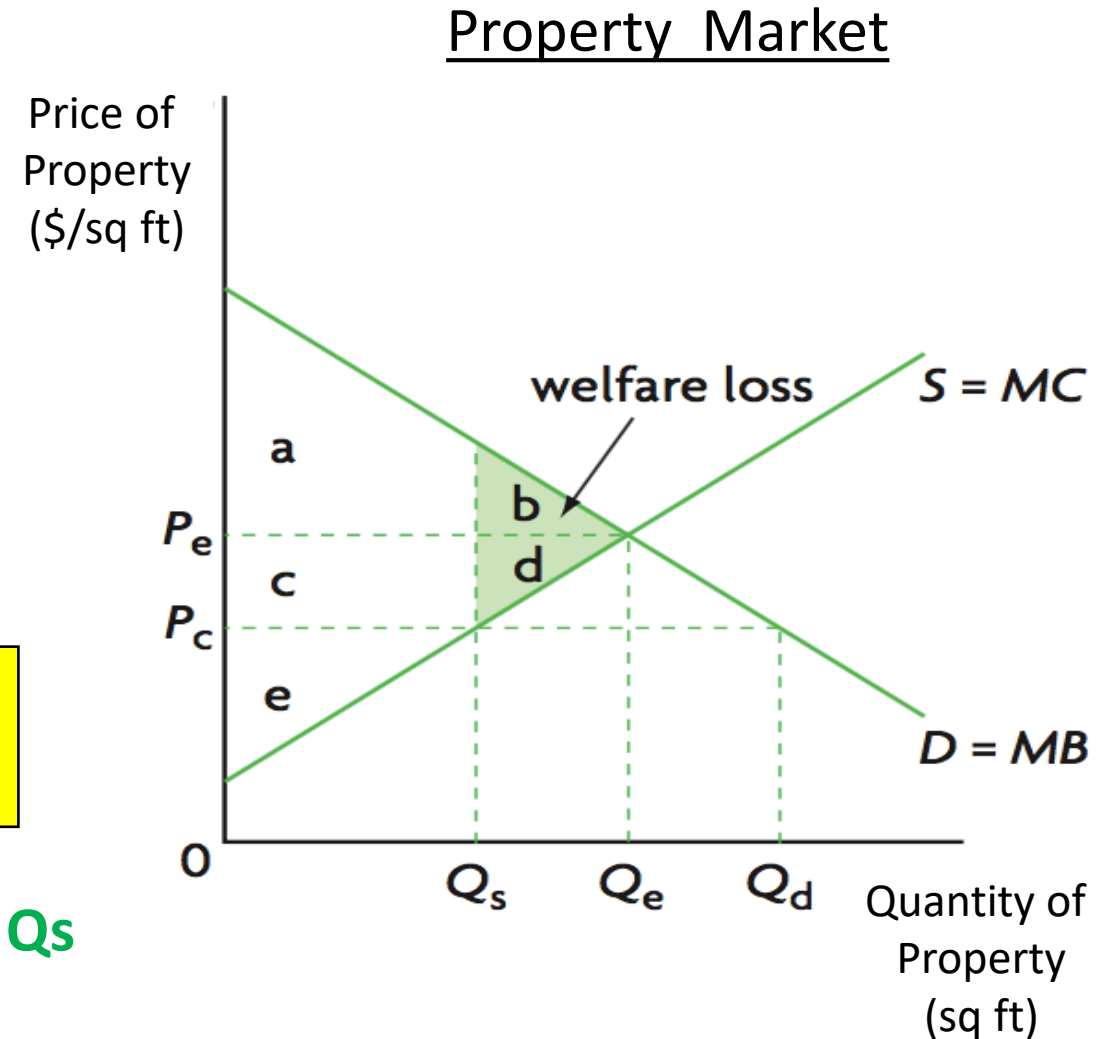
Price Ceilings: Rent Control Example

Rent control consist of a maximum legal rent on housing, which is below the market-determined level of rent.

Consequences of rent control include:

- Housing becomes more affordable to low-income earners.

- Longer waiting lists of interested tenants

- Black market where tenants sublet their apartments above the legal maximum

- Run-down and poorly maintained rental housing since it is unprofitable for landlords to maintain or renovate their rental units.

Price Ceilings: Calculation

Shortage (Excess Demand)

<u>Property Market</u>

Using the diagram…

Calculate the **excess demand** shown

Excess demand = Qd at **Pc** – Qs at **Pc**

= 30,000 – 10,000

= 20,000 units per week
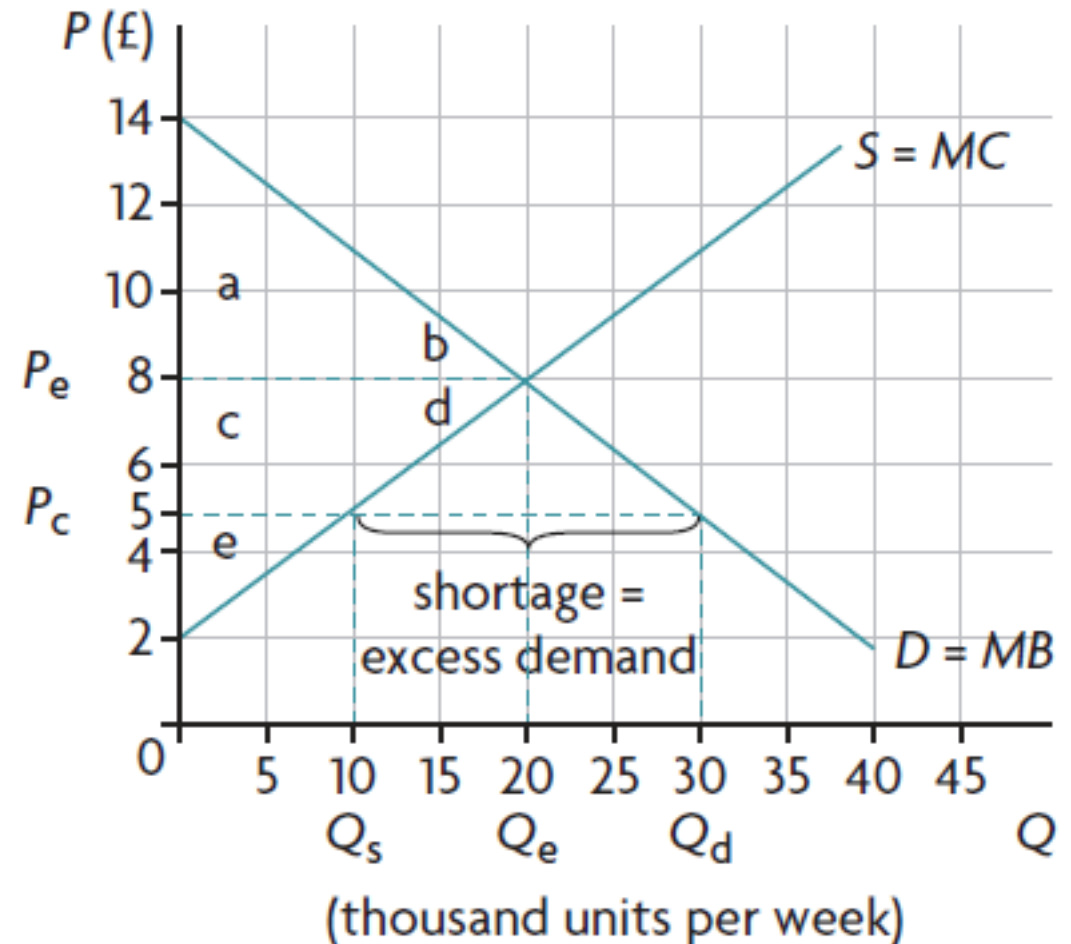
Price Ceilings: Calculation

Property Market

Change in consumer expenditure

Using the diagram… Calculate the change in consumer expenditure after the **price ceiling**.

At equilibrium = Pe x Qe	Price ceiling = Pc x Qs
= £8 x 20,000	= £5 x 10,000
= £160,000	= £50,000

Change in consumer expenditure = £160,000 – £50,000
= £110,000

This would be the same as the change in **producer (firm) revenue**

P ($£$)
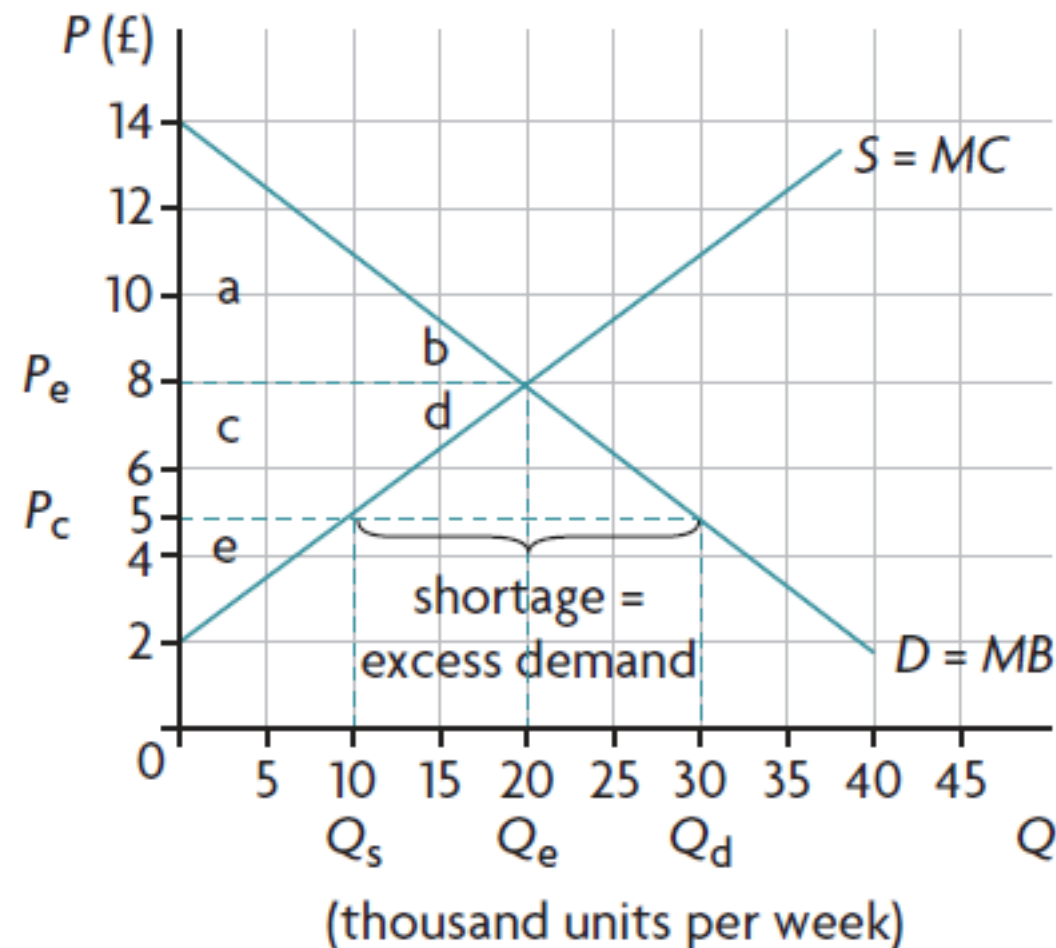
14

12

P_e 10   a

8   b

P_c c   d

6

5   e

4

2

shortage =

excess demand

$S = MC$

$D = MB$

0   5   10   15   20   25   30   35   40   45

Q_s Q_e Q_d Q

(thousand units per week)

Price Ceilings: Calculation

Change in consumer surplus

Using the diagram…

Calculate the change in **consumer surplus**.

Property Market

Consumer surplus =

$$\frac{(P \text{ intercept of } D \text{ curve minus } P \text{ of consumers}) \times Q \text{ purchased}}{2}$$

Initial consumer surplus $= \dfrac{(14-8)\ 20\,000}{2} = \dfrac{6 \times\ 20\,000}{2}$

$= £60000$

Price Ceilings: Calculation
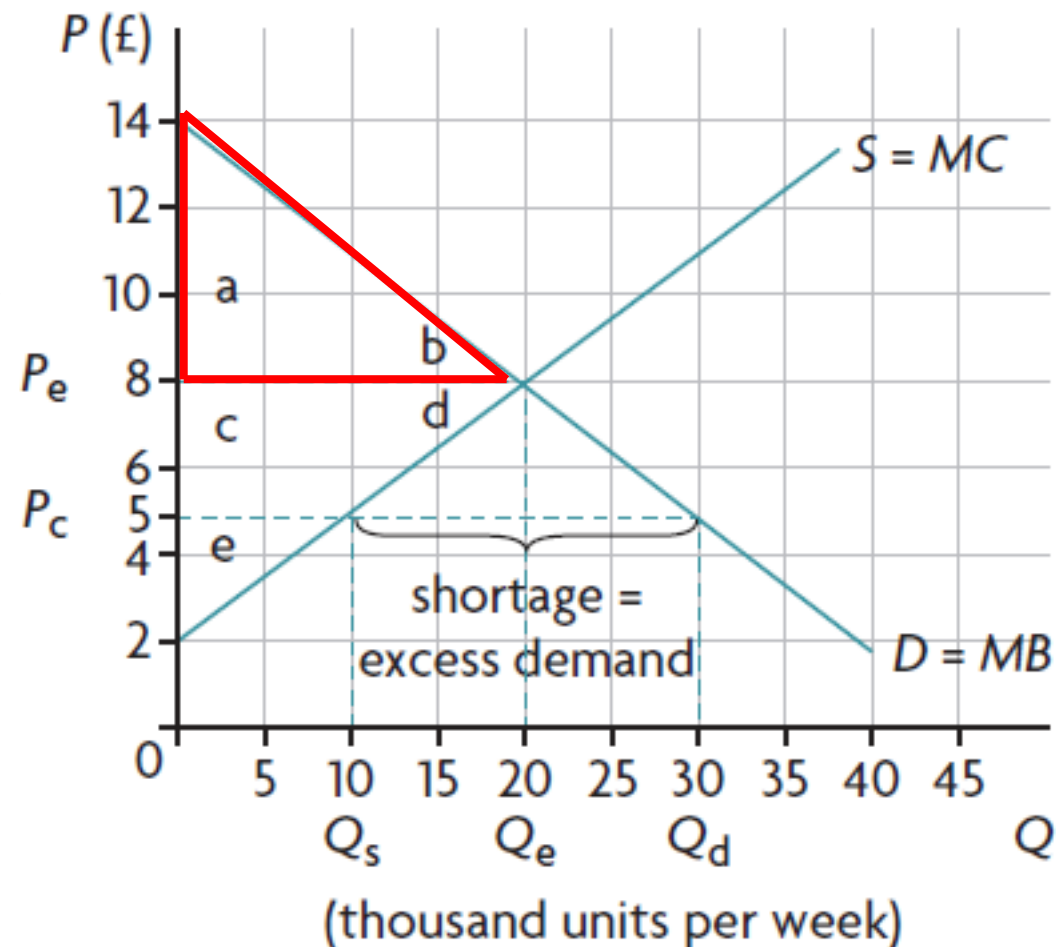
Property Market

Change in consumer surplus

? ? ? Using the diagram…

Calculate the change in **consumer surplus**.

$$\text{area of trapezium} = \frac{(a+b)\times c}{2}$$

$$\text{Final consumer surplus} = \frac{[(14-5)+(11-5)]\times 10\,000}{2}$$

$$= \frac{(9+6)\times 10\,000}{2} = \frac{150\,000}{2} = £75\,000$$

Therefore consumer surplus has increased by £75 000 – £60 000 = £15 000.

P (£)
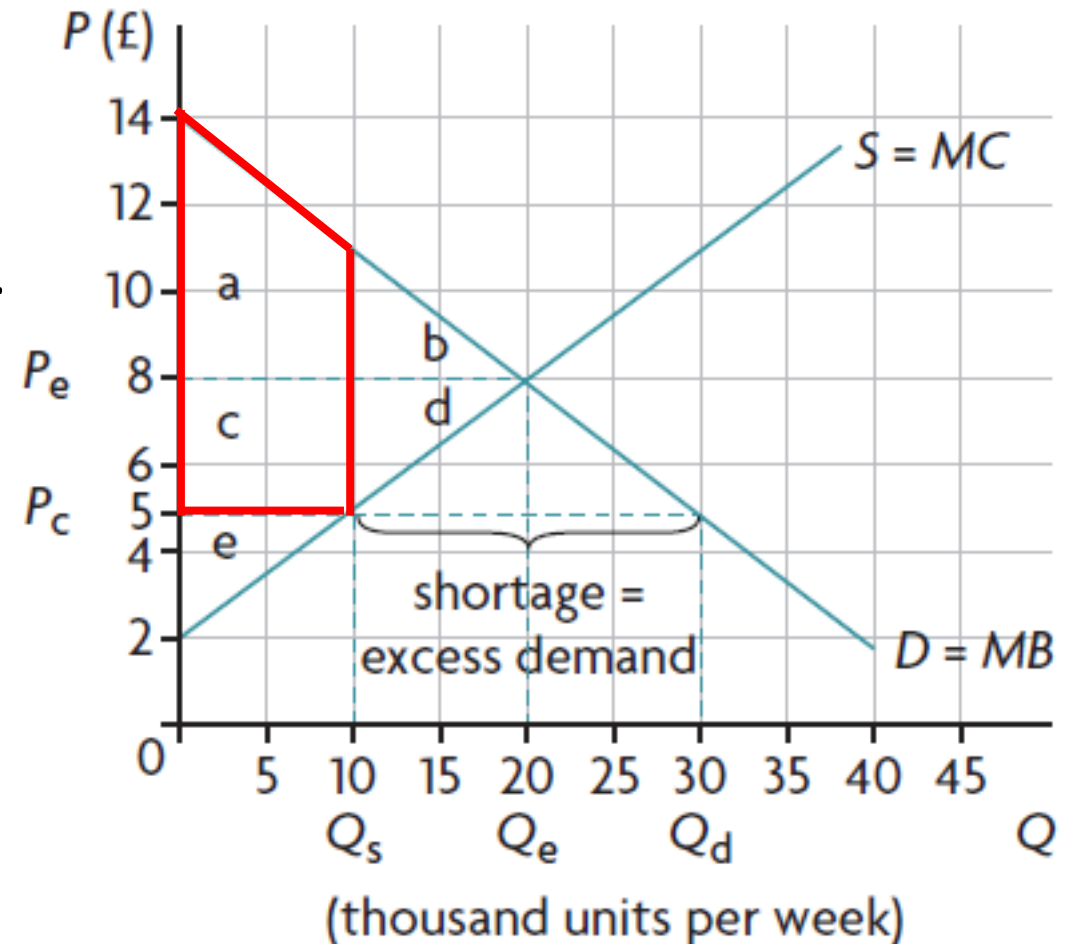
$S = MC$

a

b

P_e 8

c d

P_c 5

e

shortage =
excess demand

$D = MB$

5   10   15   20   25   30   35   40   45

Q_s Q_e Q_d Q

(thousand units per week)

Price Ceilings: Calculation

Change in producer surplus

Using the diagram…

Calculate the change in **producer surplus**.

Property Market
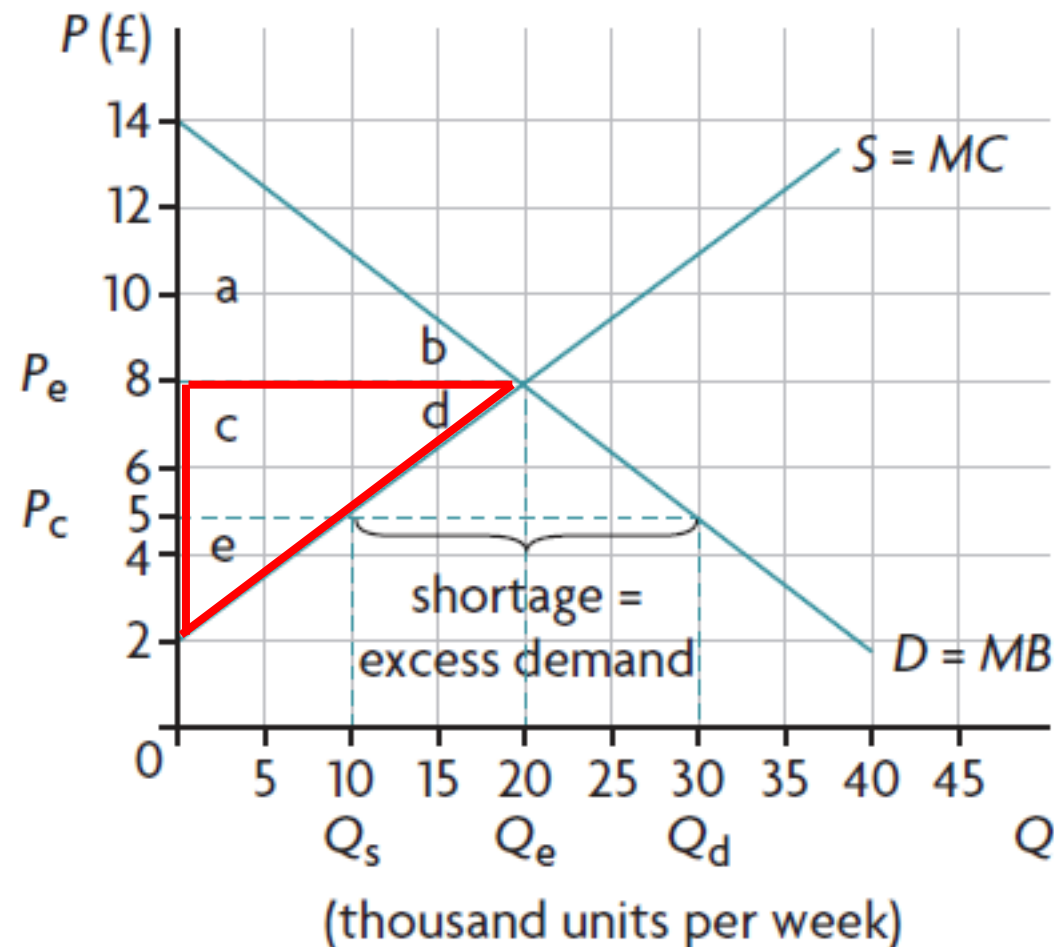
Price Ceilings: Calculation

<u>Property Market</u>

Change in producer surplus

Using the diagram…

Calculate the change in **producer surplus**.

Producer surplus =

$$\frac{(P \text{ of producers minus } P \text{ intercept of } S \text{ curve}) \times Q \text{ sold}}{2}$$

Final producer surplus $= \dfrac{(5-2) \times 10\,000}{2} = \dfrac{3 \times 10\,000}{2}$

$= £15\,000$

Producer surplus has decreased by £60 000 – £15 000 = £45 000.
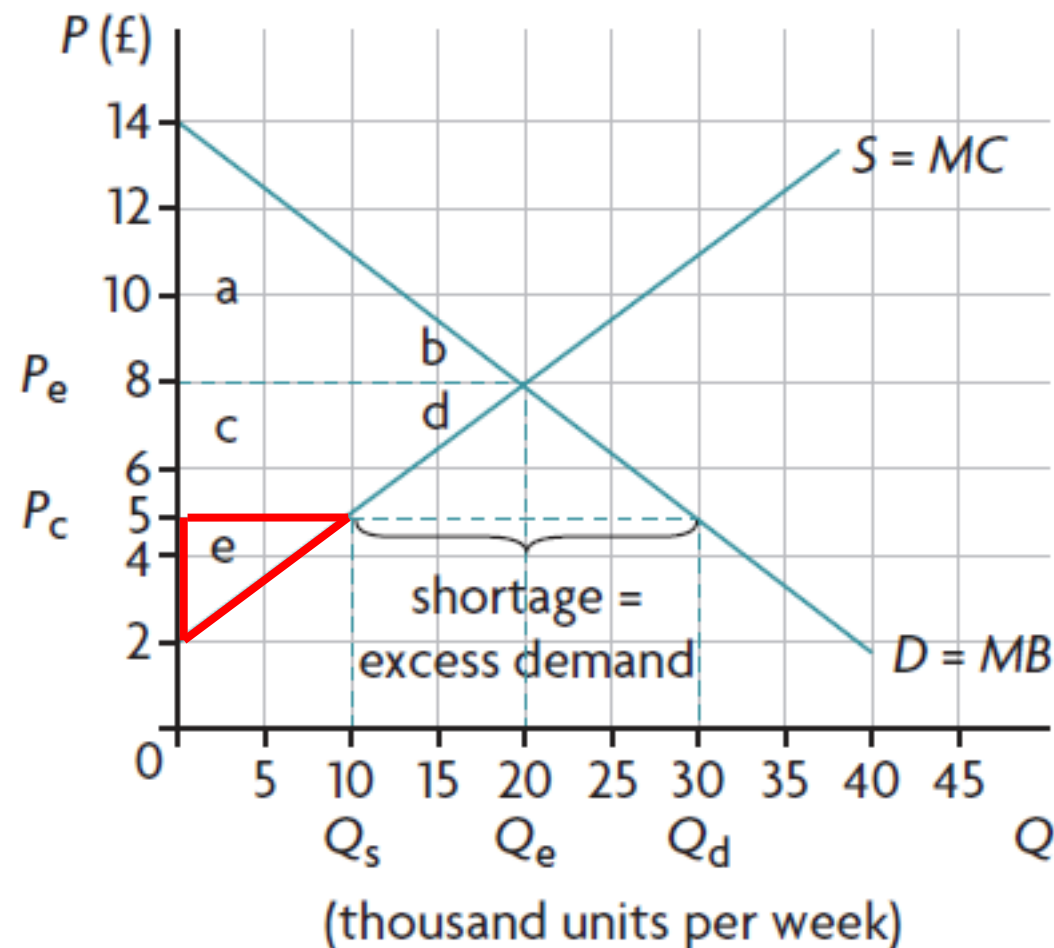
Price Ceilings: Calculation

Welfare Loss

Using the diagram…

Calculate the **welfare loss**.

$$\text{Welfare loss} = \frac{(11-5) \times (20\,000 - 10\,000)}{2} = \frac{6 \times 10\,000}{2}$$

$$= £30\,000$$

Test Your Understanding

Activity 4.2 – Textbook (Page 120)

Property Market
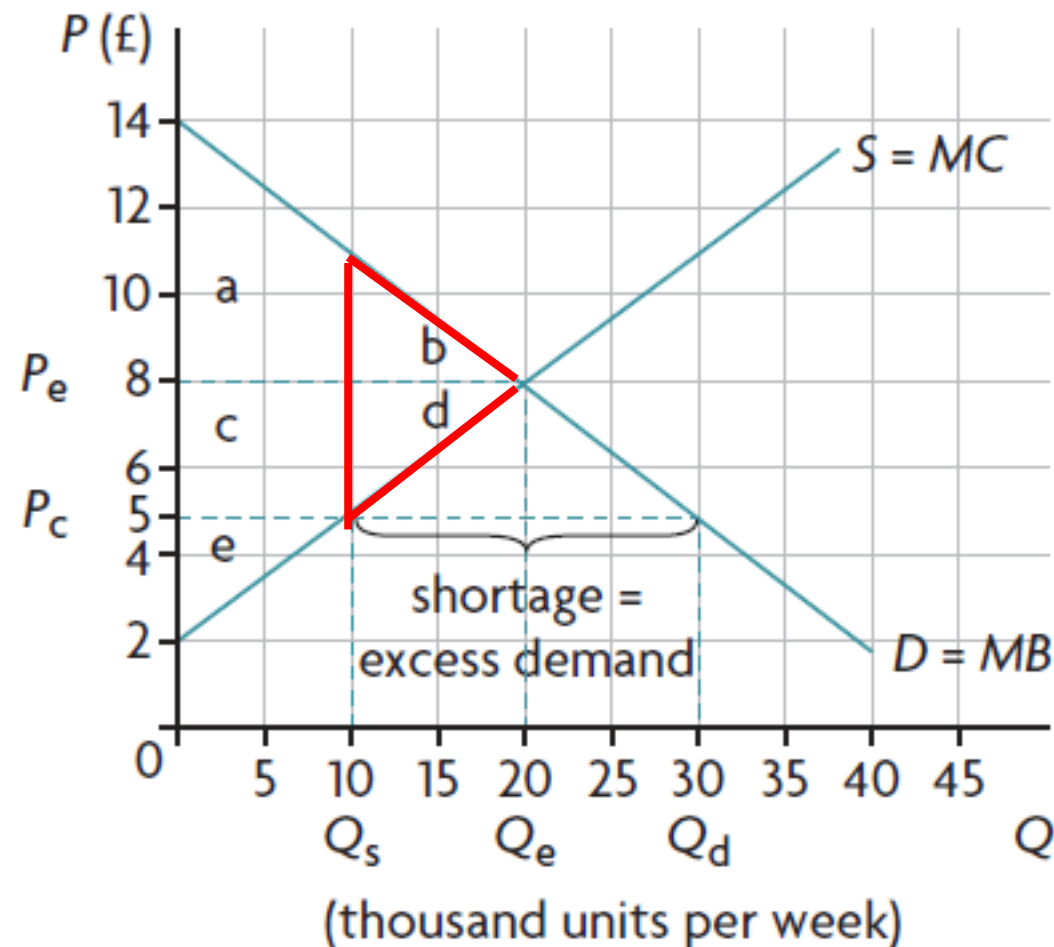
Price Floors

A **price floor** is a <u>legal minimum price</u> that the government sets for a particular product. This is done when the government believes the prices are too low.

The government may impose price floors for two main reasons:

1. To provide income support for farmers **(product market)**

2. Protect low-skilled, low-wage workers **(resource market)**

Price Floors Diagram

Cocoa-producing countries have been searching for ways to protect farmers from market swings after global overproduction sent price crashing in 2016-17, and as ongoing oversupply has meant a slow recovery in prices.

Peru, the world's seventh-largest cocoa producer is proposing a **$3,200 per tonne price minimum**.

Illustrate the effect of this price floor on the cocoa market in Peru.

Price Floors Diagram

The price ceiling **must be above the equilibrium price** in order for it to be effective i.e. **Pf > Pc**

As a result of the price floor:

▪ Quantity demanded decreases from **Qe to Qd**

▪ Quantity supplied increases from **Qe to Qs**

▪ Quantity Supplied **(Qs) >** Quantity demanded **(Qd)**

▪ At the price floor **(Pf)**, there is a **market disequilibrium**

Cocoa Market
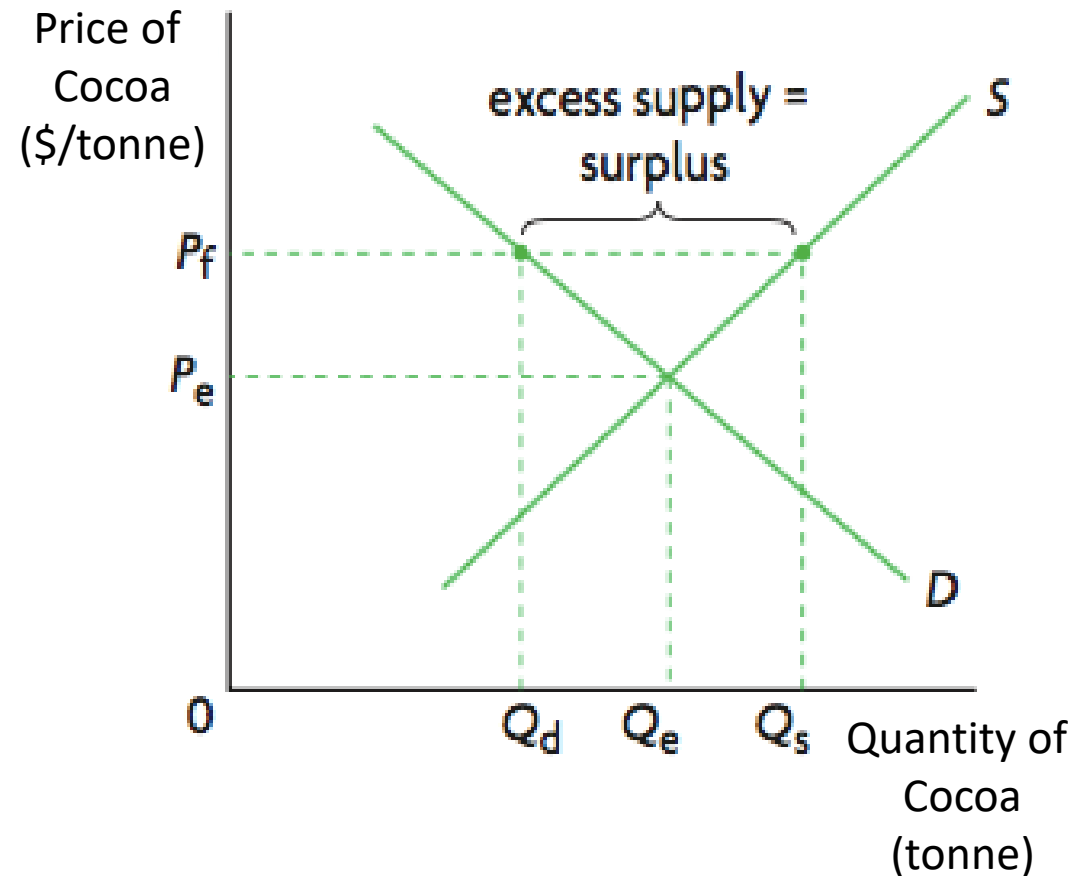
Price Floors Diagram

The government may <u>buy the excess supply</u>, causing the demand curve for the product to shift to the right to the new demand curve.

i.e. Demand curve shifts from **D to D2**

As a result, the government is able to maintain the price floor at **(Pf)**.

Price would fall back to initial equilibrium if the excess output is not purchased by government.
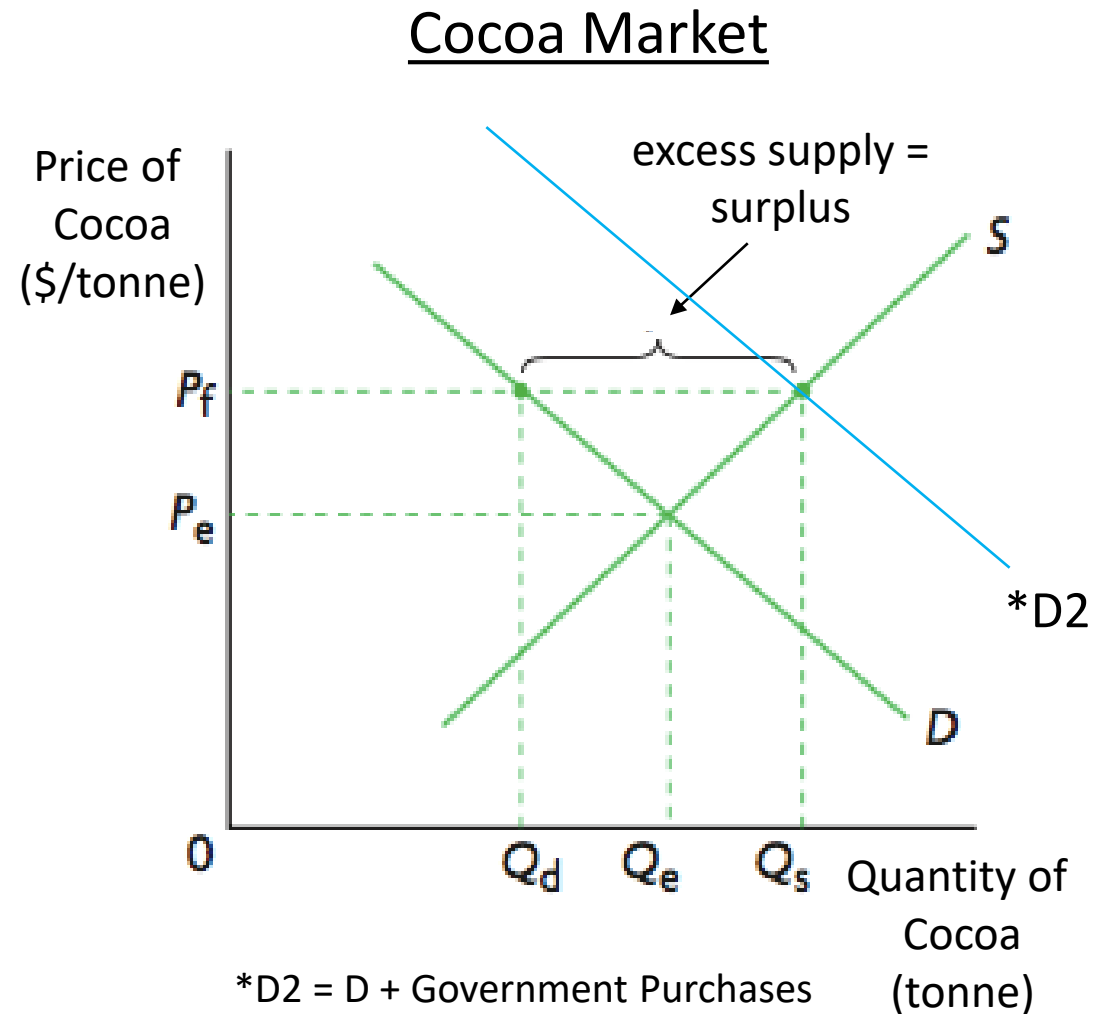
<u>Cocoa Market</u>

excess supply = surplus

Price of Cocoa ($/tonne)

P_f

P_e

S

*D2

D

0

Q_d Q_e Q_s Quantity of Cocoa (tonne)

*D2 = D + Government Purchases

Price Floors

Consequences for the economy:

1. **Surpluses**

2. **Government measures to dispose of surpluses**

   ▪ Store it

   ▪ Export the surplus

   ▪ Aid to developing countries

Price Floors

Consequences for the economy:

3. **Firm inefficiency**
   Little incentives to cut costs by using more efficiency production methods.

4. **Overallocation of resources to the production of the good and allocative inefficiency**
   A larger than optimum quantity is produced – i.e. **Qs > Qe**

5. **Negative welfare impact**
   Loss of benefit due to overallocation of resources

Price Floors

Consequences on various stakeholders:

Consumers

- Consumers pay a higher price for the good **(Pe to Pf)**

- Consumers purchase a small quantity **(Qe > Qd)**

- Consumer surplus change from **(a + b + c)** to **(a)**
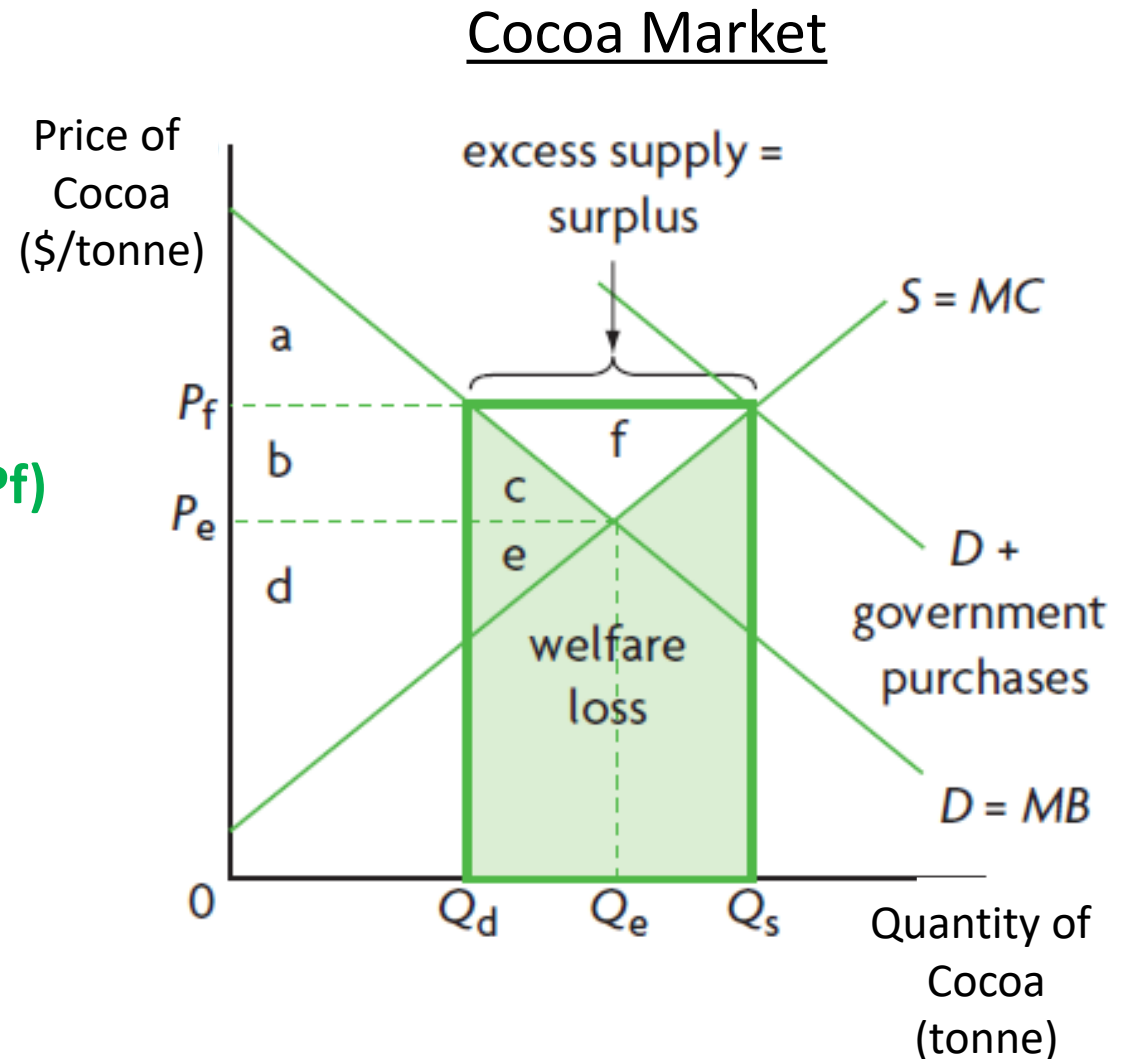
Cocoa Market

Price Floors

Cocoa Market

Consequences on various stakeholders:

Firms (Producers)

- Firms receive a higher revenue for their goods, changing from **(Pe x Qe)** to **(Pf x Qs)**

- Producer surplus changes from **(d + e)** to **(b + c + d + e + f)**

- Producers are better off and are protected against low-cost competition.
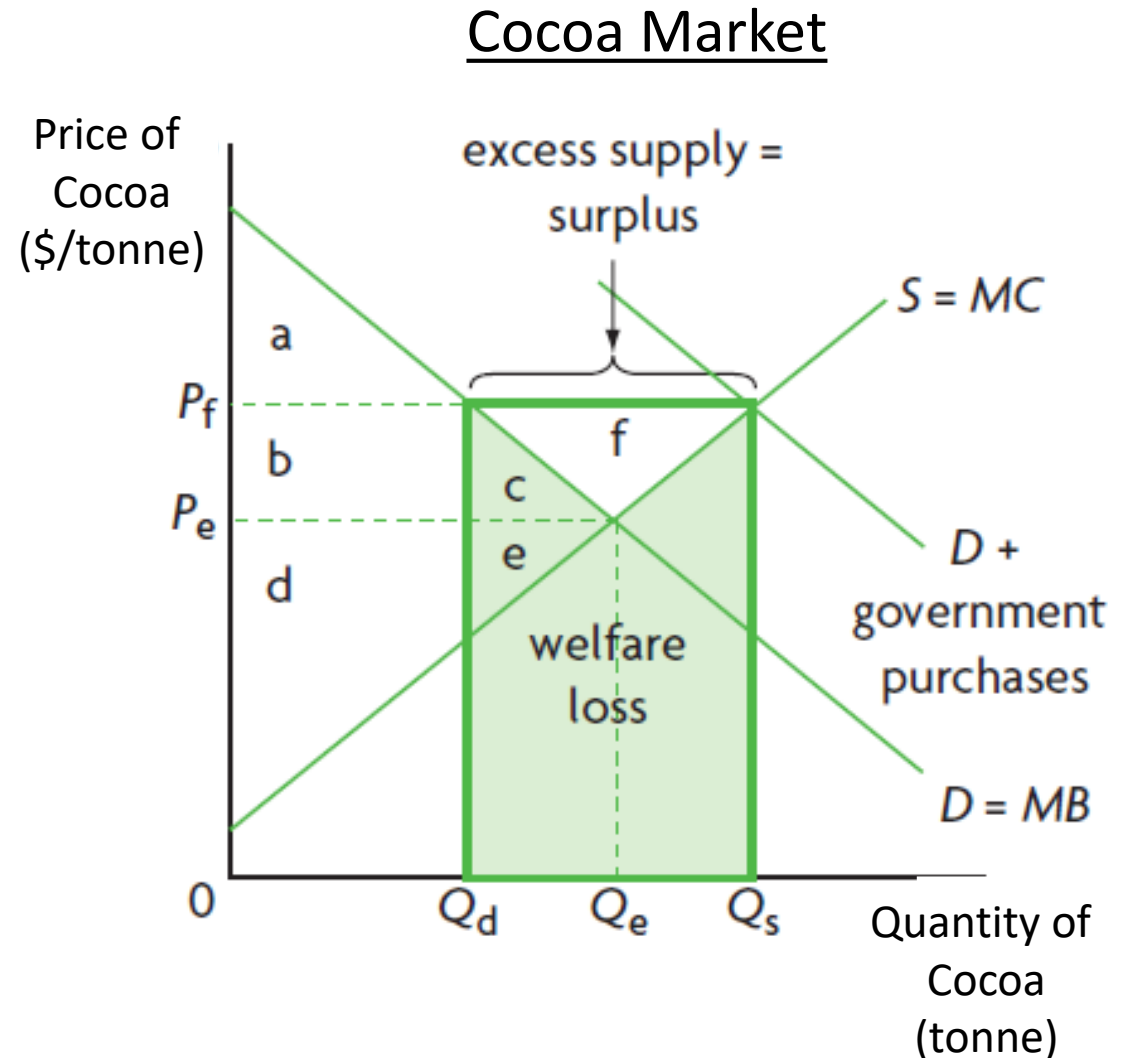
Price Floors

Consequences on various stakeholders:

Government

- The government buys the excess supply which will increase its expenditure **(Qs – Qd) x Pf**

- The government will have to raise taxes or run into a **budget deficit**

Workers

- Result in lower unemployment as more workers are needed when firms produce more **(Qe to Qs)**
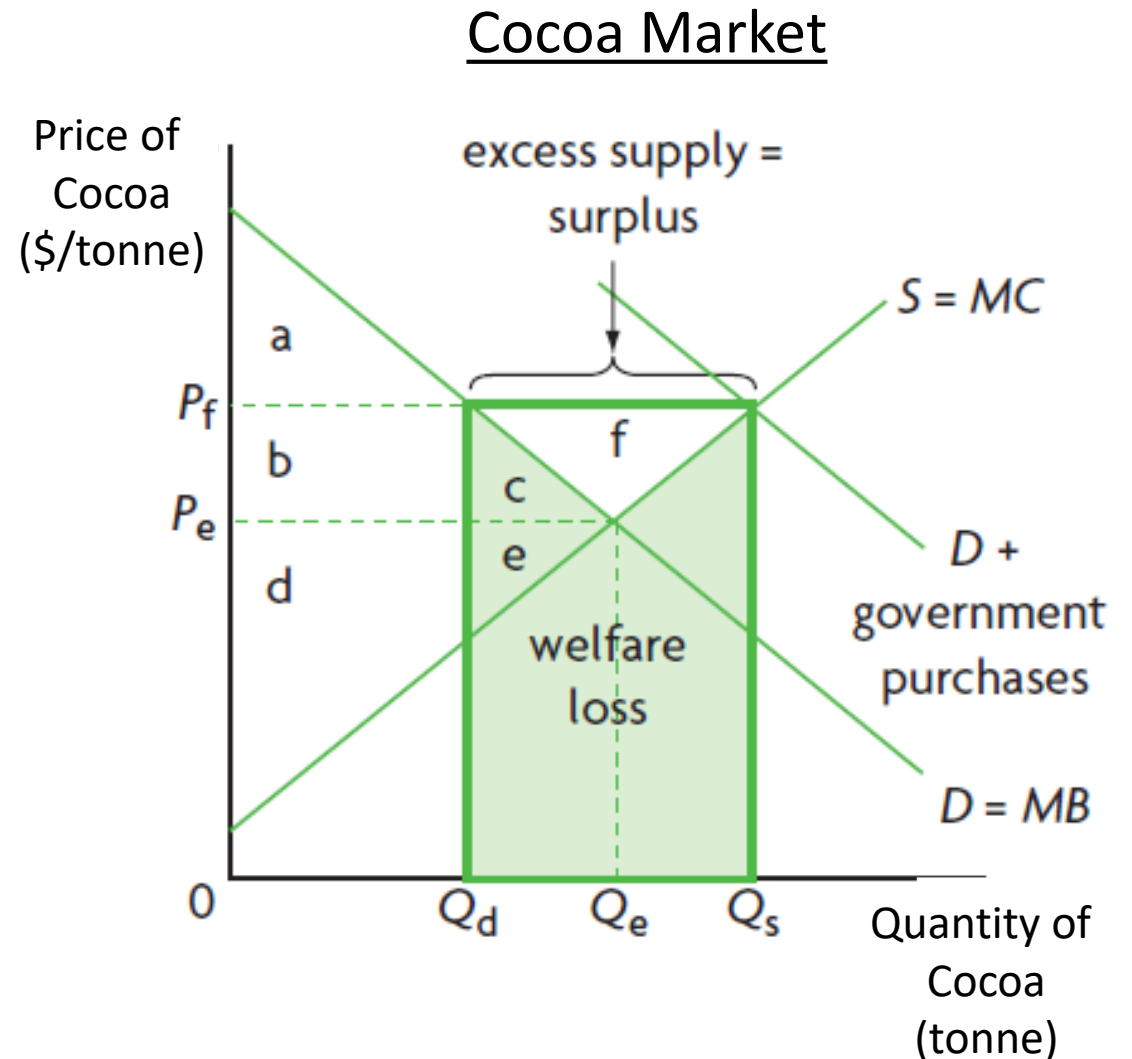
Cocoa Market

Price Floors

Consequences on various stakeholders:

Stakeholders in other countries

- The exporting of agriculture surpluses lead to lower world prices.

- Countries that <u>do not have price supports</u> are forced to sell their products at low price.

- **Global misallocation:** High cost firms produce more while low-cost firms produce less.

Price Floors: Calculation

Surplus (Excess Supply)

Using the diagram…

Calculate the **excess supply** shown

Excess supply = Qs at **Pf** – Qd at **Pf**

= 80,000 – 40,000

= 40,000 kg per week
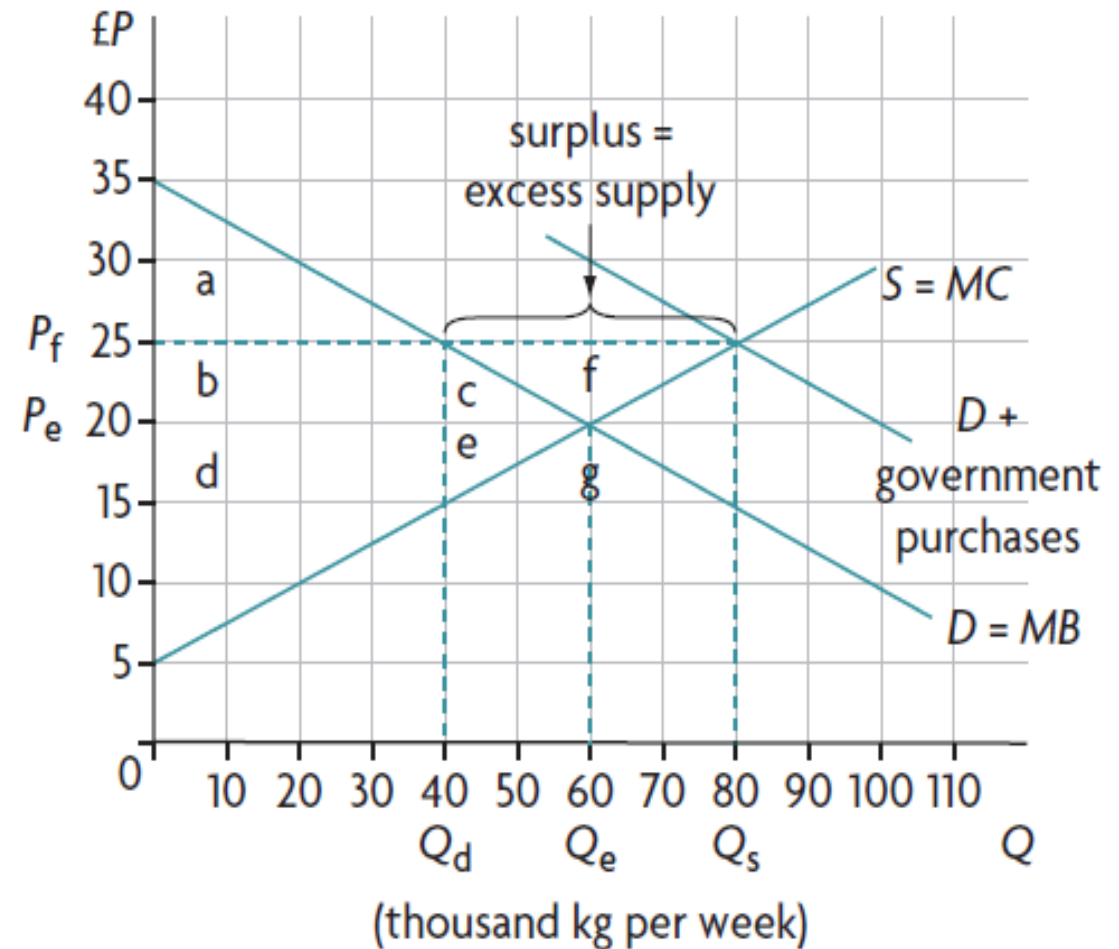
Wheat Market

Price Floors: Calculation

Change in consumer expenditure

Using the diagram…
Calculate the change in consumer expenditure after the **price floor**.

At equilibrium = Pe x Qe	Price floor = Pf x Qd
= £20 x 60,000	= £25 x 40,000
= £1,200,000	= £1,000,000
Change in consumer expenditure = £1m – £1.2m	
= - £200,000	

Wheat Market
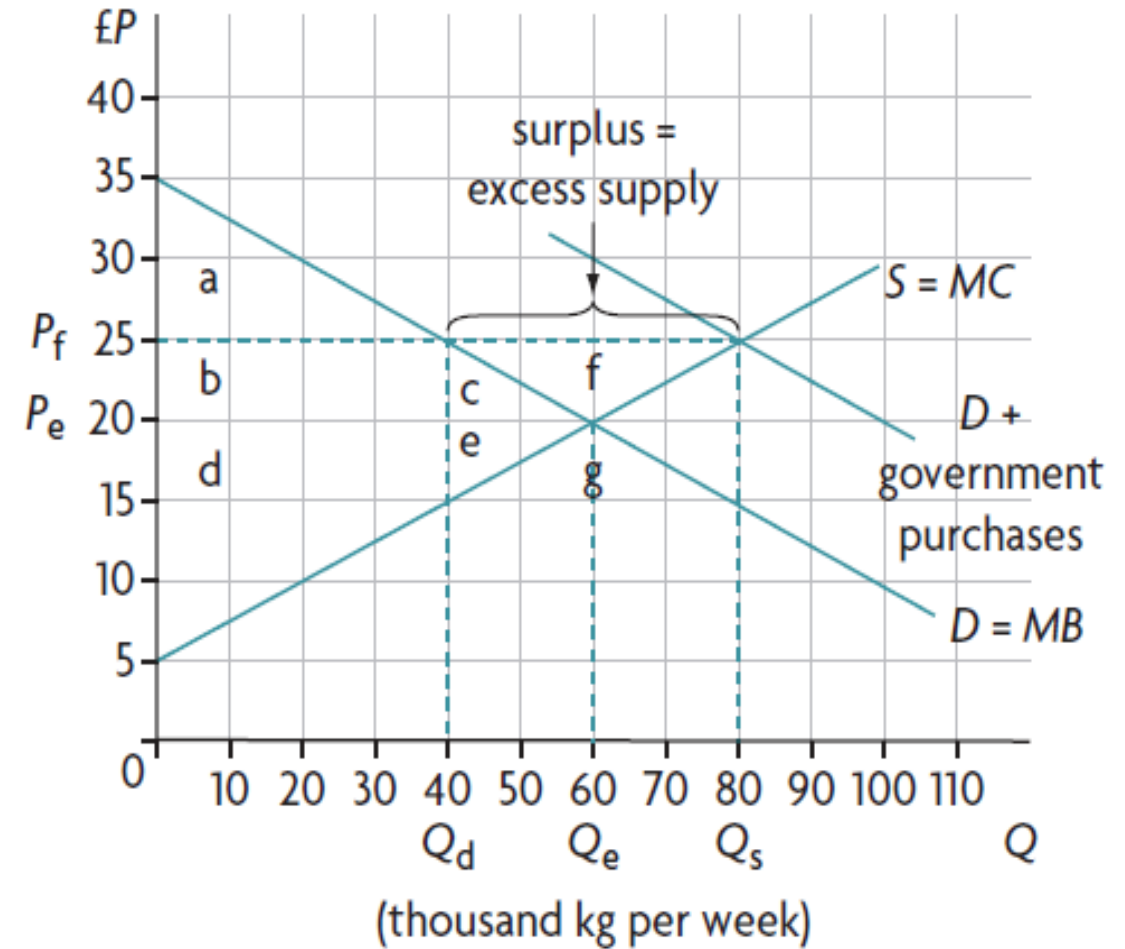
(thousand kg per week)

Price Floors: Calculation

Change in producer revenue

Using the diagram…

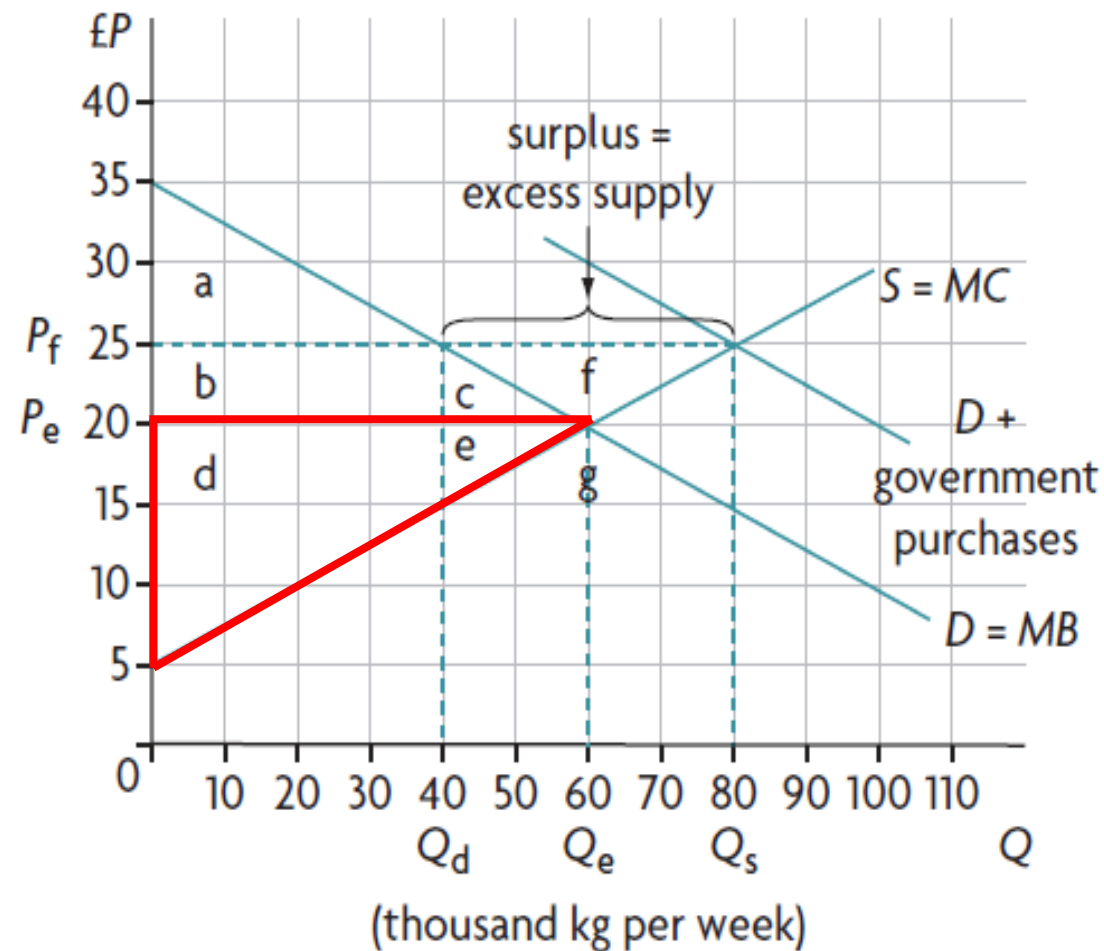Calculate the change in producer revenue after the **price floor**.

At equilibrium = Pe x Qe	Price floor = Pf x Qs
= £20 x 60,000	= £25 x 80,000
= £1,200,000	= £2,000,000

Change in firm revenue = £2m – £1.2m
                     = £800,000

Wheat Market

(thousand kg per week)
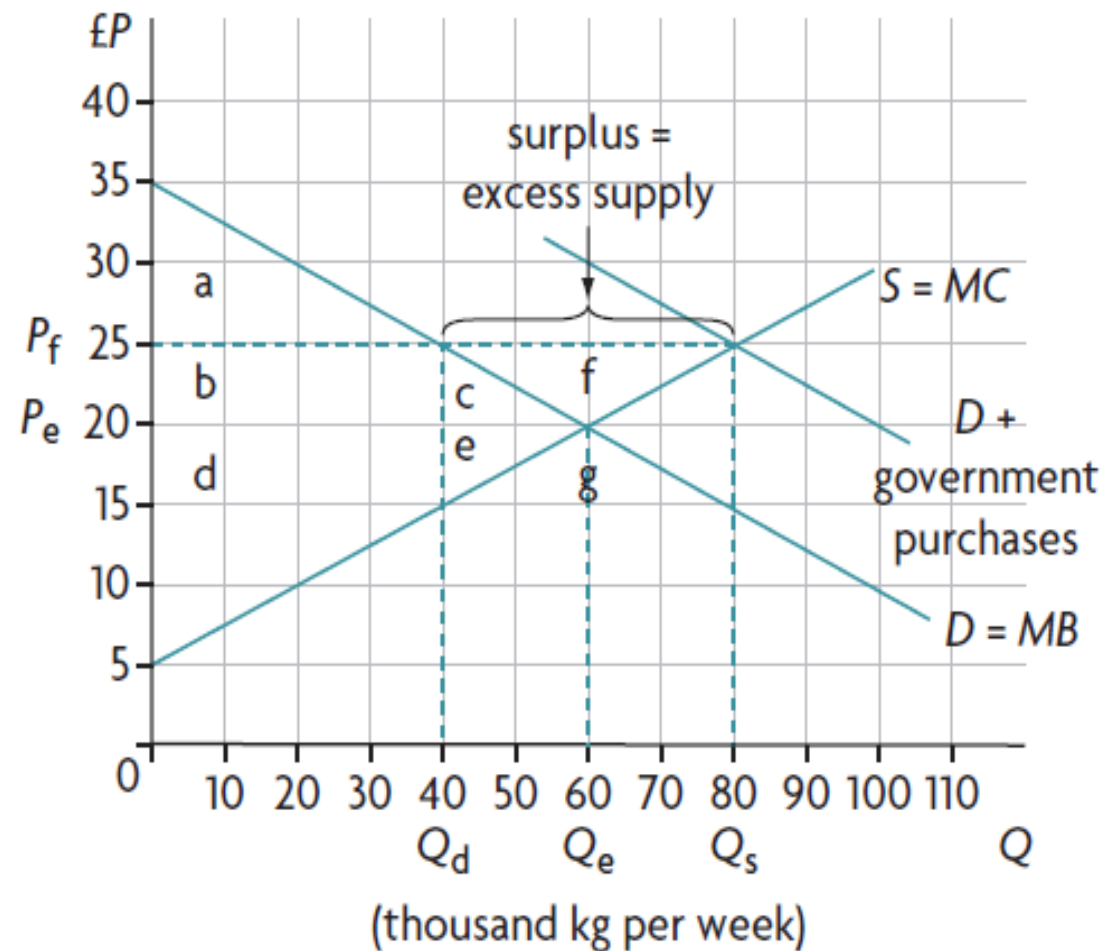
Price Floors: Calculation

Government expenditure

Using the diagram…

Calculate government expenditure

Gov. expenditure = **Pf** x (Qs – Qd)

= 25 x (80,000 - 40,000)

= £1,000,000

This is the same as Producer Revenue (£2m)
minus Consumer Expenditure (£1m)

Wheat Market
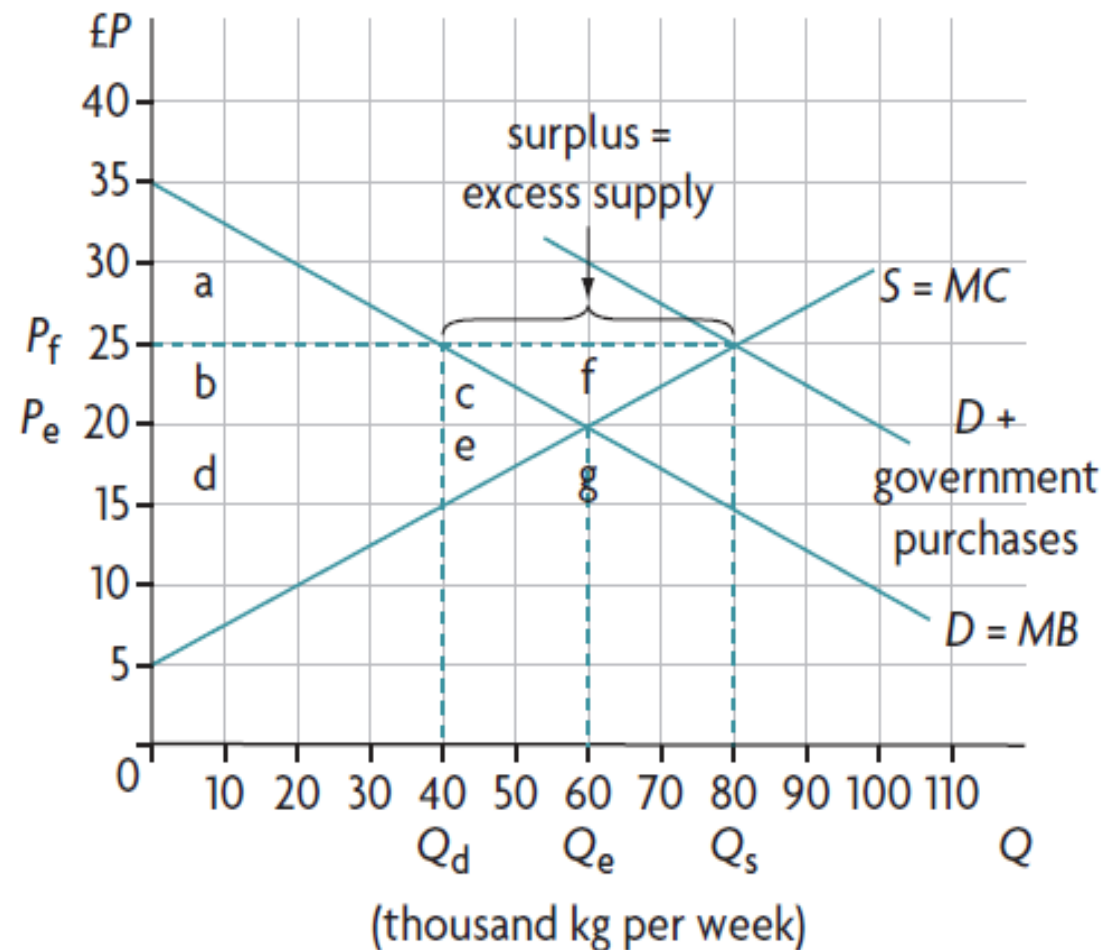
(thousand kg per week)

Price Floors: Calculation

Change in consumer surplus

Using the diagram…

Calculate the change in **consumer surplus** after the **price floor**.

Consumer surplus =

$$\frac{(P \text{ intercept of } D \text{ curve minus } P \text{ of consumers}) \times Q \text{ purchased}}{2}$$

Initial consumer surplus $\frac{(35-20)\times 60\,000}{2}$ = £450 000

After the price floor is imposed consumer surplus is:

Final consumer surplus $= \frac{(35-25)\times 40\,000}{2} = \frac{10\times 40\,000}{2}$

Therefore, consumer surplus *decreased* by £450 000 – £200 000 = £250 000.

Wheat Market
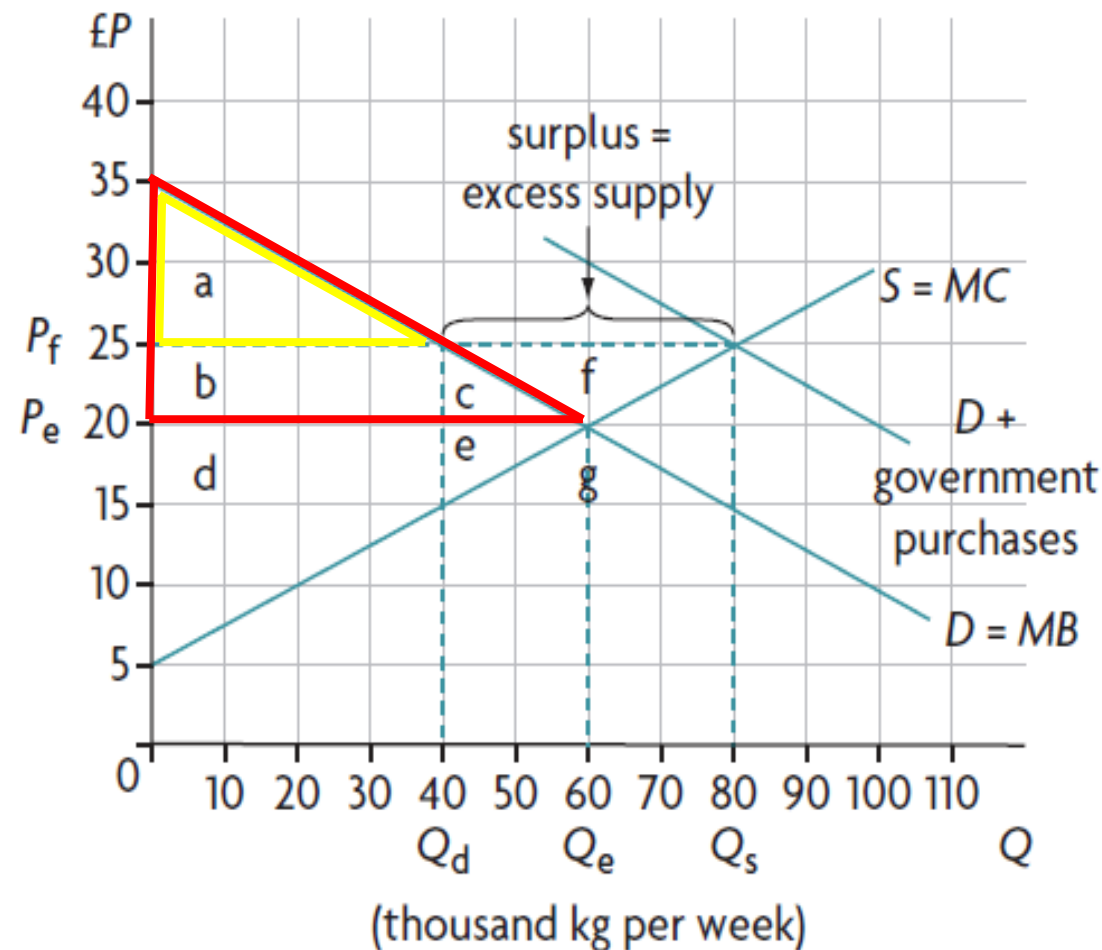
Price Floors: Calculation

Change in producer surplus

Using the diagram…
Calculate the change in **producer surplus** after the **price floor**.

Producer surplus =

$$\frac{(P \text{ of producers minus } P \text{ intercept of } S \text{ curve}) \times Q \text{ sold}}{2}$$

Before the price floor producer surplus is:

Initial producer surplus = $\frac{(20-5) \times 60\,000}{2} = \frac{15 \times 60\,000}{2} = £450\,000$

Wheat Market

Price Floors: Calculation

Change in producer surplus

Using the diagram…
Calculate the change in **producer surplus** after the **price floor**.

After the price floor is imposed producer surplus is:

Final producer surplus = $\dfrac{(25-5)\times80\,000}{2} = \dfrac{20\times80\,000}{2}$

$= £800\,000$

Therefore, producer surplus *increased* by £800 000 – £450 000 = £350 000.

Wheat Market
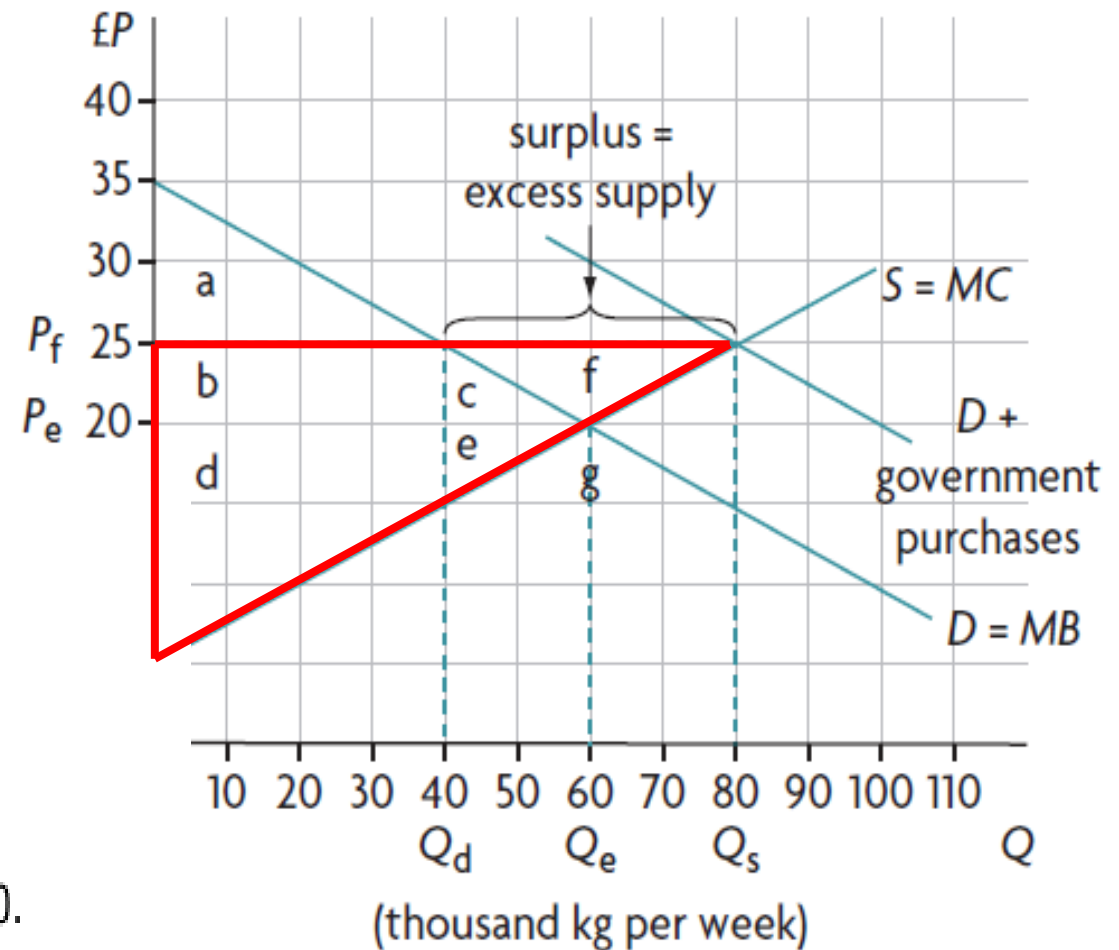
Price Floors: Calculation

Welfare Loss

Using the diagram…
Calculate the **welfare loss**.

The welfare loss is given by the area highlighted in the diagram minus **area F**.

We have found above that government spending on the subsidy is £1 million.

$$\text{Area } f = \frac{(25-20) \times (80\,000 - 40\,000)}{2} = \frac{(5 \times 40\,000)}{2}$$

$$= £100\,000$$

Therefore, welfare loss = £1 million – £100 000 = £900 000.

Wheat Market
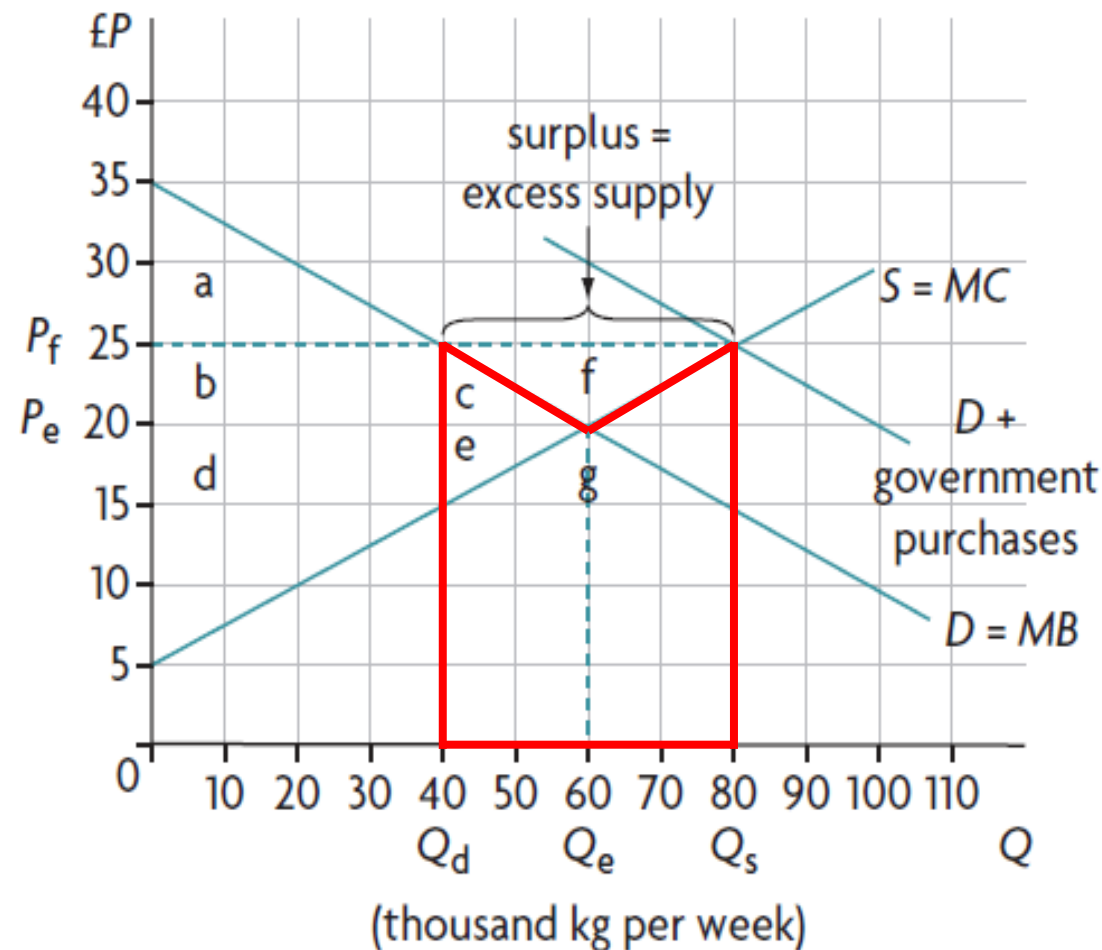
Minimum Wage

A **minimum wage** is a legal minimum price of labour that an employer must pay.

Guarantee an adequate income to low-income and low skilled workers.

What is the minimum wage in Hong Kong?

Hong Kong minimum wage to jump to HK$37.50, in biggest rise since it was introduced

Breakdown of monthly wage spent on basic food

Rice (1.5kg) HK$24.86

20 eggs HK$45.28

Cheese (1kg) HK$146.27

Vegetables (8kg) HK$160.77

Fruit (6kg) HK$129.74

Meat (6kg) HK$738.81

Milk (10L) HK$224.30

Bread (10 loaves) HK$187.10

Total: **HK$1,657**

Source: Picodi

SCMP

Is the minimum wage in Hong Kong sufficient?

In 2018, a report by the Chinese University of Hong Kong and Oxfam Hong Kong found a person needed to **earn a minimum of HK$54.70 per hour** to make ends meet.

The "living wage" study found that basic monthly expenses for a single person were between HK$10,494 and HK$11,548, while that for a three-person family was around HK$20,545.

Cost of basic food products compared to minimum wages around the world
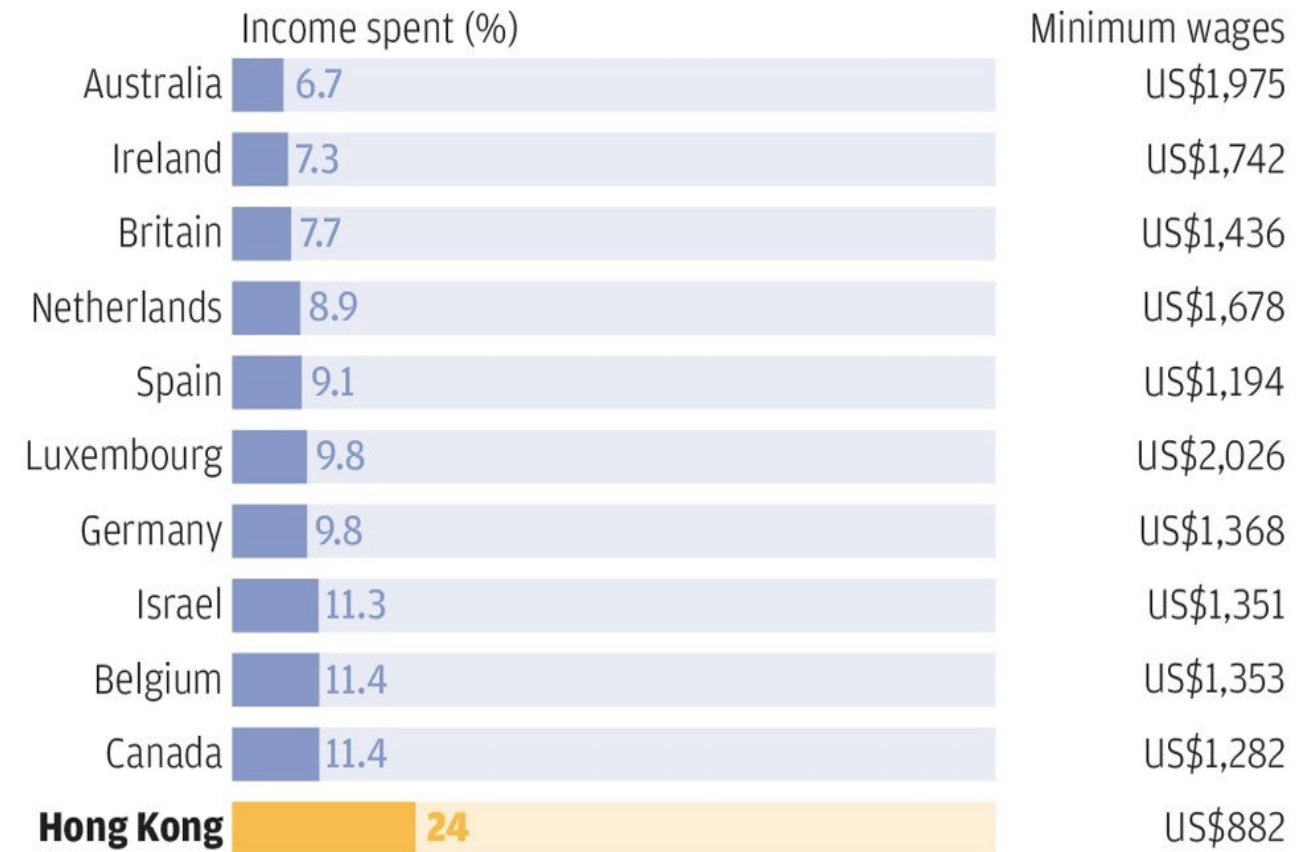
	Income spent (%)	Minimum wages
Australia	6.7	US$1,975
Ireland	7.3	US$1,742
Britain	7.7	US$1,436
Netherlands	8.9	US$1,678
Spain	9.1	US$1,194
Luxembourg	9.8	US$2,026
Germany	9.8	US$1,368
Israel	11.3	US$1,351
Belgium	11.4	US$1,353
Canada	11.4	US$1,282
Hong Kong	24	US$882

Source: Picodi

SCMP
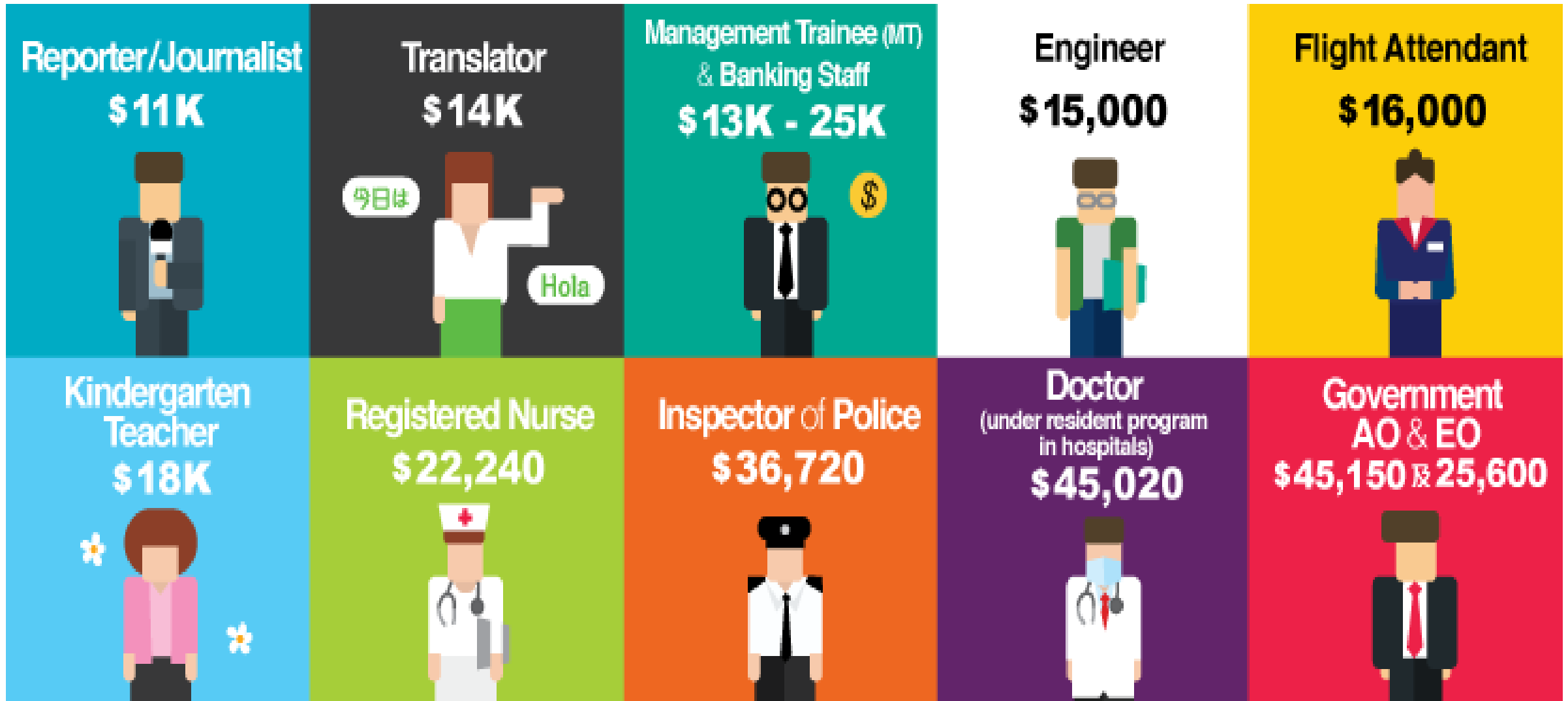
Minimum Wage Diagram

Canada's largest province has passed legislation that will increase the minimum wage to C$15 an hour.

Ontario's legislature passed a bill that included the increase as part of an overhaul of labour laws.

Minimum Wage by Country

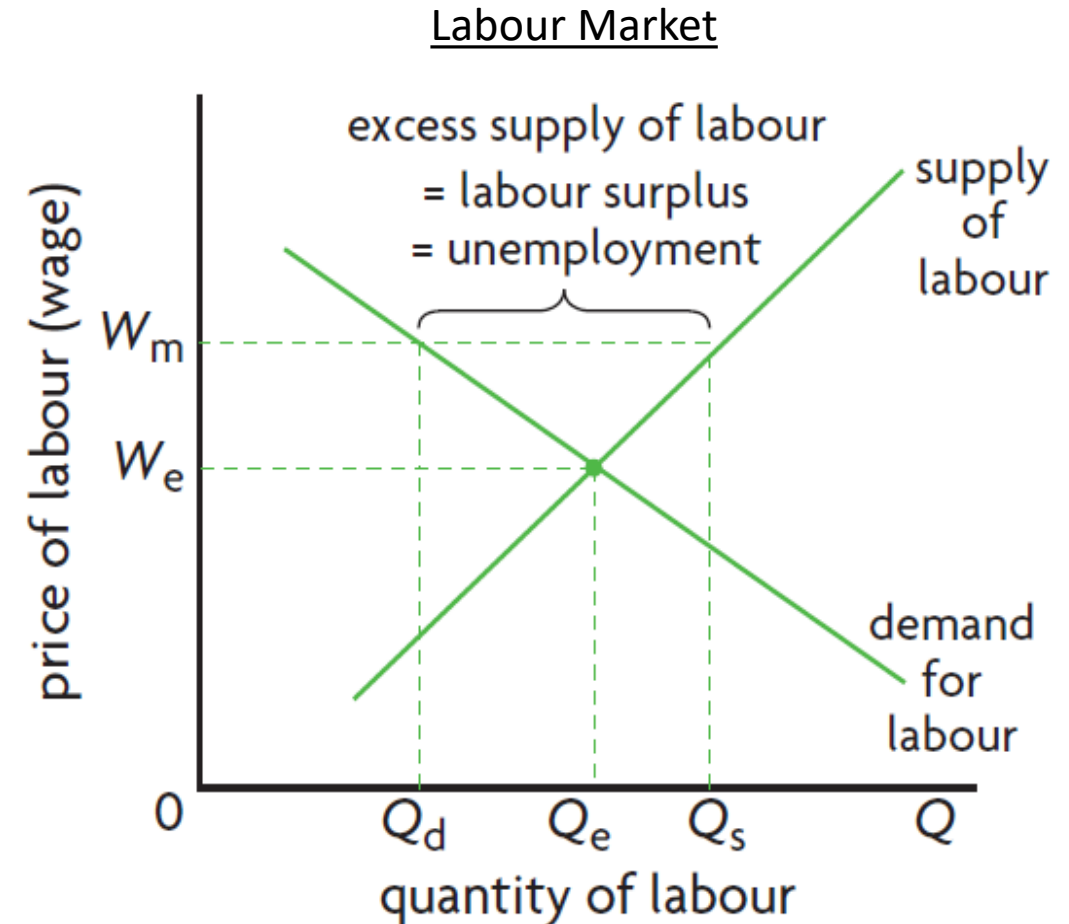*Illustrate the effect of this price floor on the labour market in Ontario*

Minimum Wage Diagram

As a result of the minimum wage law:

- Quantity demanded for labour falls **(Qe to Qd)**

- Quantity supplied of labour rises **(Qe to Qs)**

- Quantity Supplied **>** Quantity demanded

- At the minimum wage rate **(Wm)**, there is a **market disequilibrium**

Labour Market

Minimum Wage

Consequences for the economy:

1. Surplus and unemployment

2. Illegal workers at wages below the minimum wage

3. **Misallocation of labour resources**
   This changes the incentives of hiring unskilled labour

4. Misallocation in product markets as cost of production rises

5. Negative welfare impacts
   Government does not 'buy' the excess supply of labour

Minimum Wage Diagram

Labour Market

Consequences on various stakeholders:

Firms (Producers)

- Employer surplus changes from **(a + b +c)** to **(a)**

- Firms are worse off as costs of production rises.

Workers

- Workers <u>partly gain and partly lose</u> depending on whether they remain employed.

- Unemployment is represented as **(Qs – Qd)**
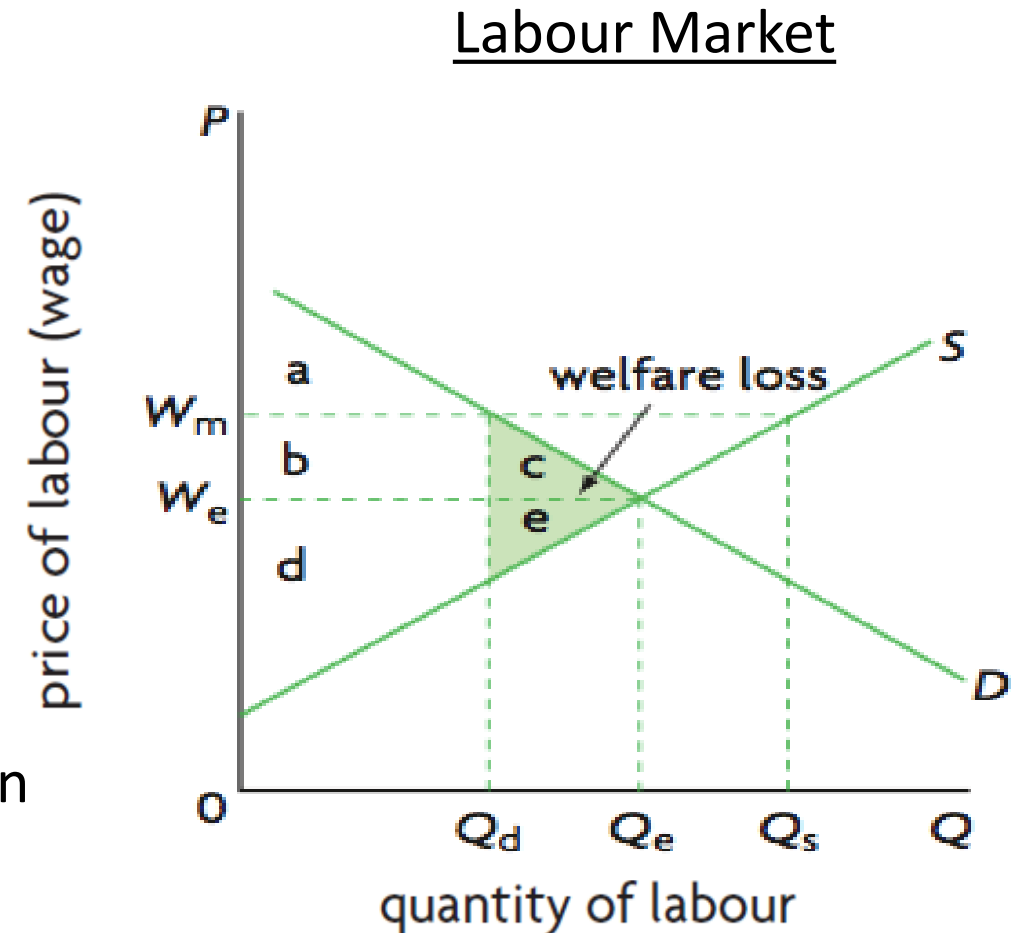
Minimum Wage Diagram

Consequences on various stakeholders:

Consumers

▪ Consumers are worse off as there are high product prices and lower quantities.

Government

▪ Could be worse off if unemployment rises which increases welfare payments.

▪ Possible gain if firms become more productive and unemployment falls.

Labour Market
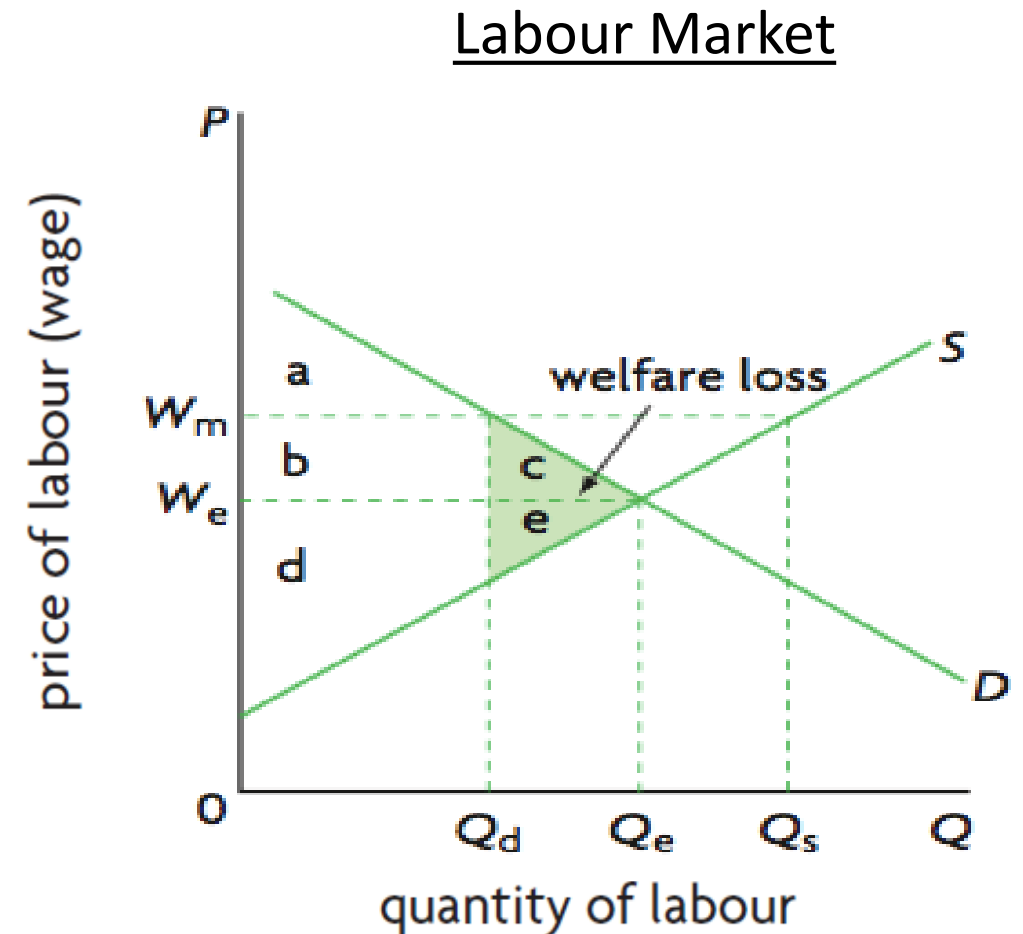
Price Floors and Minimum Wage

In the real world

- Economists agree that prices floors for agricultural products are highly inefficient.

- Strong political pressures by farmers claim they need income support.

- Studies show that minimum wage may have no or positive effect on total employment.

- Firms may cut non-wage benefits instead workers.

- Labour productivity may increase as a result.

Setting Fixed Prices

In pairs or small groups…
Think of examples of goods and services with fixed supply.

- The ticket price is fixed at **Pfx**

- If the price could respond to market forces it would rise to **Pe**

- Shortage arises between **a and b**

a   Price fixing resulting in a shortage
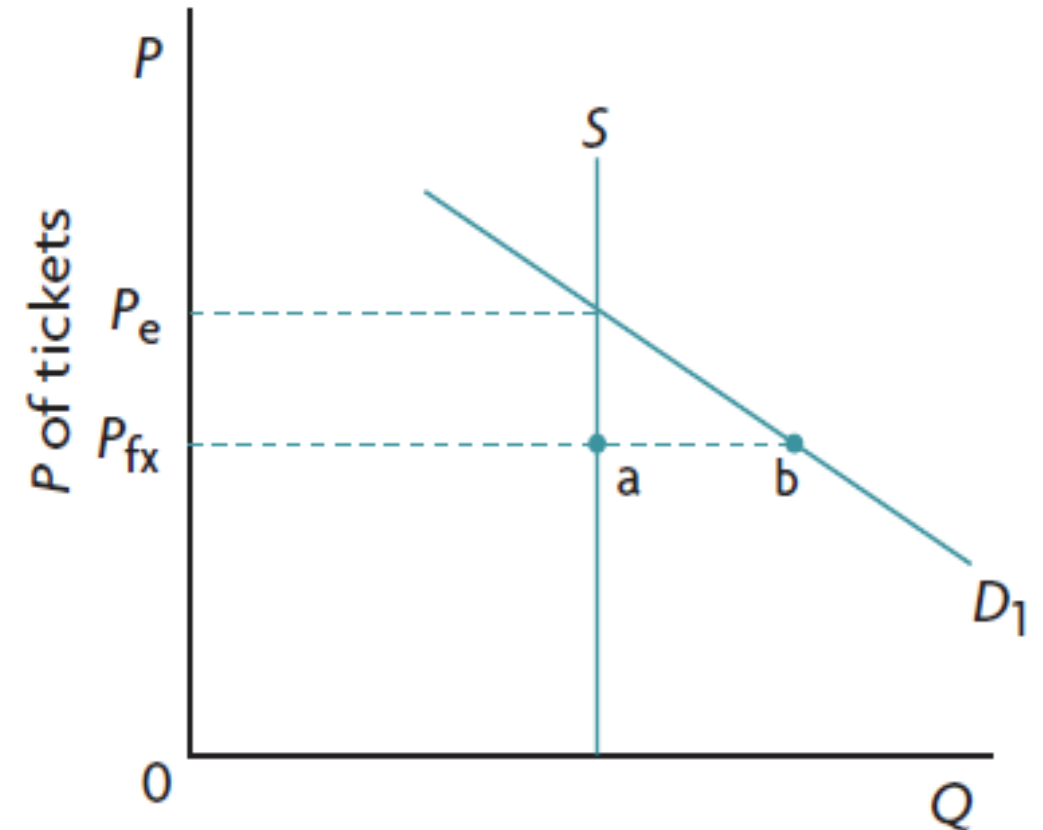
Setting Fixed Prices

In pairs or small groups…
Think of examples of goods and services with fixed supply.

- The ticket price is fixed at **Pfx**

- If the price could respond to market forces it would lower to **Pe**

- Surplus arises between **c and d**

b   Price fixing resulting in a surplus
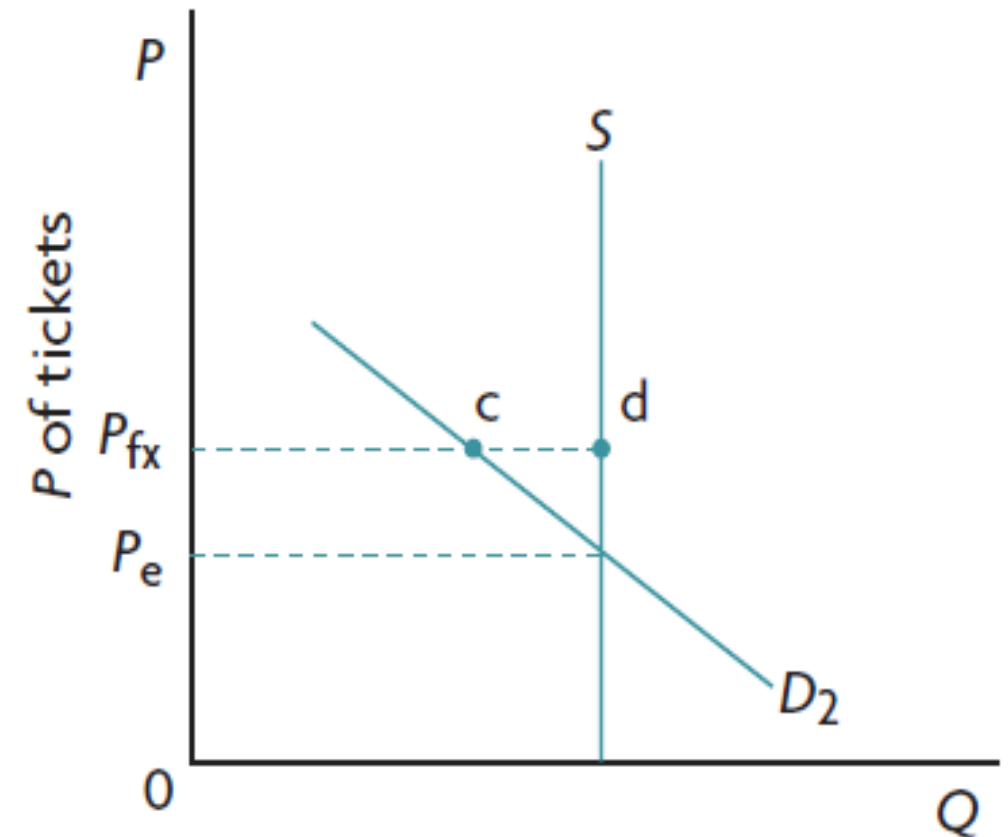
Indirect Taxes

An **indirect tax** is imposed by the government on producers for the sale of products which is then (partly) passed on to the consumers in the form of a higher price.

Types of indirect taxes:

1. Excise taxes

   Imposed on particular goods and services such as petrol, cigarettes, cars and alcohol.

Indirect Taxes

An **indirect tax** is imposed by the government on producers for the sale of products which is then (partly) passed on to the consumers in the form of a higher price.

Types of indirect taxes:

2. Taxes on spending on all (or most) goods and services

Examples of Sales Taxes?

UK Value Added Taxes (VAT): 20%

Australia's Goods and Sales Taxes (GST): 10%

Japan's Sales Tax: 10%

Indirect Taxes

An **indirect tax** is imposed by the government on producers for the sale of products which is then (partly) passed on to the consumers in the form of a higher price.

Why do governments impose indirect taxes?

- Source of government revenue

- Discourage consumption of harmful goods for individuals and society

- Redistribute income if tax is placed on luxury goods

- Improving allocation of resources by correct negative externalities

Excise Taxes

When imposed on particular goods, **excise taxes** will affect the allocation of resources by:

- **Increasing the price paid by consumers**

  Reduce consumer spending on taxed goods

- **Decreasing the price received by producers**

  Reduce production by sellers

Excise Taxes – Specific Taxes

Specific taxes is a <u>fixed amount</u> of tax per unit of the good or service sold.

Example: Specific taxes on cigarettes in Hong Kong

Hong Kong taxes $1,906 for every 1000 cigarettes or $38.12 per pack of 20 cigarettes.

This tax causes a <u>parallel inward shift of the supply curve</u> as the tax is fixed amount for each unit of output.

The price the firm receives <u>must be higher than</u> the original price by the amount of the tax.

(a) Specific tax
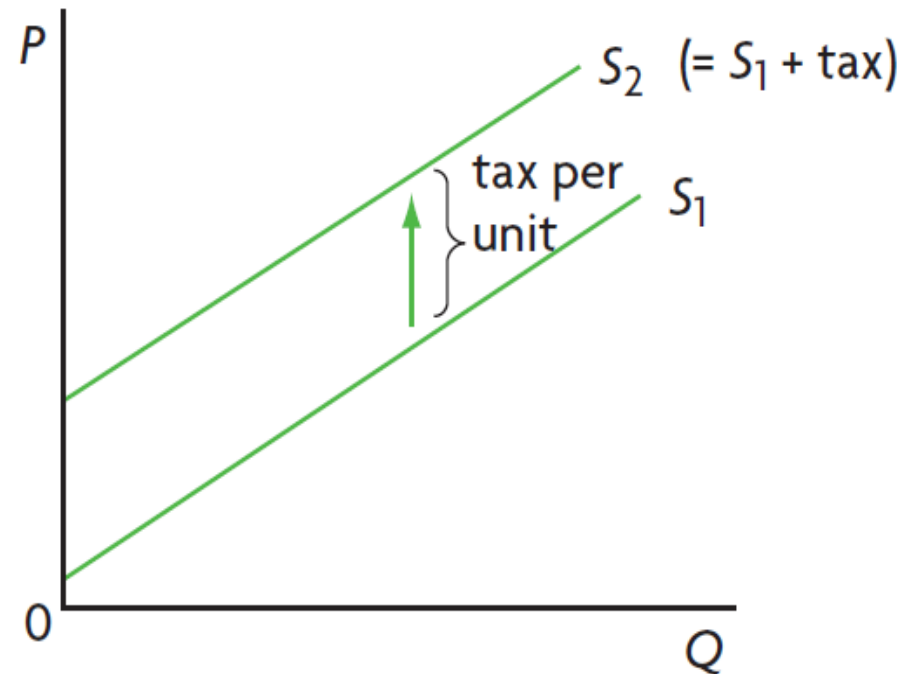
Excise Taxes – Ad Valorem Taxes

Ad Valorem tax is a <u>fixed percentage</u> of the price of the good or service.
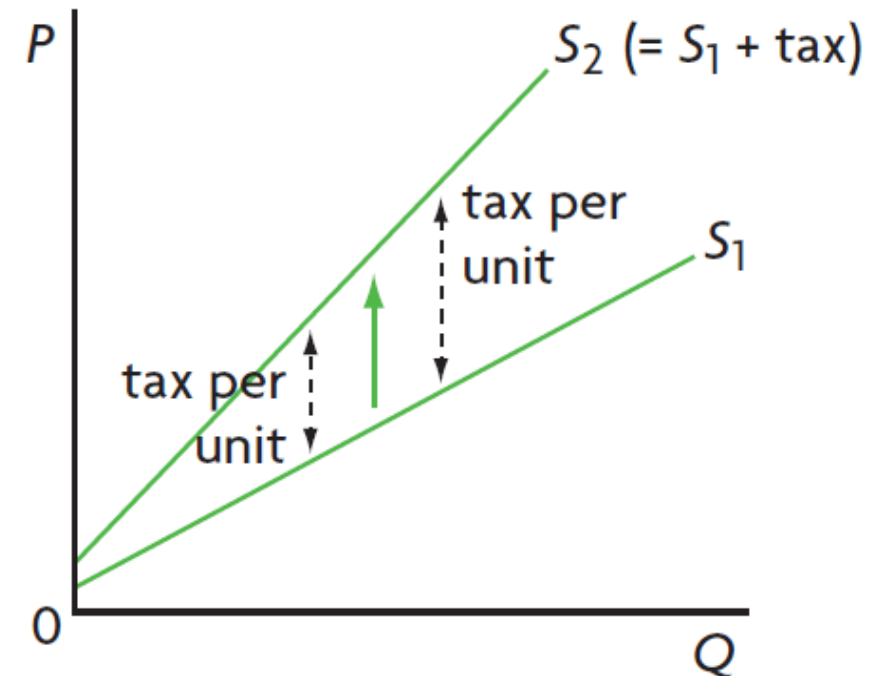
Example: Ad Valorem taxes on alcohol in Hong Kong

|	Type of Liquor	Rate
1.	Liquor with an alcoholic strength of more than 30% by volume measured at a temperature of 20°C	100%
2.	Liquor, other than wine, with an alcoholic strength of not more than 30% by volume measured at a temperature of 20°C	0%
3.	Wine	0%

Excise Taxes – Ad Valorem Taxes

Ad Valorem tax is a <u>fixed percentage</u> of the price of the good or service.

Example: Ad Valorem taxes on alcohol in Hong Kong

Hong Kong taxes liquor with an alcoholic strength of more than 30% at 100%.

Price of Liquor A = $60, Ad Valorem Tax = $60
Price of Liquor B = $80, Ad Valorem Tax = $80

An ad valorem tax causes the <u>supply curve to shift left</u> and <u>become steeper as price increases</u>.

(b) *Ad valorem* tax

Excise Taxes – Ad Valorem Taxes

Specific taxes is a <u>fixed percentage</u> of the price of the good or service.

Example: Ad Valorem taxes on alcohol in Hong Kong

Hong Kong taxes liquor with an alcoholic strength of more than 30% at 100%.

Food for Thought
What might be an advantage of **ad valorem tax** compared to **specific tax**?

(b) *Ad valorem* tax
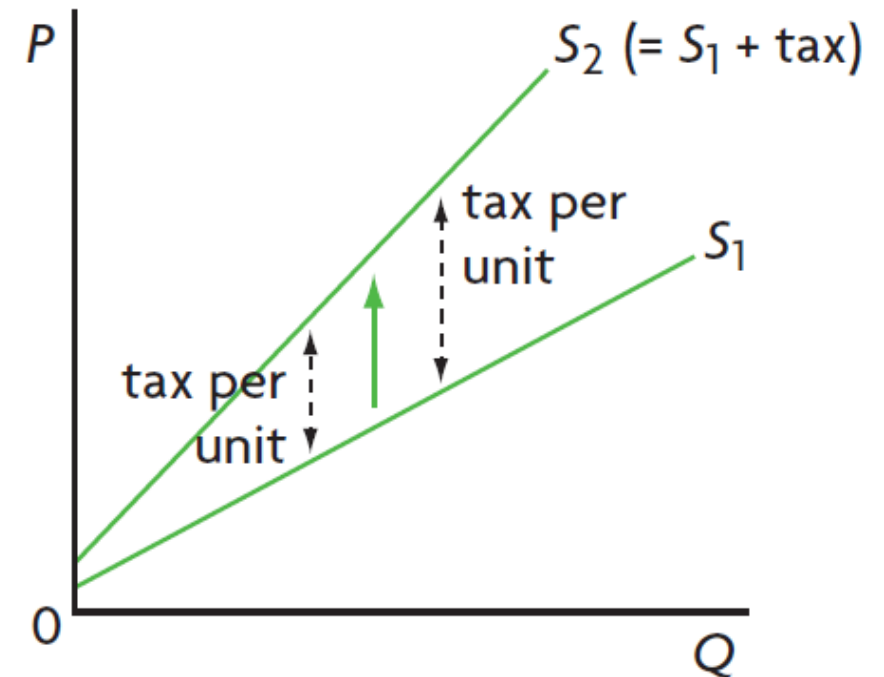
Indirect Tax Diagram

Alaska imposes an **indirect specific tax** of **$34.50 (per passenger, per voyage)** on travel on commercial passenger vessels, typically cruise ships that have 250 or more berths and provide overnight accommodations in the state's marine waters.

Illustrate the effect of this tax on the cruise ship travel market.

Indirect Tax Diagram

Market for Travel on Cruise Ships

Indirect specific tax of $34.50 (per passenger, per voyage) on cruise ships in Alaska.

- The tax is an **additional cost** for the cruise ship, so the supply of tickets (travel packages) **decreases**.

- Supply will **shift upwards** by $34.50 from S to S + Tax.

- The price of the ticket increases from **P* to Pc**

- The quantity of ticket decreases from **Q* to Qt**

- Tax per unit is shown by **Pc - Pp** or difference between the two supply curves.
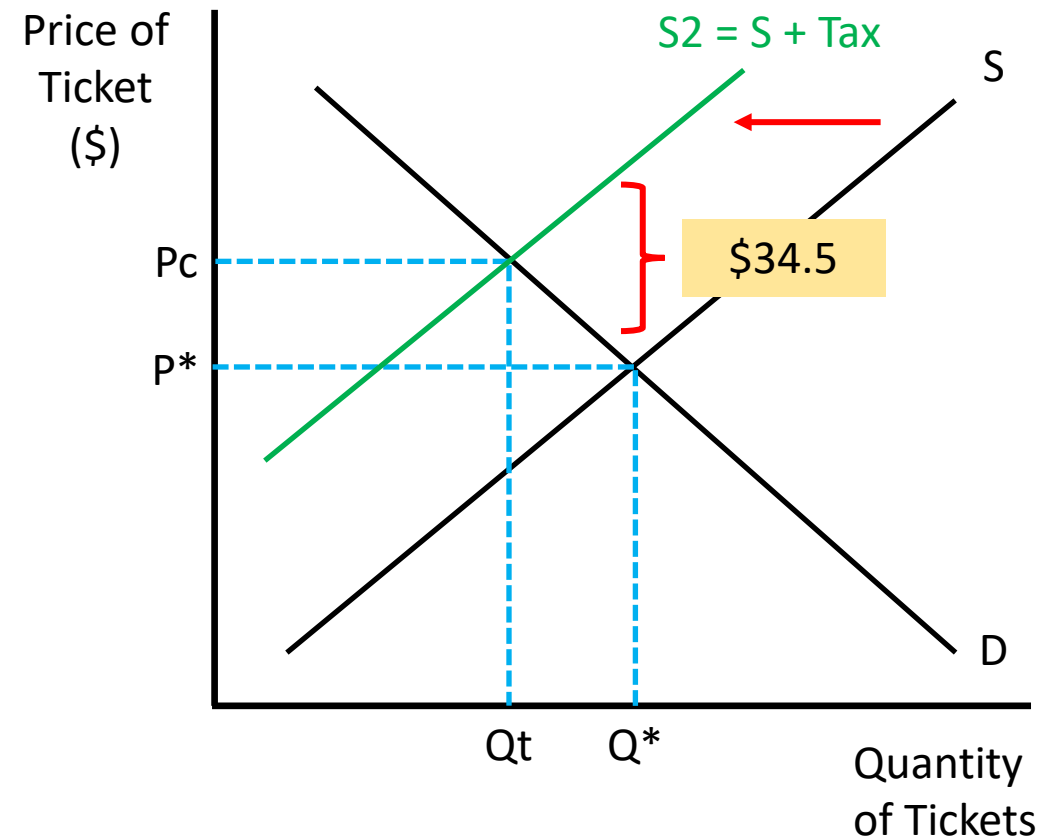
Indirect Tax Diagram

Market for Travel on Cruise Ships

Consequences on various stakeholders:

Stakeholders are individuals or groups of individuals who have an interest in something and are affected by it.

Consumers

- Consumers now pay more their ticket **(P* to Pc)**

- This will discourage their spending on travelling via cruise ships **(Q* to Qt)**

- Consumers are now worse off as they are receiving less and paying more for it.
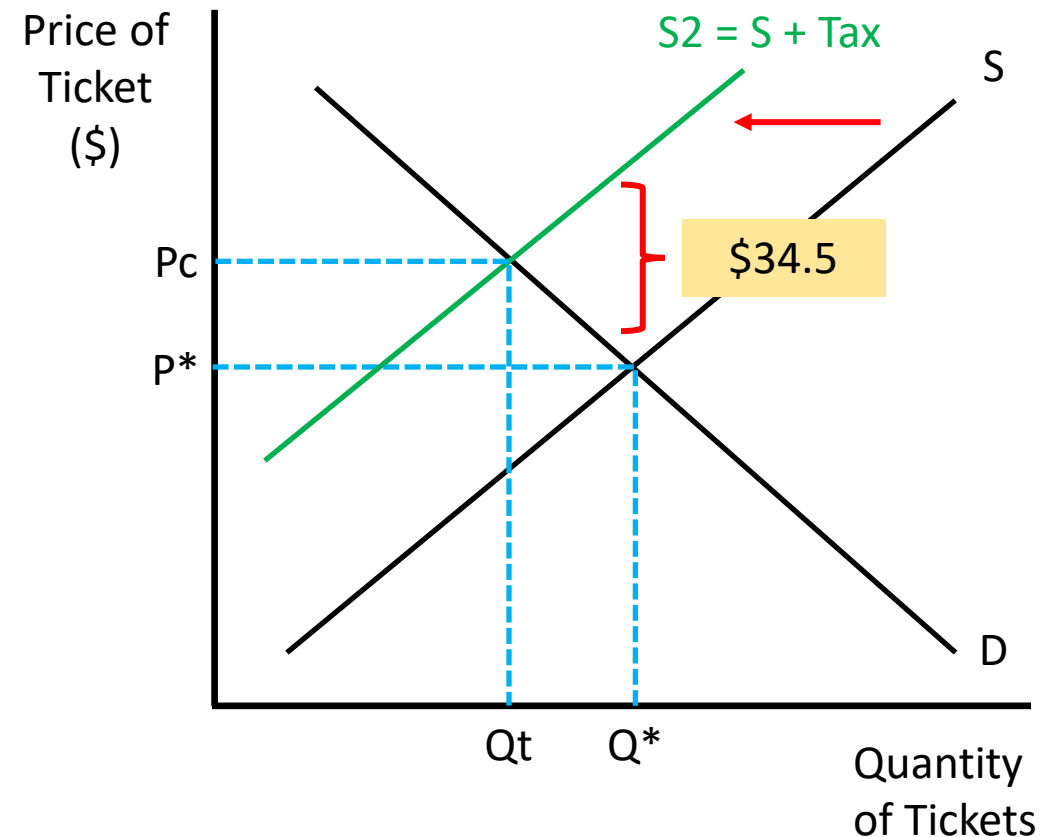
Price of Ticket ($)

S2 = S + Tax

S

Pc

$34.5

P*

D

Qt   Q*

Quantity of Tickets

Indirect Tax Diagram

Market for Travel on Cruise Ships

Consequences on various stakeholders:

Firms (Producers)

- Firms received from consumers **Pc** per unit but must pay the **$34.5 per passenger** to the government.

- Firms receive less for their tickets **(P* to Pp)**

- Firms now provide fewer tickets **(Q* to Qt)**

- Firms receive less revenue from **(P* x Q*) to (Pp x Qt)**

- Firms are worse off as a result from the tax.
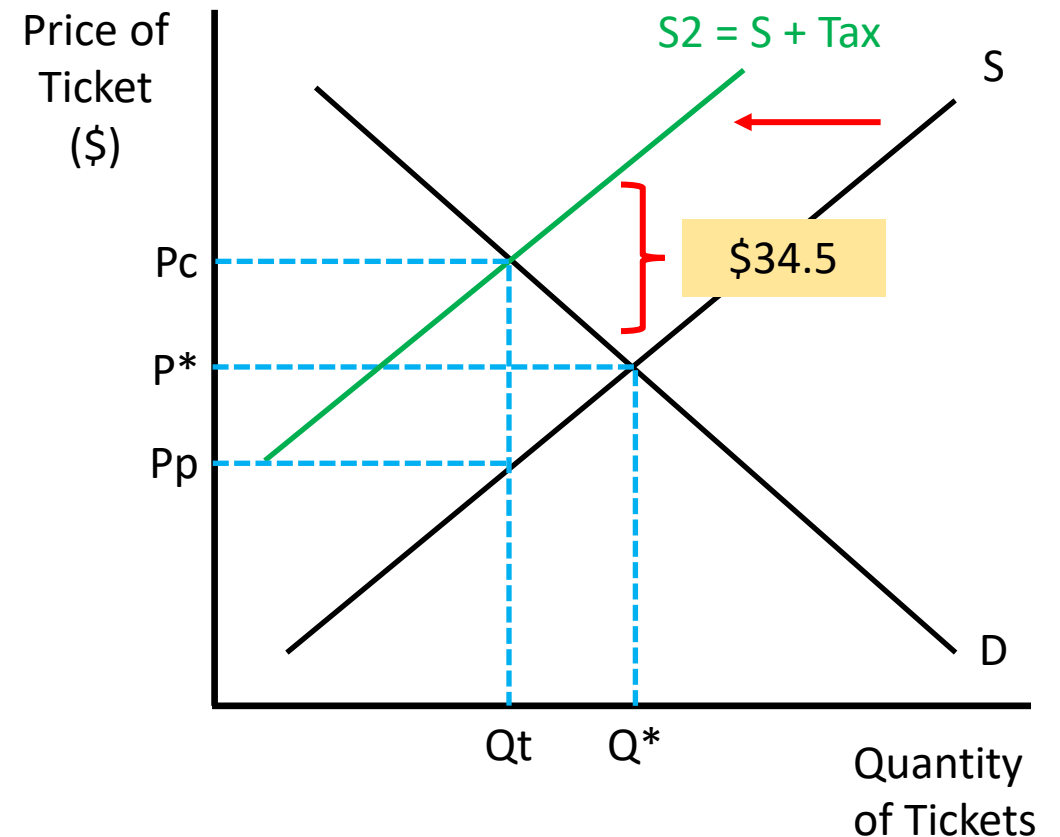
Price of Ticket ($)

S2 = S + Tax

S

Pc

$34.5

P*

Pp

D

Qt   Q*

Quantity of Tickets

Indirect Tax Diagram

Market for Travel on Cruise Ships

Consequences on various stakeholders:

Government

- The government receives tax revenue of **(Pc – Pp) x Qt**

- This is the only stakeholder that gains and is positive for the government budget.

Workers

- Result in unemployment as fewer workers are needed when the quantity of tickets falls **(Q* to Qt)**
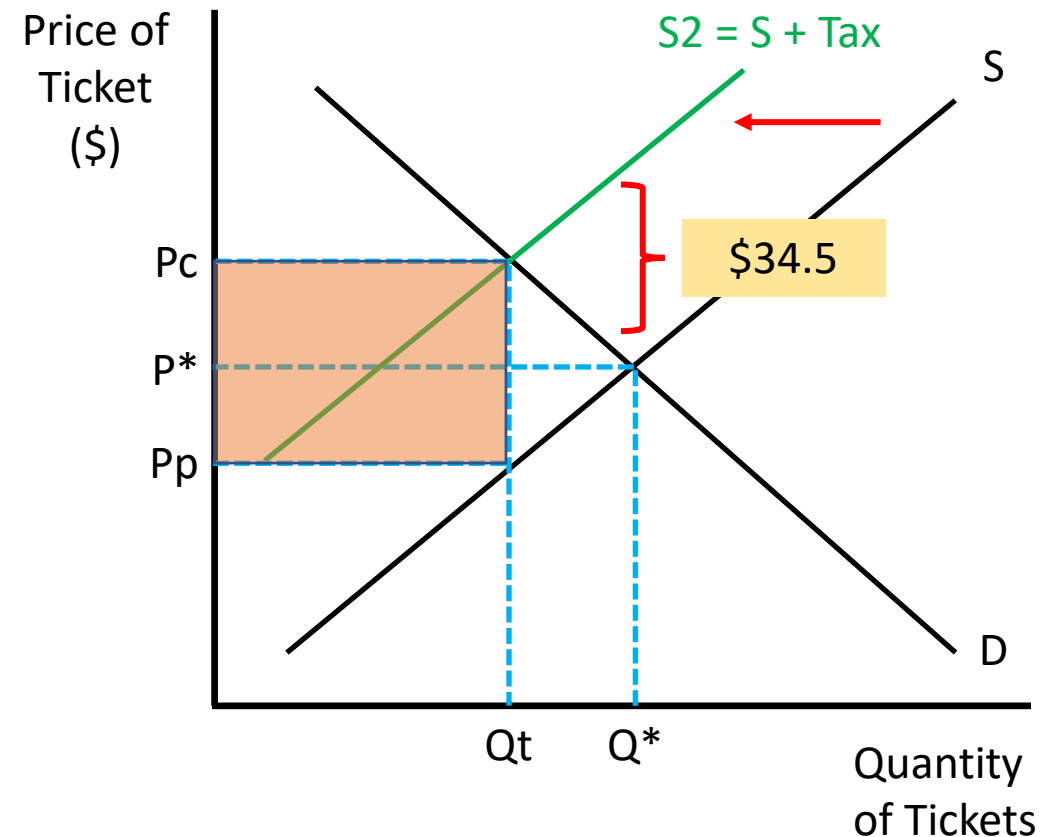
Price of Ticket ($)

S2 = S + Tax

S

$34.5

Pc

P*

Pp

Qt   Q*

Quantity of Tickets

D

Indirect Tax Diagram

Market for Travel on Cruise Ships

Consequences on various stakeholders:

Society as a Whole

▪ Society is worse off as a result of the tax as there is **underallocation of resources** **(Qt < Q*)**

The market outcomes due to **indirect ad valorem tax** is the same as **specific tax**

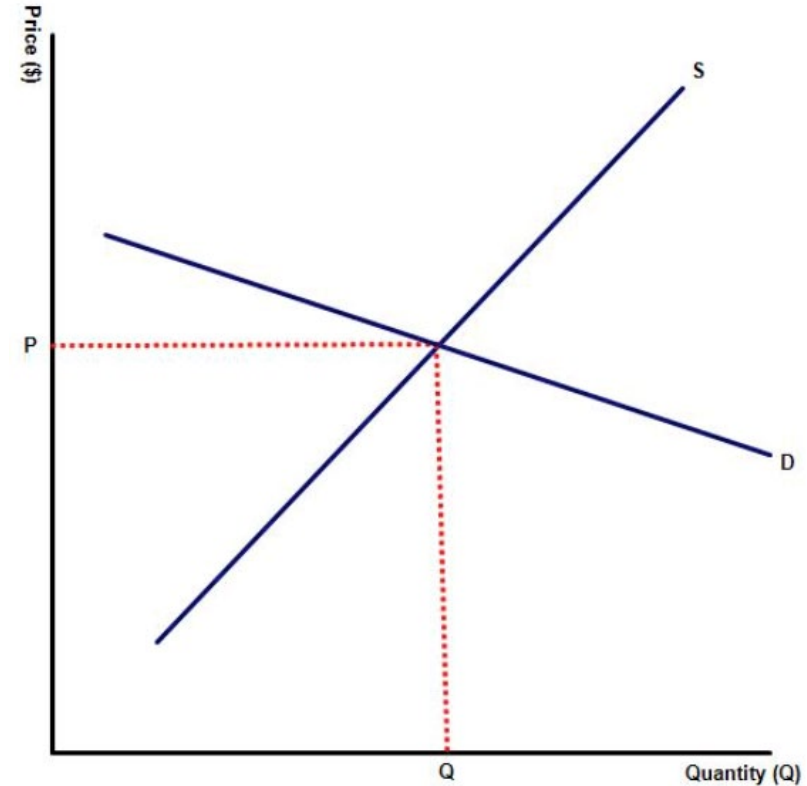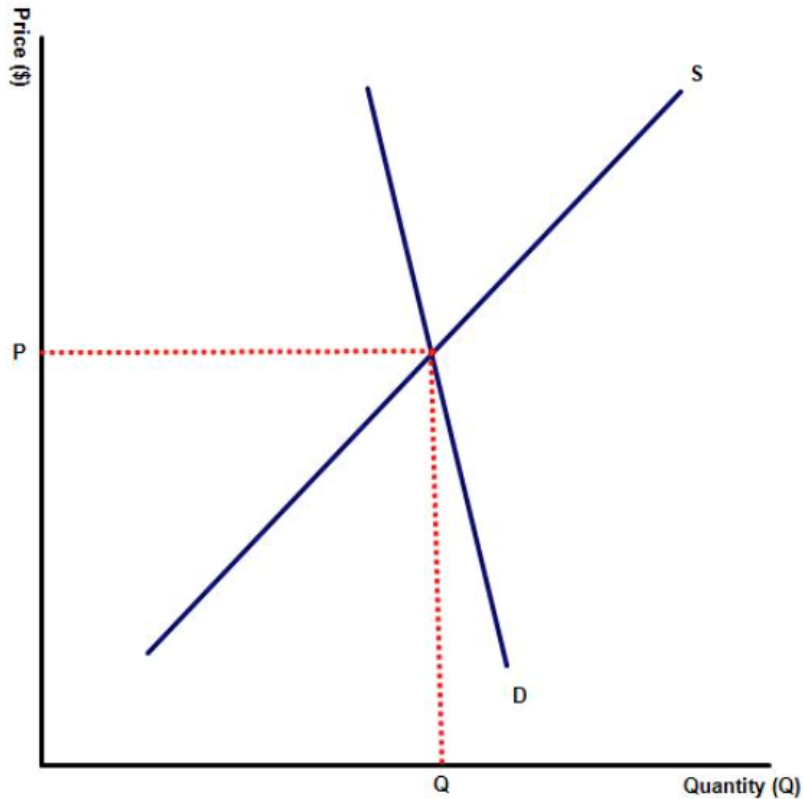**Food for Thought**
How does PED affect the tax burden?

Price of Ticket ($)

S2 = S + Tax

S

$34.5

Pc

P*

Pp

D

Qt   Q*

Quantity of Tickets
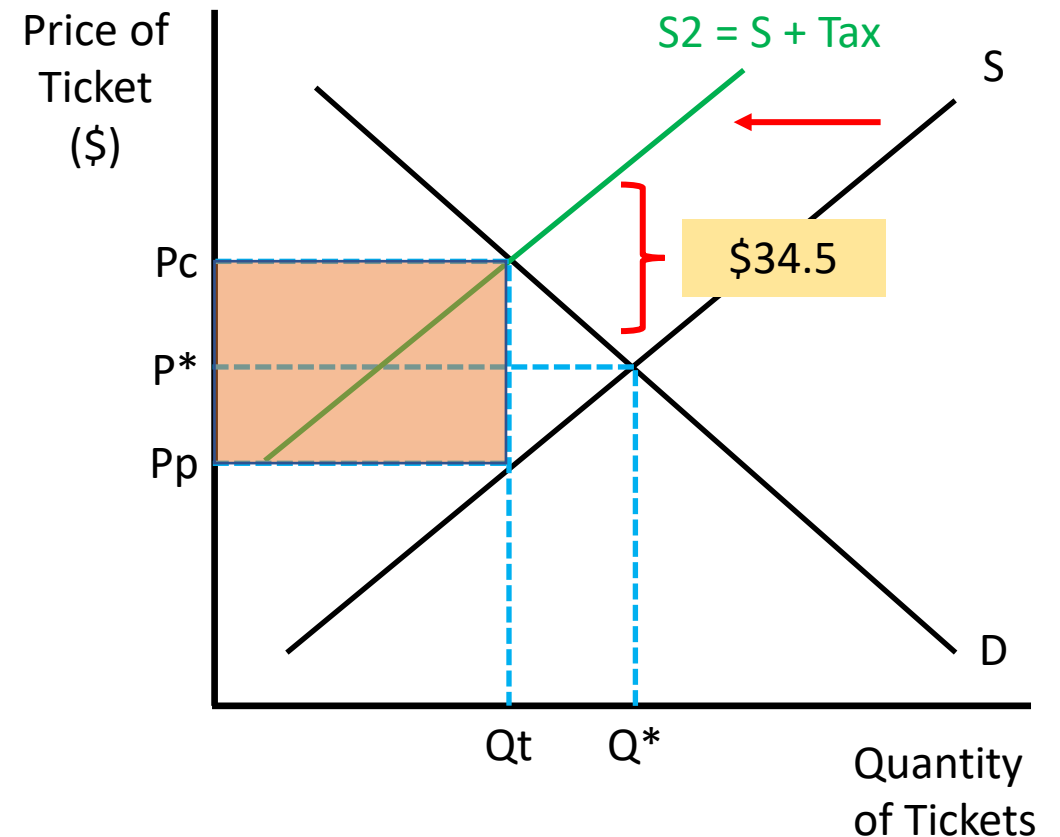
Indirect Tax Diagram

On your own paper…
Add a flat tax onto the diagrams shown and illustrate how the tax burden differs
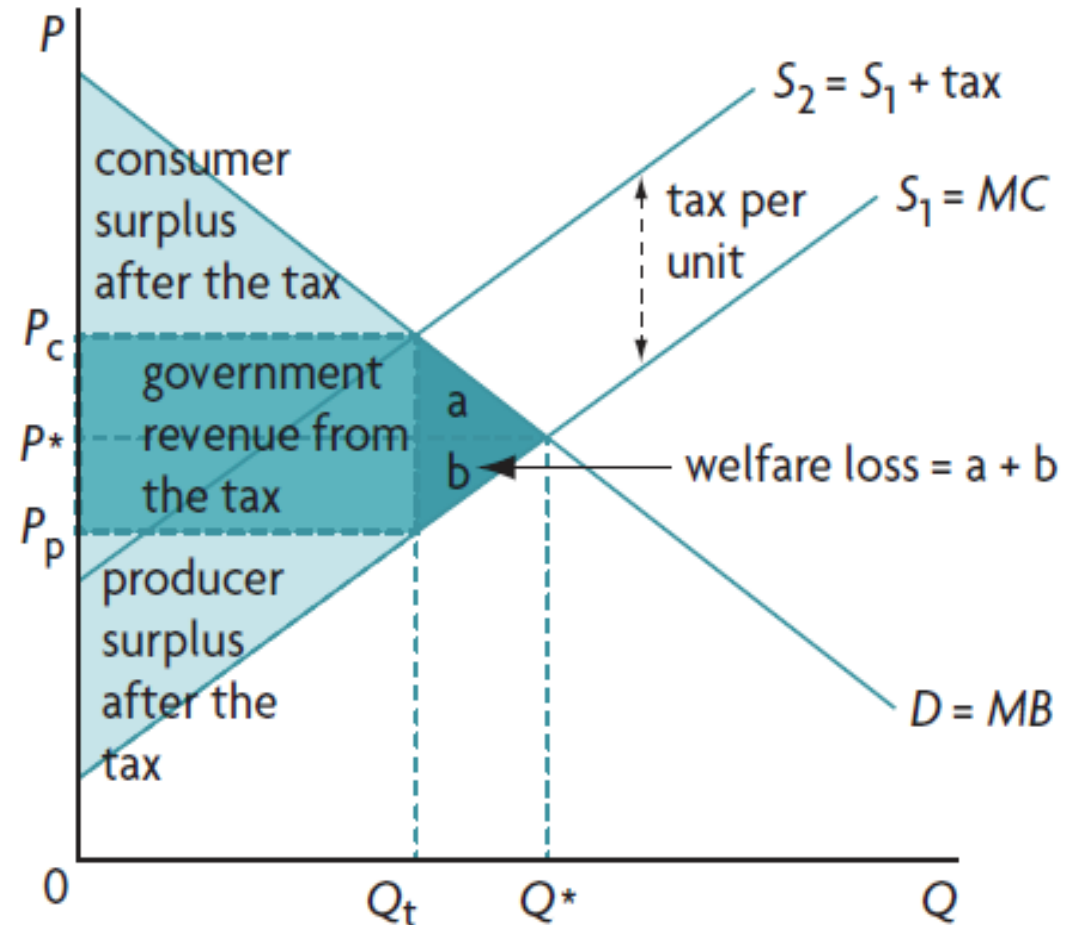
Indirect Tax Diagram

Welfare Loss

A portion of the **consumer and producer surplus** becomes government revenue.

Always refer to the <u>initial supply curve</u> when identifying **producer surplus** after the imposition of an indirect tax.

Welfare loss occurs because the tax causes a smaller than optimum quantity.

At Qt, MB > MC

P

consumer surplus after the tax

$S_2 = S_1 + tax$

tax per unit

$S_1 = MC$

P_c

government revenue from the tax

a

$P*$

b

welfare loss = a + b

P_p

producer surplus after the tax

$D = MB$

0   Q_t $Q*$ Q

Indirect Taxes: Calculation

Consumer Expenditure

Using the diagram…
Calculate the change in **consumer expenditure** after tax.

Before tax = P* x Q*	After tax = Pc x Qt
= €16 x 28	= €19 x 22
= €448	= €418
Change in consumer expenditure = €418 - €448	
= -€30	

Market for Petrol
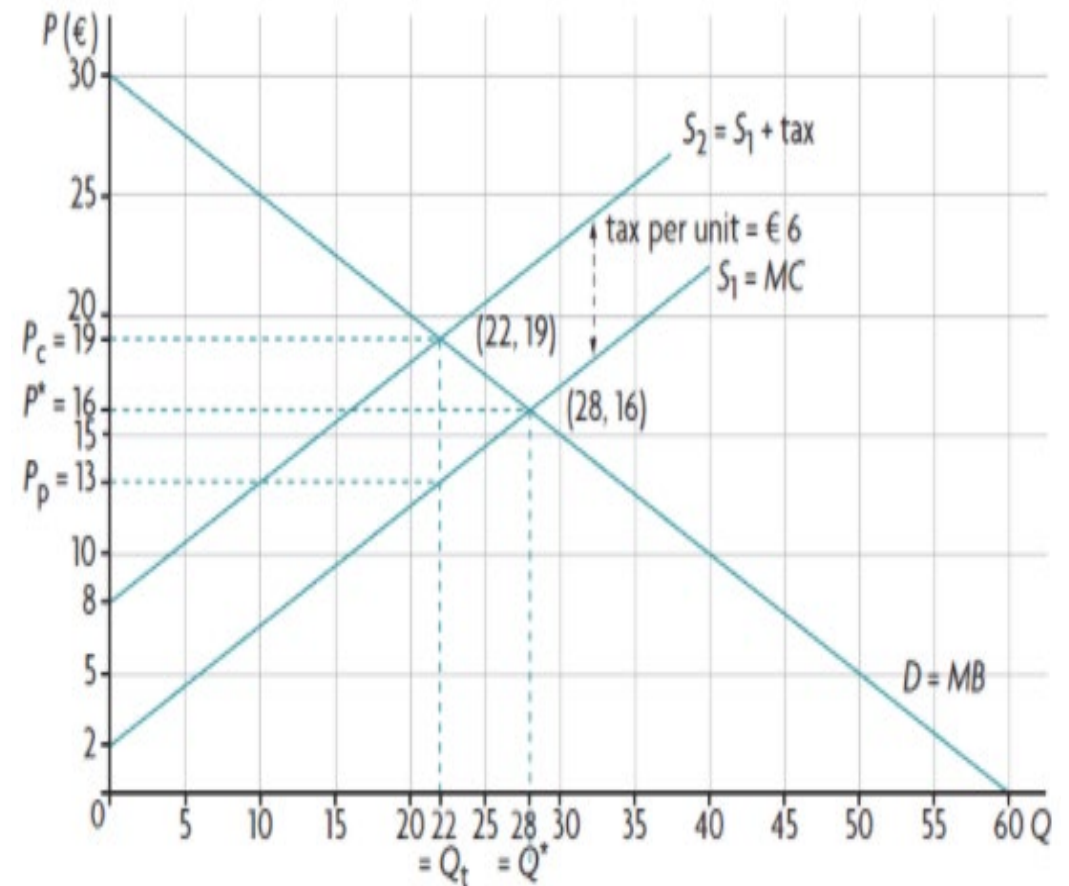
Quantity of Petrol (Litres)

Indirect Taxes: Calculation

Producer Revenue

Using the diagram…
Calculate the change in **producer revenue** after tax.

Before tax = P* x Q*	After tax = Pp x Qt
= €16 x 28	= €13 x 22
= €448	= €286
Change in firm revenue = €448 - €286	
= - €162	

Firm revenue is <u>less than</u> consumer expenditure

Market for Petrol

Quantity of Petrol (Litres)
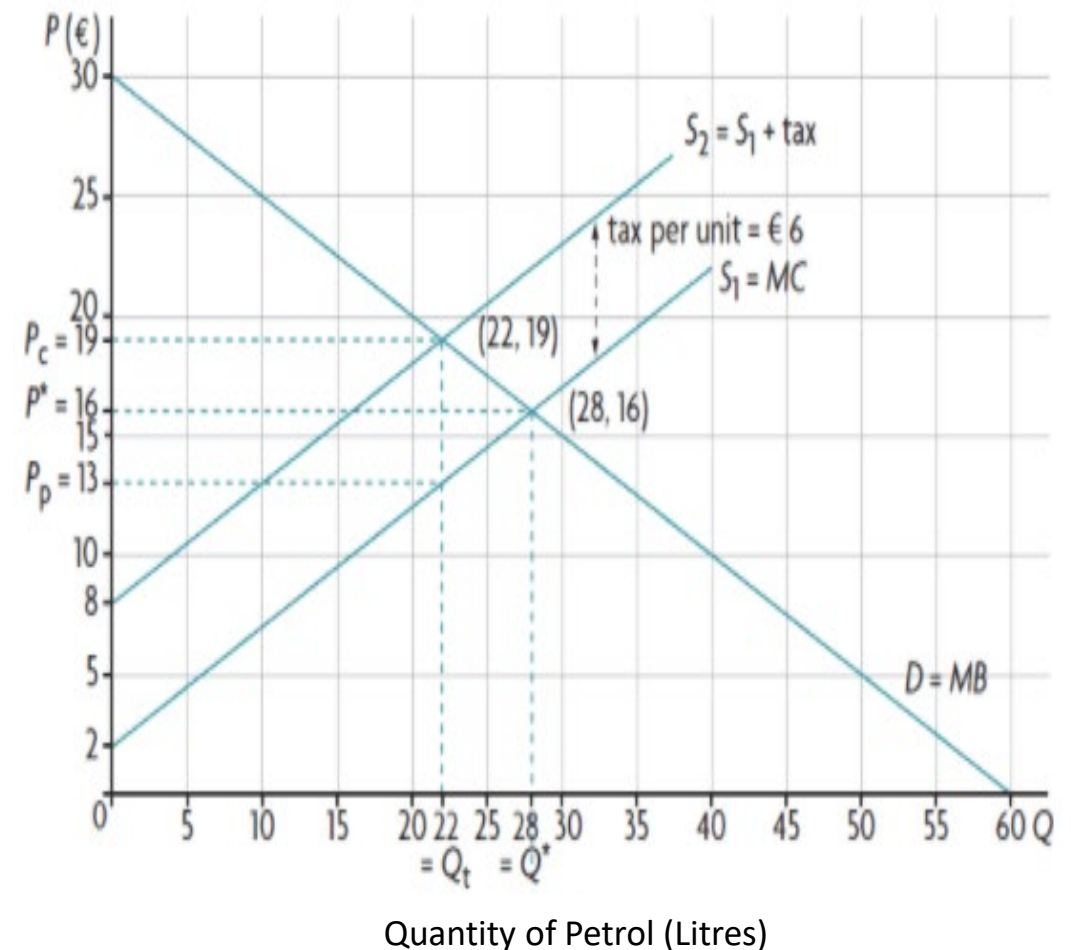
Indirect Taxes: Calculation

Government Revenue

Using the diagram…
Calculate the **government revenue**

1	Government revenue = (Pc – Pp) x Qt = (€19 – €13) x 22 = €132
2	Government revenue = Consumer exp – Firm revenue = €418 - €286 = €132

Market for Petrol
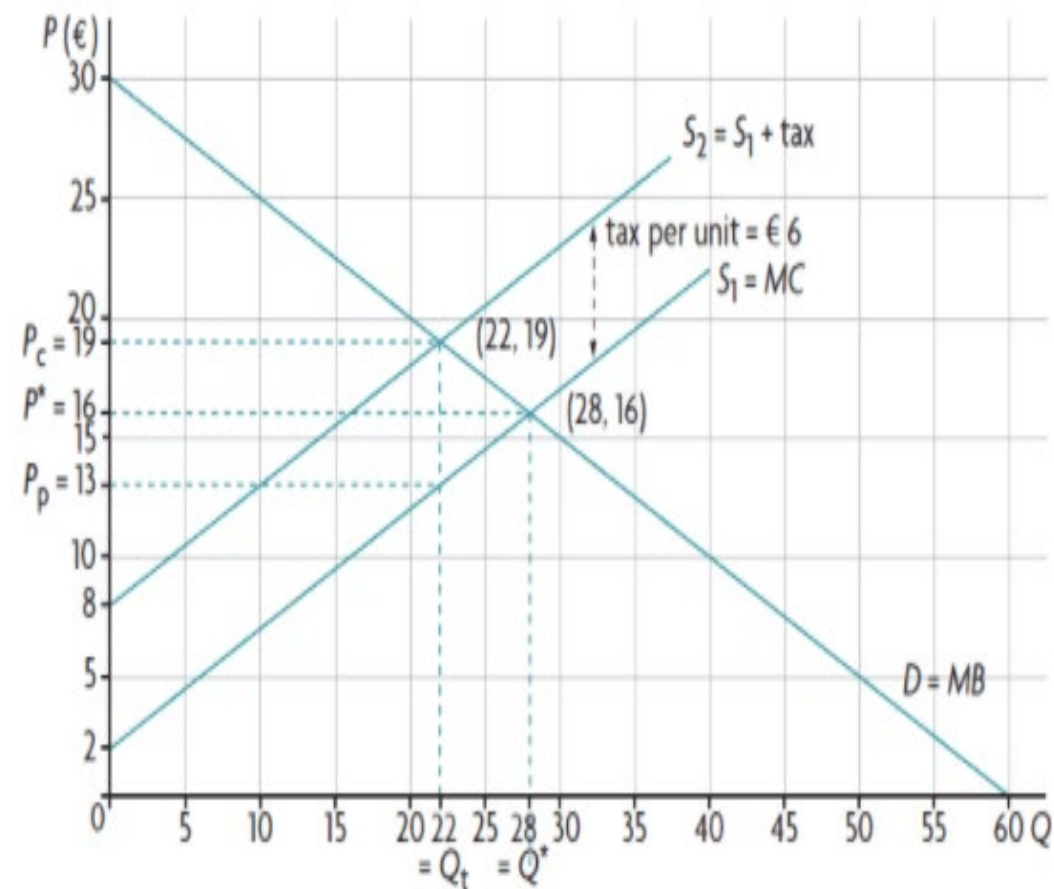
Quantity of Petrol (Litres)

Indirect Taxes: Calculation

Consumer Surplus

Using the diagram…
Calculate the change in **consumer surplus** after the tax

Consumer surplus = $\dfrac{(P \text{ intercept of D curve minus } P \text{ of consumers}) \times Q \text{ purchased}}{2}$
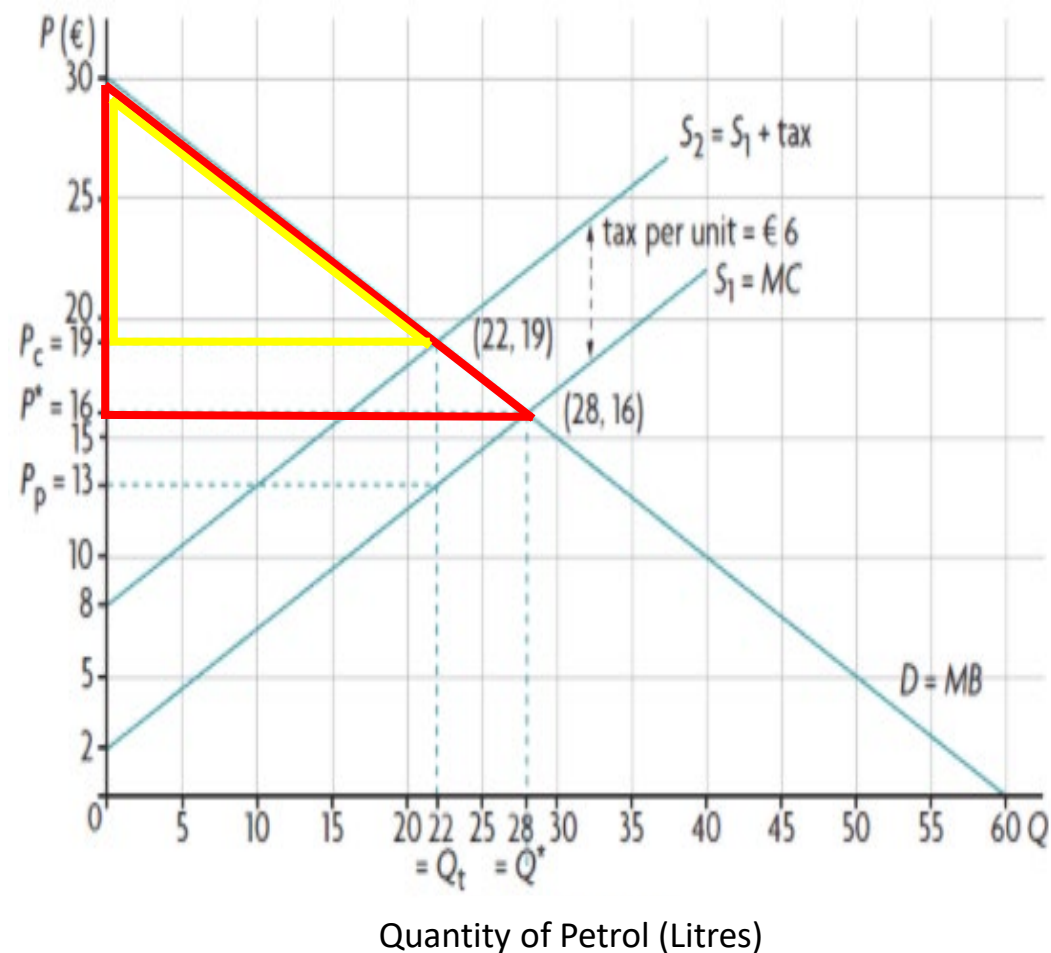
Therefore, consumer surplus before the tax is:

$\dfrac{(30-P^*) \times Q^*}{2} = \dfrac{(30-16) \times 28}{2} = \dfrac{14 \times 28}{2} = \dfrac{392}{2} = €196$

Consumer surplus after the tax is:

$\dfrac{(30-P_c) \times Q_t}{2} = \dfrac{(30-19) \times 22}{2} = \dfrac{11 \times 22}{2} = \dfrac{242}{2} = €121$

Change in consumer surplus = - € 75

Market for Petrol

Quantity of Petrol (Litres)

Indirect Taxes: Calculation

Producer Surplus

Using the diagram…
Calculate the change in
producer surplus after the tax

Producer surplus = $\dfrac{(P \text{ of producers minus } P \text{ intercept of } S_1 \text{ curve}) \times Q \text{sold}}{2}$
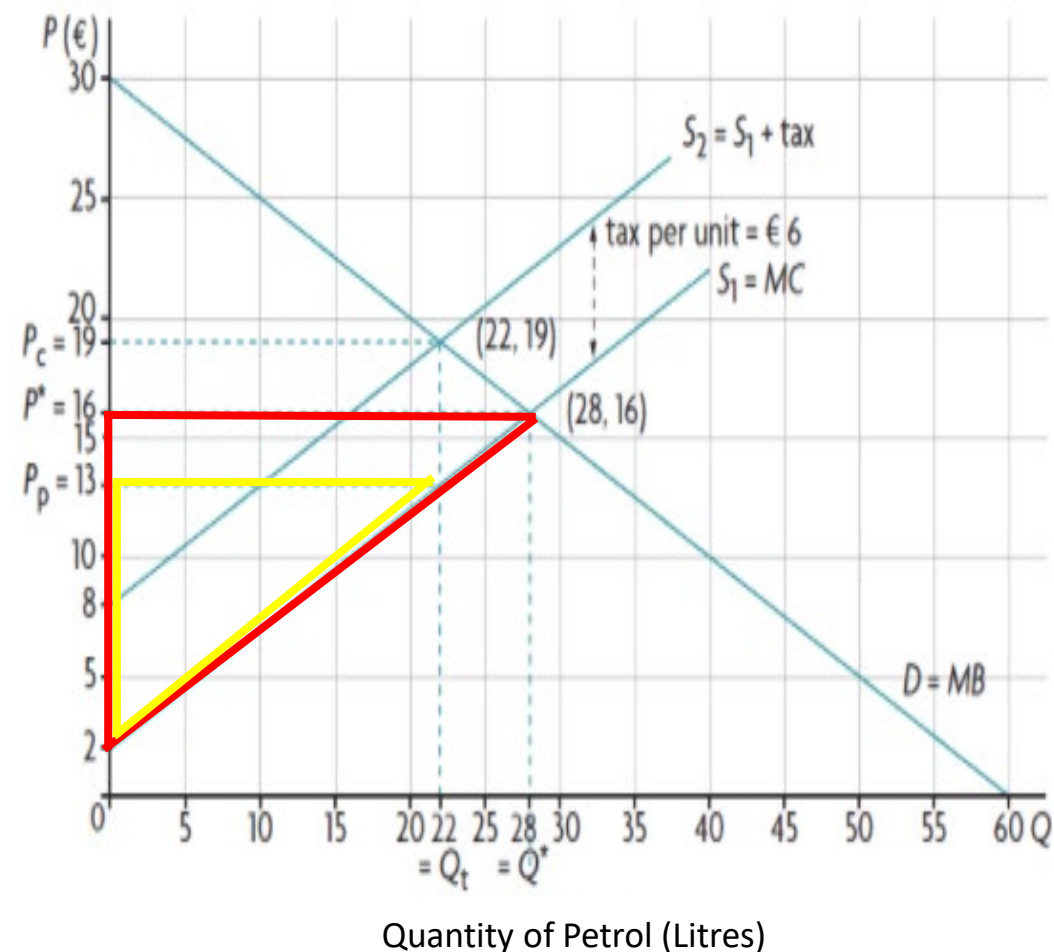
Therefore, producer surplus before the tax is:

$\dfrac{(P^* - 2) \ast Q^*}{2} = \dfrac{(16-2) \times 28}{2} = \dfrac{14 \times 28}{2} = \dfrac{382}{2} = €196$

Producer surplus after the tax is:

$\dfrac{(P_P - 2) \times Q_t}{2} = \dfrac{(13-2) \times 22}{2} = \dfrac{11 \times 22}{2} = \dfrac{242}{2} = €121$

Change in consumer surplus = - € 75

Market for Petrol

Quantity of Petrol (Litres)

Indirect Taxes: Calculation

Market for Petrol
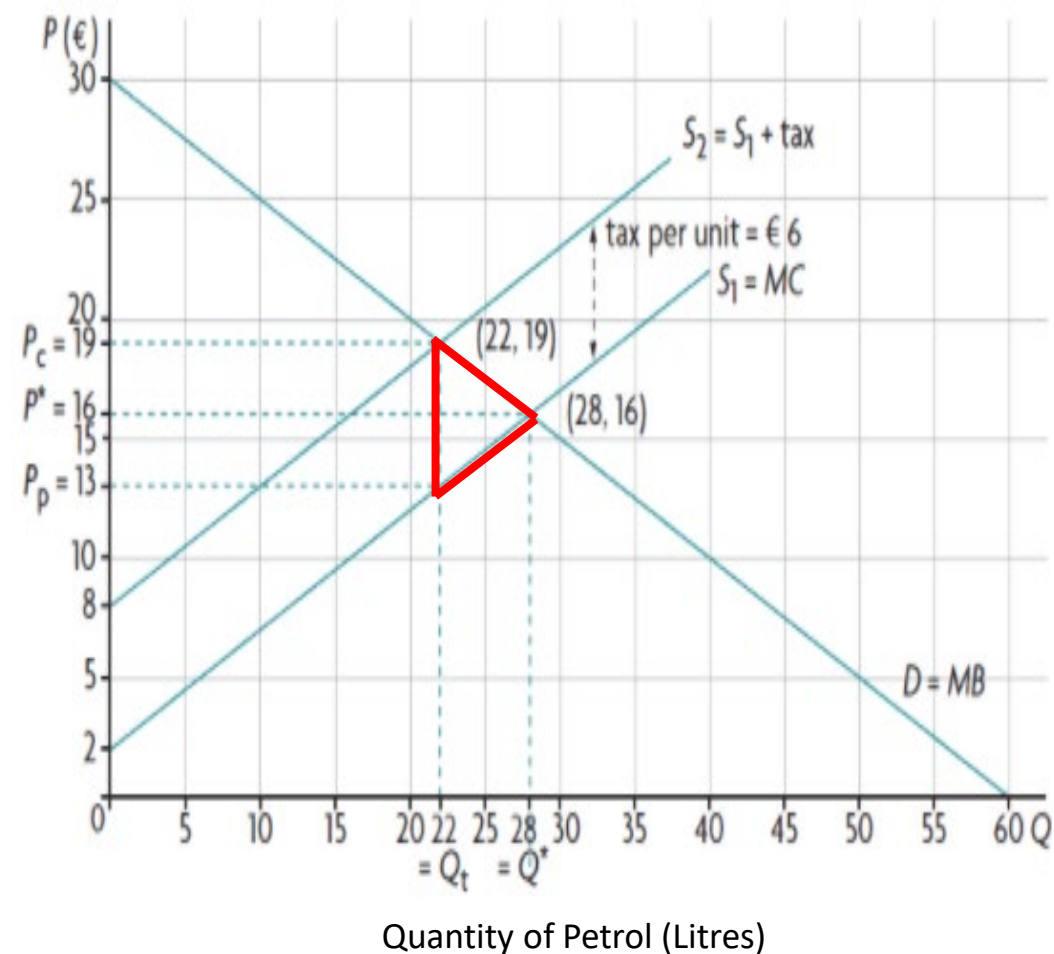
Welfare Loss

Using the diagram…

Calculate the **welfare loss**

$$\frac{(P_c - P_p)(Q^* - Q_t)}{2} = \frac{(19-13)(28-22)}{2} = \frac{6 \times 6}{2} = €18$$

Subsidies

A **subsidy** refers to assistance by the government to individuals or groups of individuals such as firms, consumers, industries or sectors of an economy.

Types of subsidies:

- Direct cash payments
- Low-interest or interest-free loans
- Provision of goods and services by the government at below market prices
- Tax relief

Focus for this section

Subsidies

Why do governments grant subsidies to firms?

- Increase revenue and incomes of producers

- Make certain goods affordable to low-income consumers

- Encourage production and consumption of certain 'desirable' products

- Support the growth of particular industries

- Encourage exports of particular goods and services

- Improve the allocation of resources by correcting **positive externalities**

Subsidies Diagram

Assume the government grants a $1.00 per unit subsidy on vaccinations in Singapore.

- The subsidy reduces the production cost of vaccinations so the supply of vaccinations **increases**.

- Supply will shift **downwards** by $1.00 from **S to S - Subsidy** as firms produce more output.

- The price of vaccinations decreases from **P* to Pc**

- The quantity of vaccinations increases from **Q* to Qsb**

- Subsidy per unit is shown by the difference between the two supply curves.
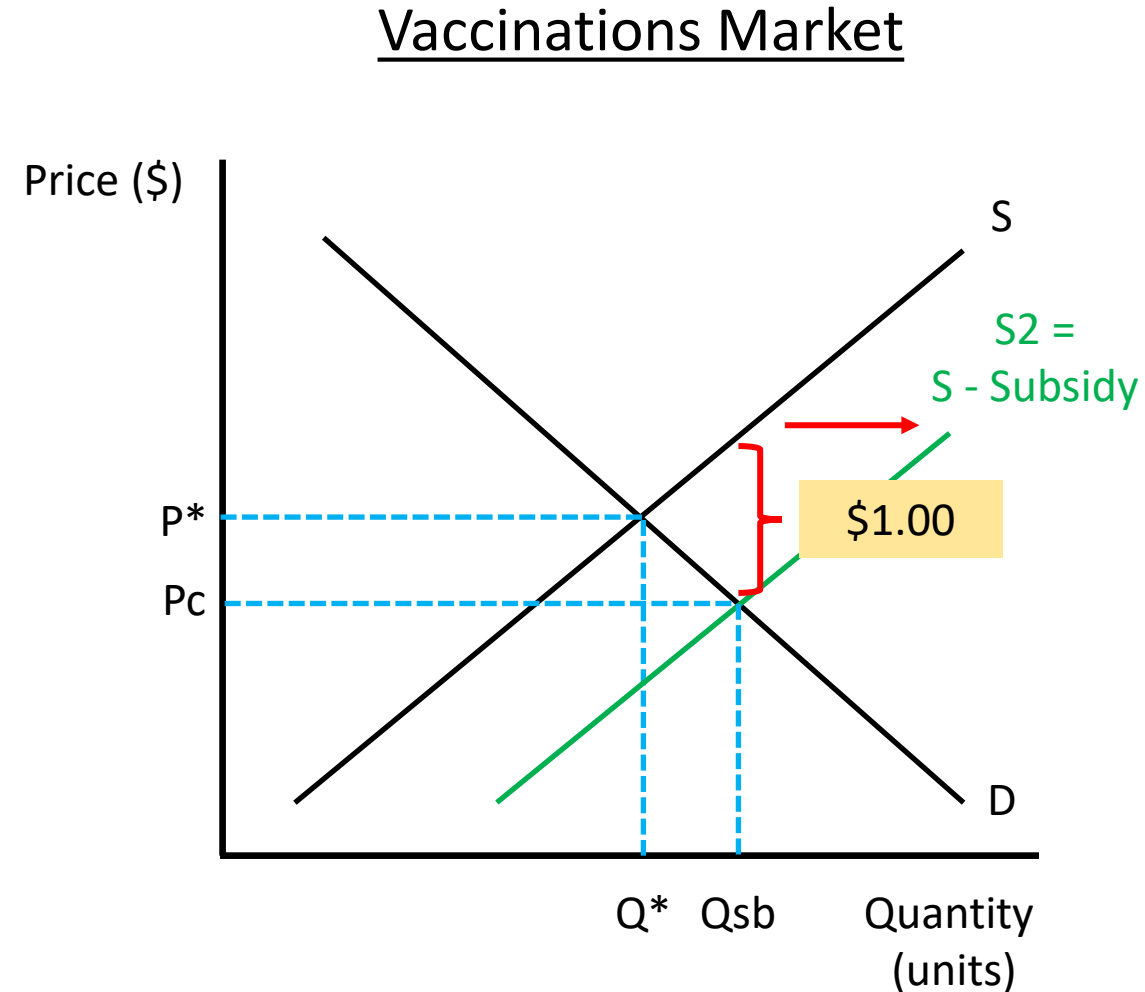
Vaccinations Market

Price ($)

S

S2 =
S - Subsidy

$1.00

P*

Pc

D

Q* Qsb   Quantity
(units)

Subsidies Diagram

Consequences on various stakeholders:

Consumers

▪ Consumers now pay less for vaccinations **(P* to Pc)**

▪ Consumers now consume more **(Q* to Qsb)**

▪ Consumers are better off as a result from the subsidy as more vaccinations can be consumed.
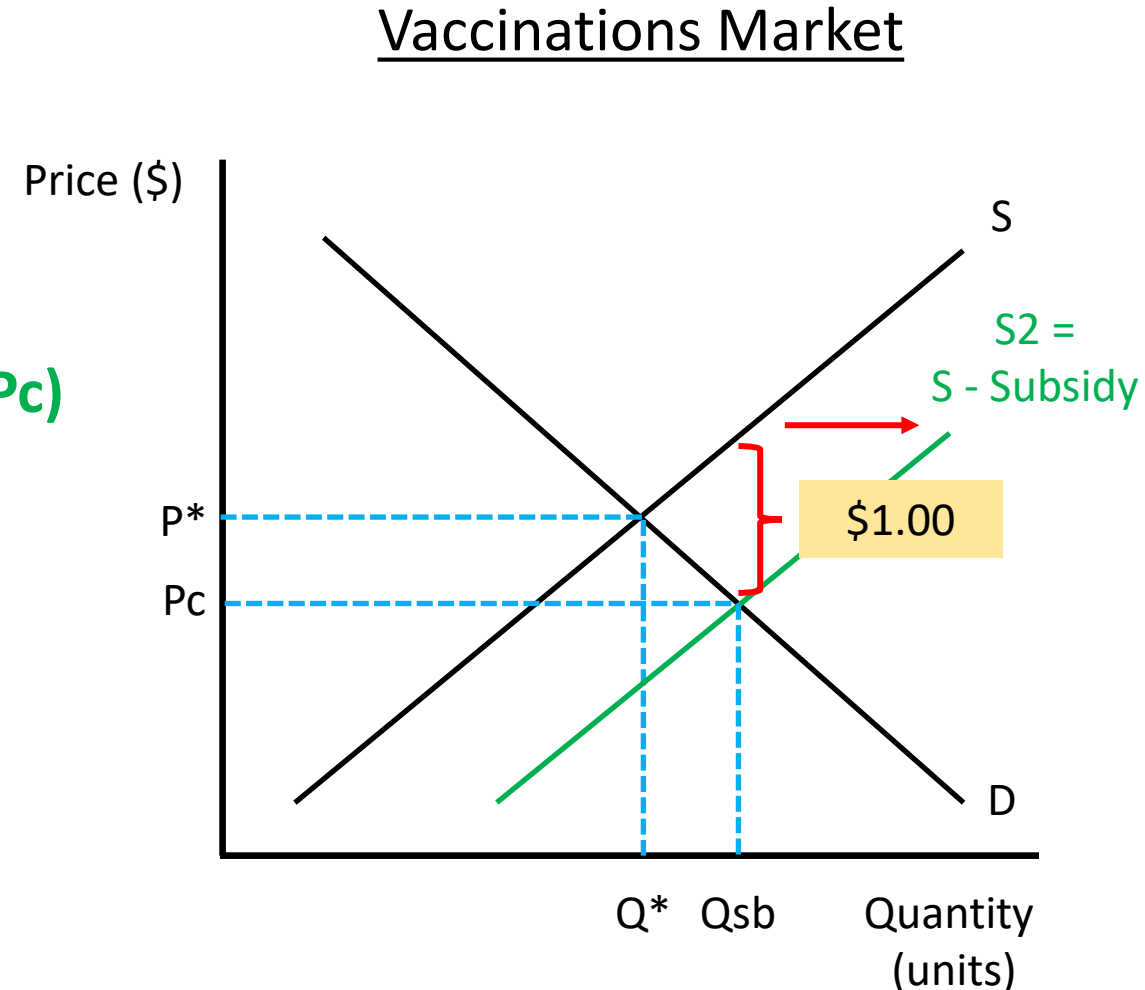
Vaccinations Market

Price ($)

S

S2 = S - Subsidy

$1.00

P*

Pc

D

Q*   Qsb   Quantity (units)

Subsidies Diagram

Consequences on various stakeholders:

Firms (Producers)

- Firms receive **Pc** from consumers and **an extra $1.00** for each unit of vaccination from the government.

- Firms ultimately receive more for selling vaccinations **(P* to Pp)**

- Firms' revenue increases to **Pp x Qsb**

- Firms are better off as a result from the subsidy.
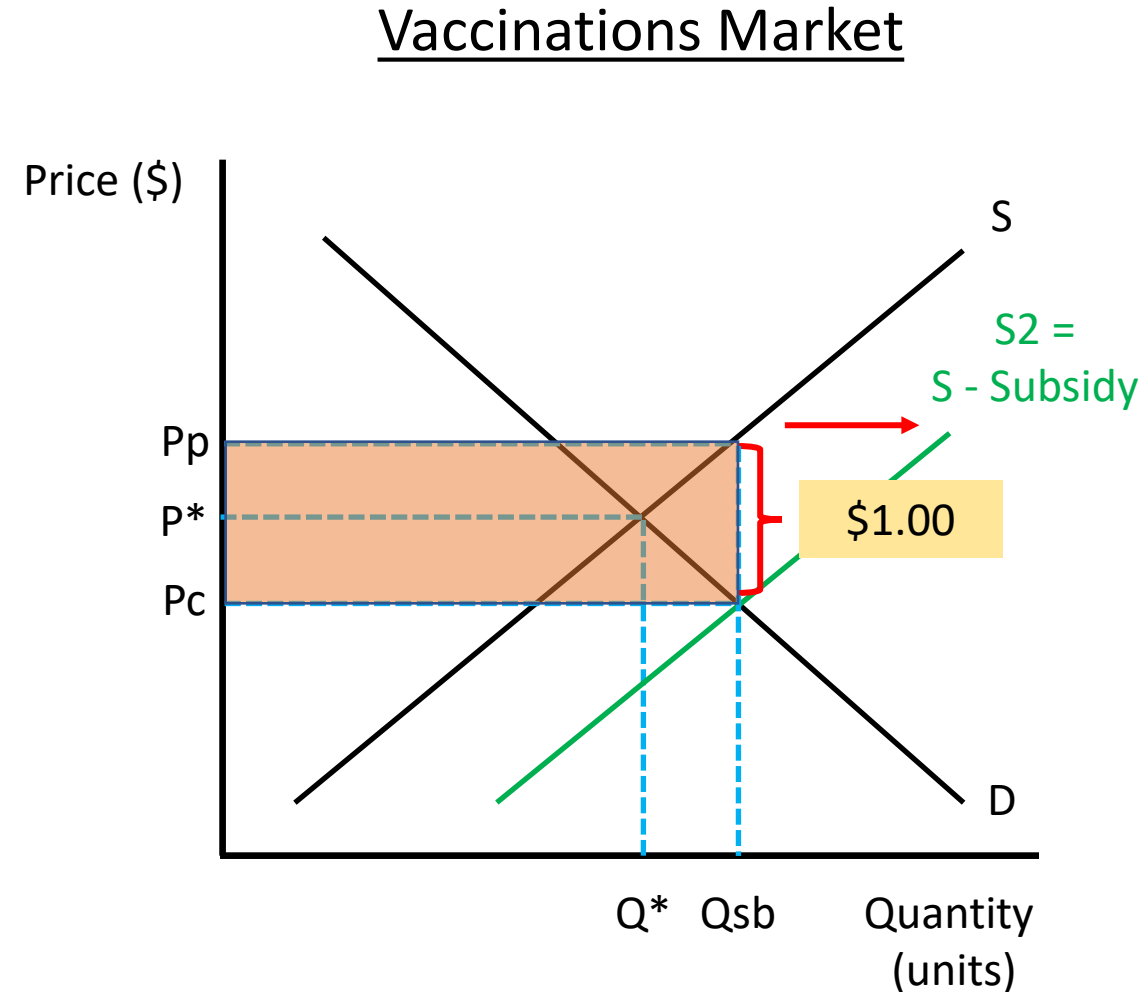
<u>Vaccinations Market</u>

Price ($)

S

S2 = S - Subsidy

Pp

P*

$1.00

Pc

D

Q* Qsb   Quantity (units)

Subsidies Diagram

Consequences on various stakeholders:

Government

- The government pays for the subsidy which will increase its expenditure.

- The government will have to raise taxes or run into a **budget deficit**.

- Impact on the government's budget is negative.
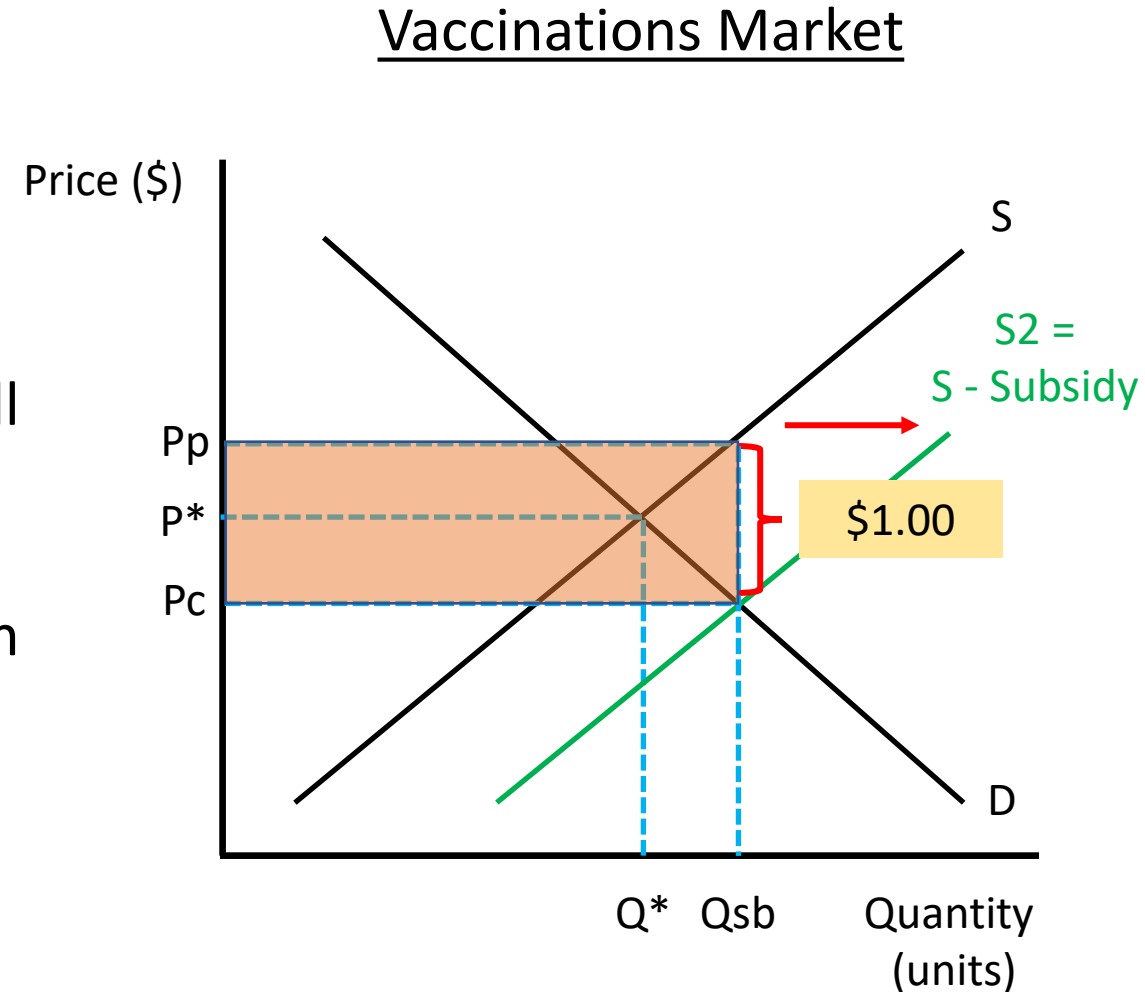
Vaccinations Market

Price ($)

S

S2 =
S - Subsidy

Pp

P*

$1.00
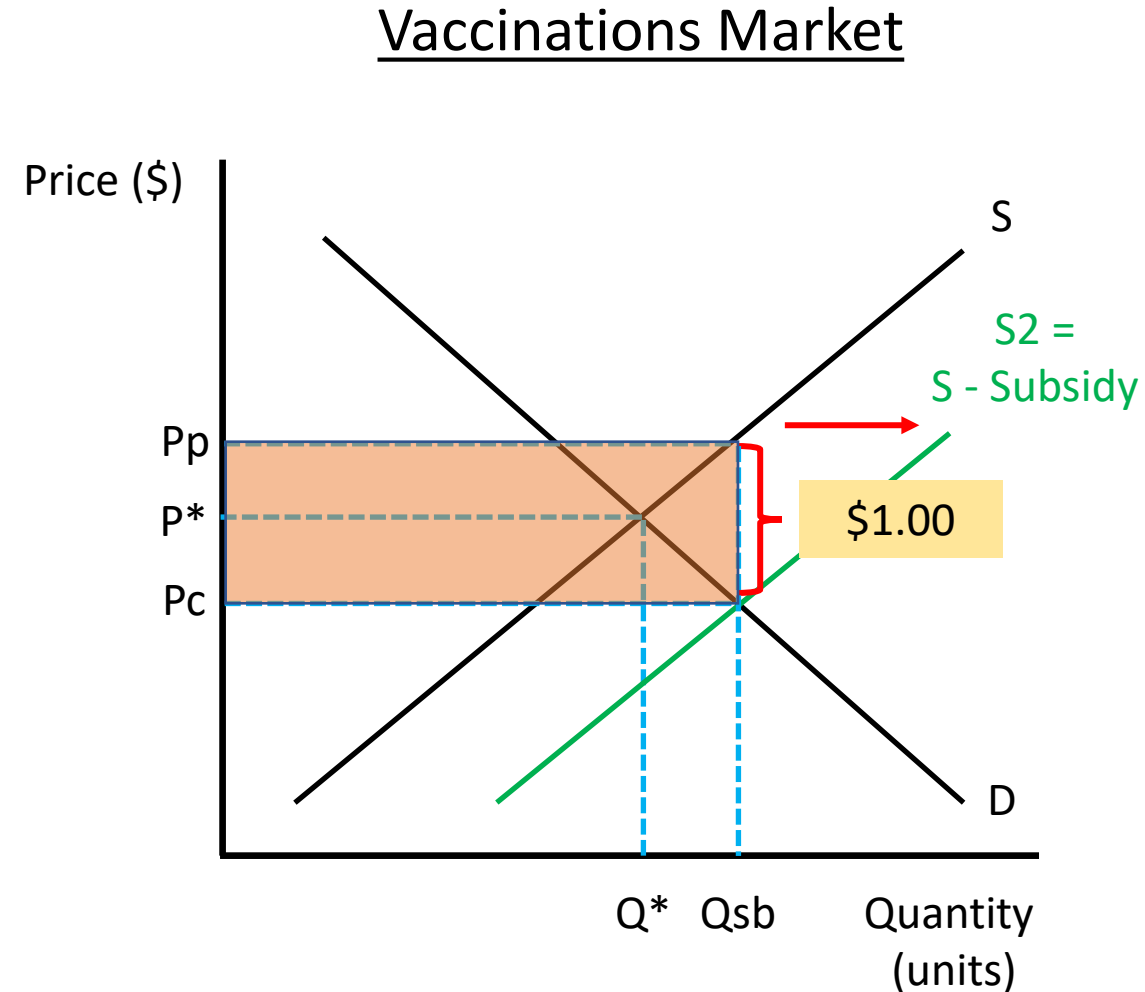
Pc

D

Q* Qsb   Quantity
(units)

Subsidies Diagram

Consequences on various stakeholders:

Workers

- Result in lower unemployment as more workers are needed when firms produce more **(Q* to Qsb)**

Society as a Whole

- Society is worse off as a result of the subsidy because there is overallocation of resources **(Q*< Qsb)**
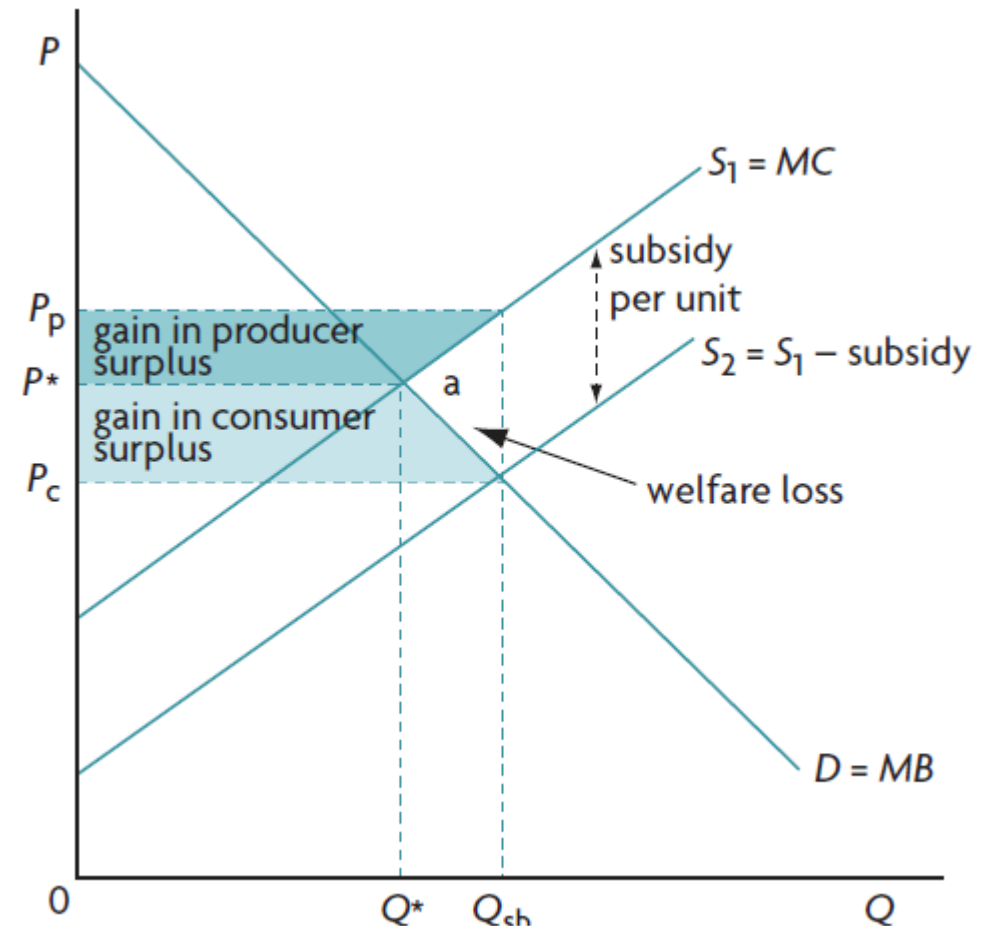
Vaccinations Market

Subsidies Diagram

Consequences on various stakeholders:

Welfare Loss

- The subsidy is paid for by taxes that have an **opportunity cost** (alternative use forgone)

- The social losses due to government spending is represented by the **welfare loss** of **area a**

- Allocative inefficiency has occurred as a result
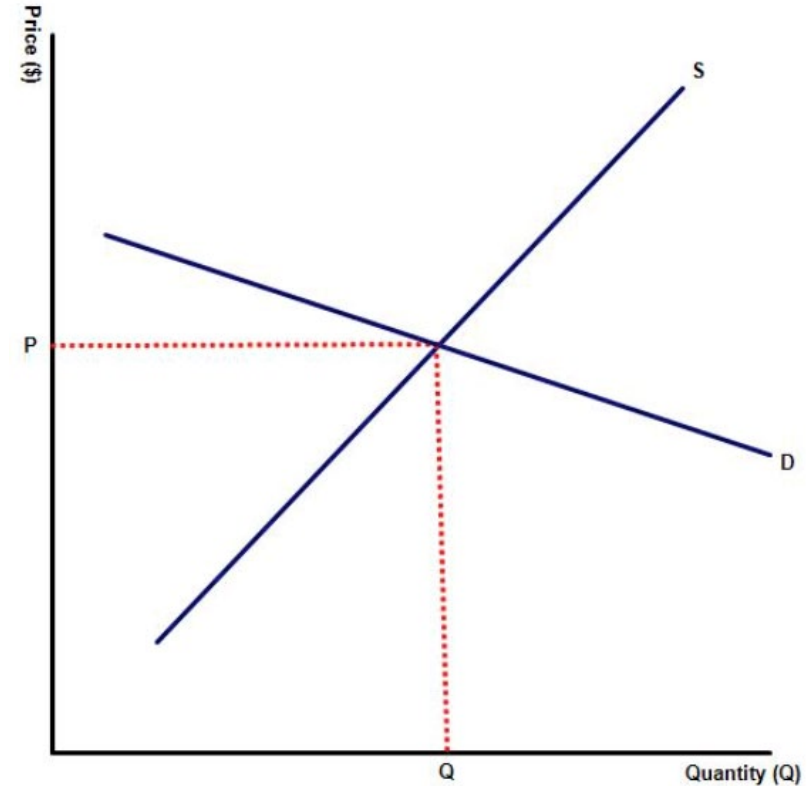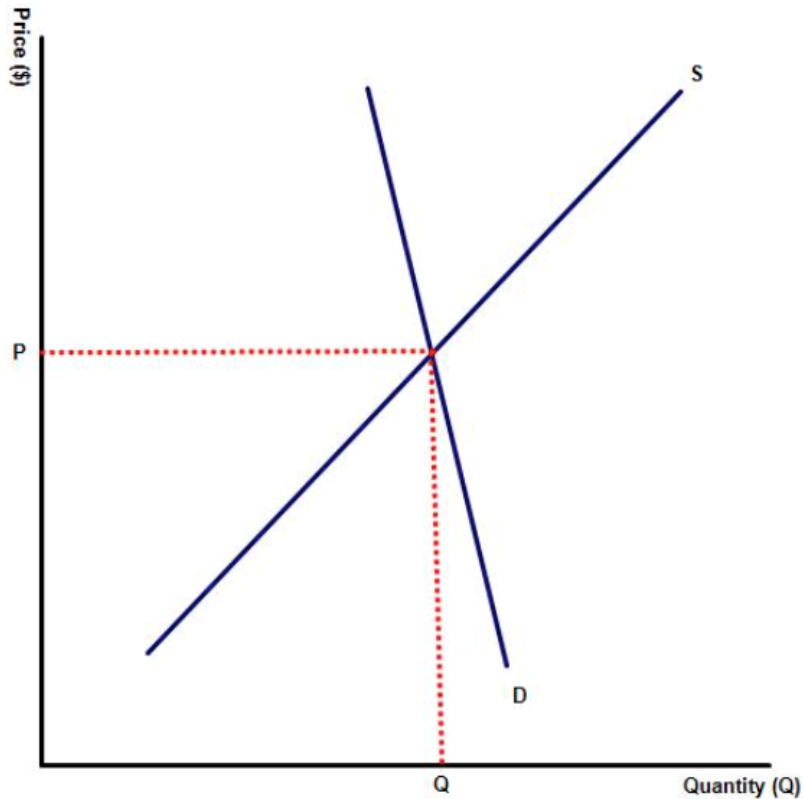
Vaccinations Market

Subsidies Diagram

On your own paper…
Add a subsidy onto the diagrams shown and illustrate how effective it would be.

Subsidies: Calculation

Consumer Expenditure

Using the diagram…
Calculate the change in **consumer expenditure** after subsidies.

Before subsidies = P* x Q*	After subsidies = Pc x Qsb
= $20 x 20	= $18 x 24
= $400	= $432
Change in consumer expenditure = $432 - $400 = $32	

Market for Vaccinations

$P(\$)$ $S_1 = MC$
$S_2 = S_1 - subsidy$
subsidy per unit = \$4
(20, 20)
$P_p = 22$
$P* = 20$
$P_c = 18$
(24, 18)
$D = MB$
$= Q* = Q_{sb}$
Q

Quantity of Vaccinations (Shots)
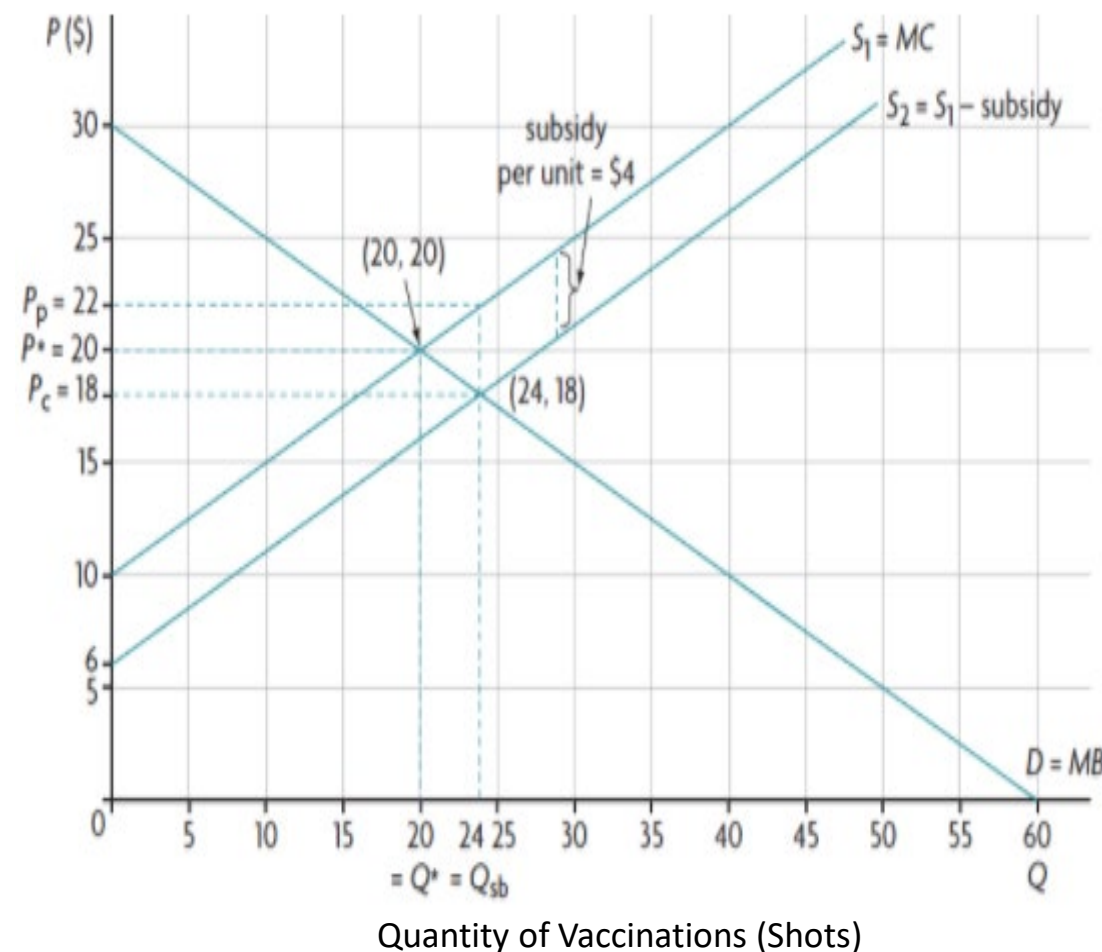
Subsidies: Calculation

Producer Revenue

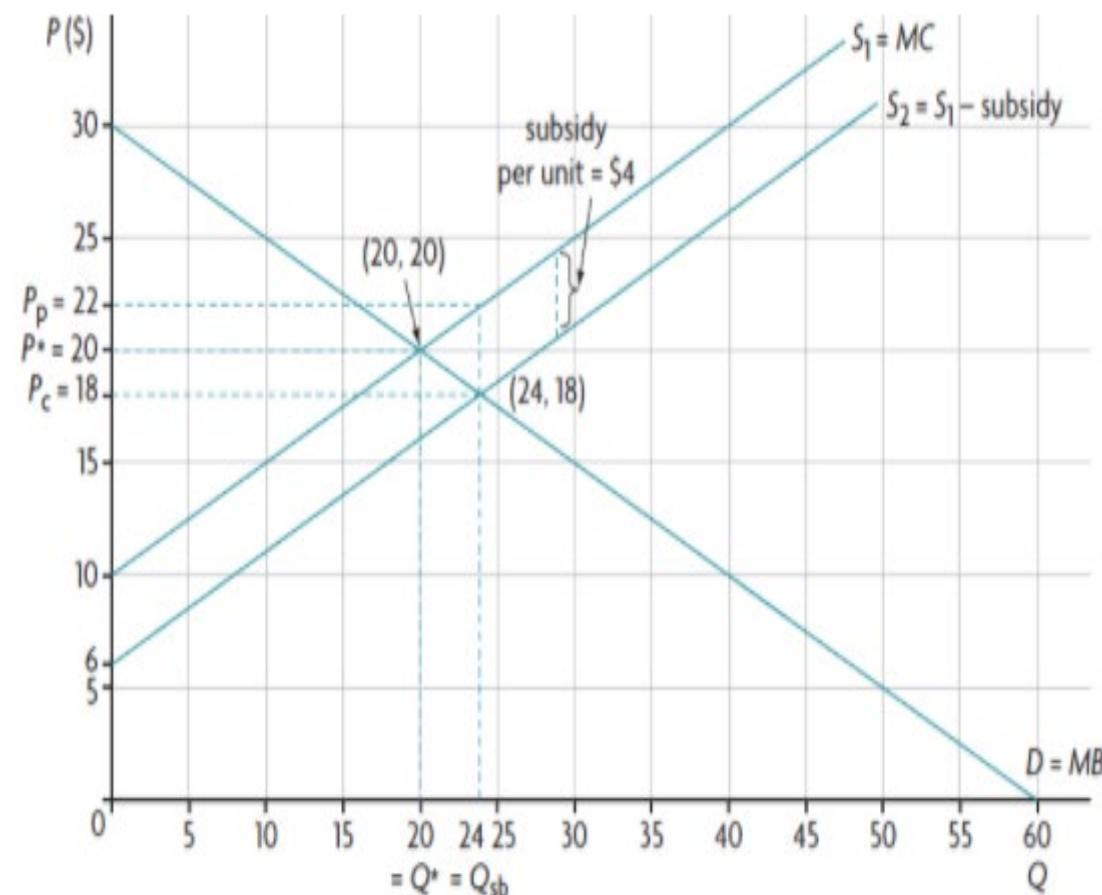**Using the diagram**…
Calculate the change in **producer revenue** after subsidies.

Before subsidies = P* x Q* = $20 x 20 = $400	After subsidies = Pp x Qsb = $22 x 24 = $528
Change in consumer expenditure = $528 - $400 = $128	

Market for Vaccinations

Quantity of Vaccinations (Shots)

Subsidies: Calculation

Government Expenditure

Using the diagram…
Calculate the **government expenditure**

1	Government expenditure = (Pp – Pc) x Qsb 　　　　　　　　　　= $4 x 24 　　　　　　　　　　= $96
2	Government expenditure = Firm revenue - Cons exp. 　　　　　　　　　　= $528 - $432 　　　　　　　　　　= $96

Market for Vaccinations
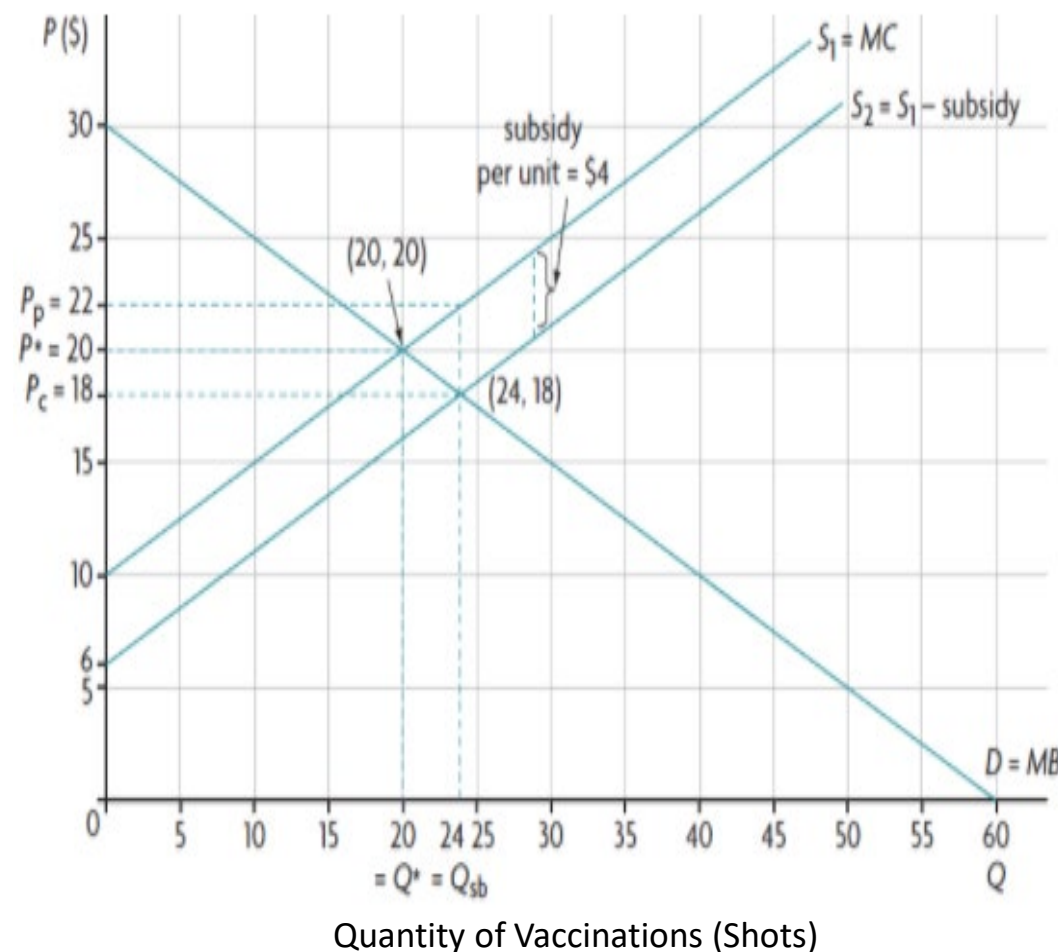
Quantity of Vaccinations (Shots)

Subsidies: Calculation

Consumer Surplus

Using the diagram…
Calculate the change in **consumer surplus** after subsidies

Consumer surplus = $\dfrac{(P \text{ intercept of D curve minus } P \text{ of consumers}) \times Q \text{ purchased}}{2}$
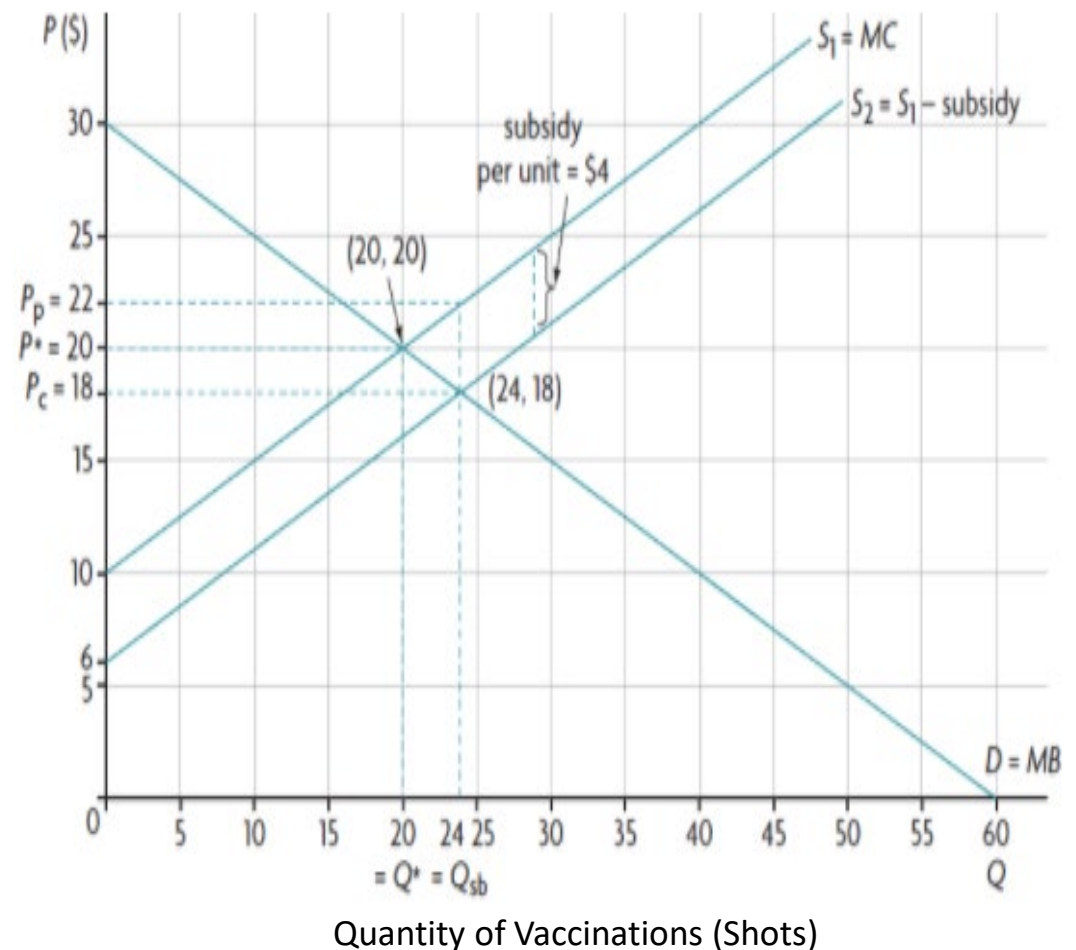
Therefore, consumer surplus before the subsidy is:

$$\frac{(30-P^*) \times Q^*}{2} = \frac{(30-20) \times 20}{2} = \frac{10 \times 20}{2} = \frac{200}{2} = \$100$$

Consumer surplus after the subsidy is:

$$\frac{(30-P_c) \times Q_{sb}}{2} = \frac{(30-18) \times 24}{2} = \frac{12 \times 24}{2} = \frac{288}{2} = \$144$$

Consumer surplus increases by $44

Market for Vaccinations

Quantity of Vaccinations (Shots)

Subsidies: Calculation

Market for Vaccinations

Producer Surplus

Using the diagram…
Calculate the change in **producer surplus** after subsidies

Producer surplus =

$$\frac{(P \text{ of producers minus } P \text{ intercept of } S_1 \text{ curve}) \times Q \text{ sold}}{2}$$

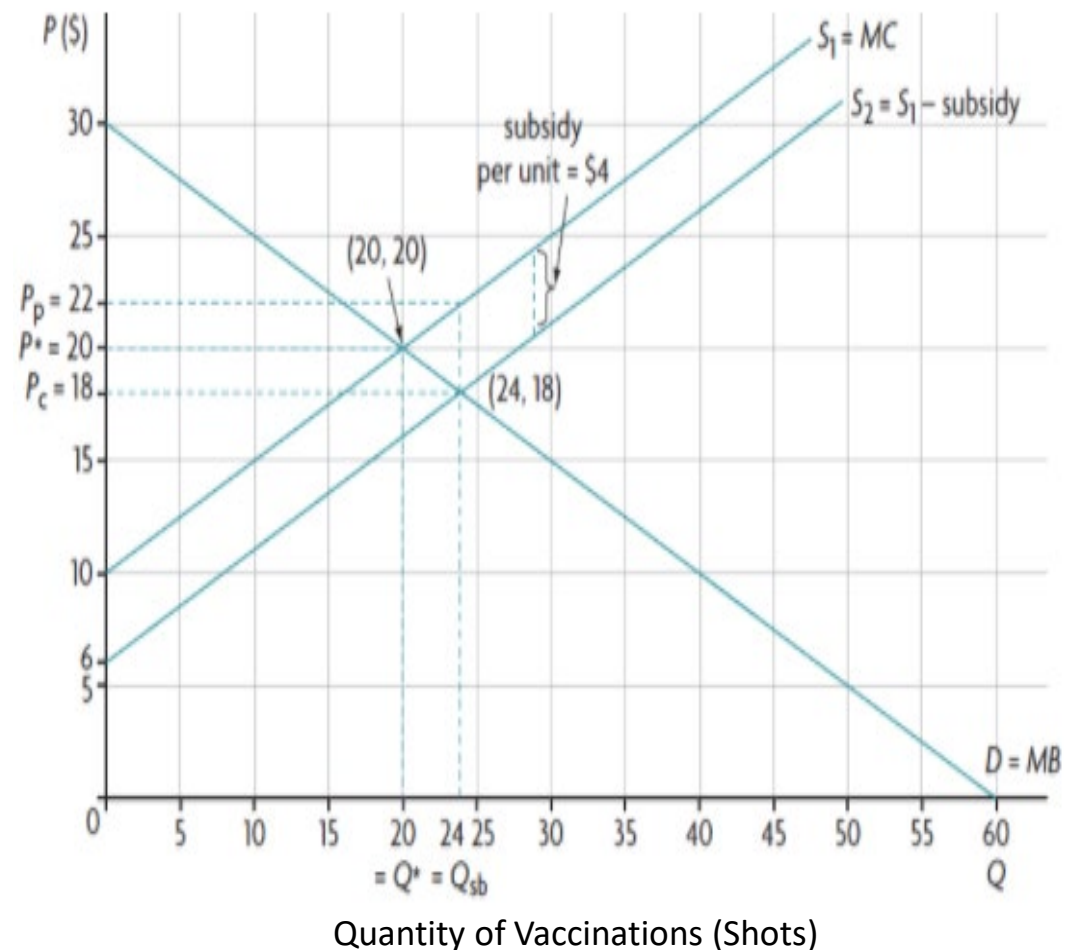Therefore, producer surplus before the subsidy is:

$$\frac{(P^* - 10) \times Q^*}{2} = \frac{(20-10)\,20}{2} = \frac{10 \times 20}{2} = \frac{200}{2} = \$100$$

Producer surplus after the subsidy is:

$$\frac{(P_P - 10) \times Q_{sb}}{2} = \frac{(22-10) \times 24}{2} = \frac{12 \times 24}{2} = \frac{288}{2} = \$144$$

Therefore producer surplus increased by $44 (= \$144 − \$100).

Quantity of Vaccinations (Shots)

Subsidies: Calculation

Market for Vaccinations

Welfare Loss

Using the diagram…
Calculate the **welfare loss**

Welfare loss can be found by:

$$\frac{(P_p - P_c)(Q_{sb} - Q^*)}{2} = \frac{(22-18)(24-20)}{2} = \frac{4 \times 4}{2} = \$8$$

Test Your Understanding
Activity 4.9 – Textbook (Page 140)

Quantity of Vaccinations (Shots)