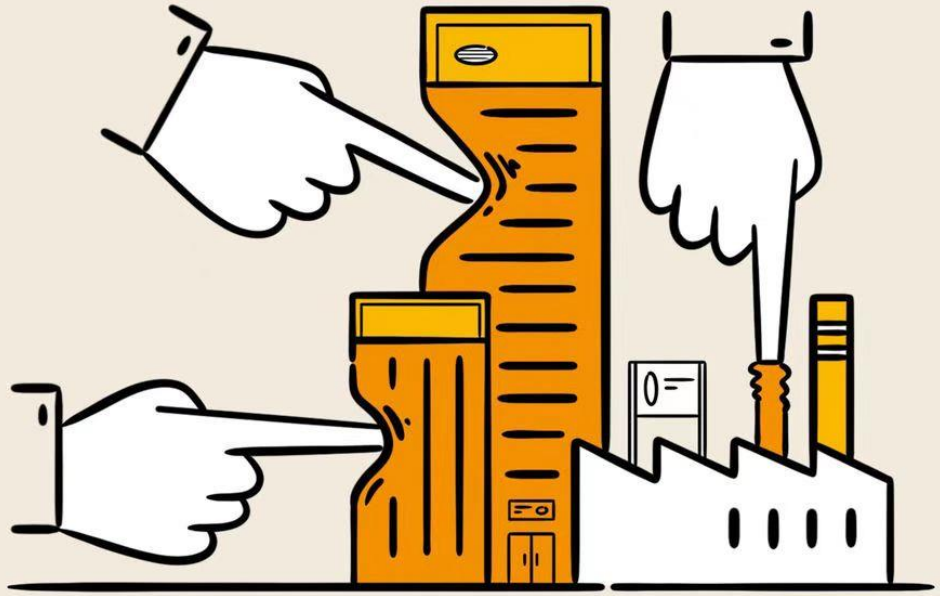

GOVERNMENT INTERVENTION

Why governments intervene in markets

1. Earn revenue for the government from indirect taxes.

- Value-added tax, tariff, consumption tax
- Usually imposed on goods with price inelastic demand. (0<PED<1)
- Cigarettes, alcohol, gasoline, etc.



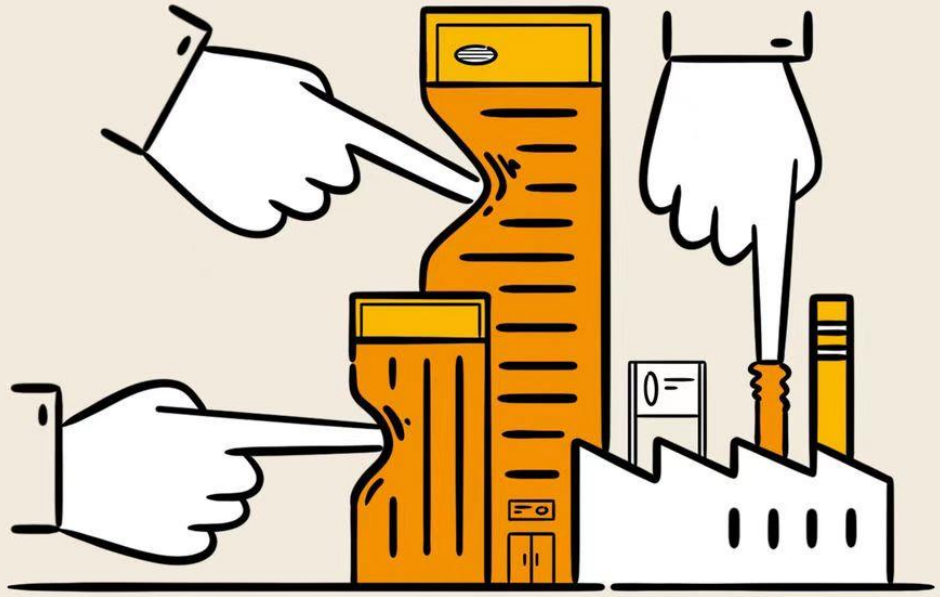
2. Provide support to firms：

- Financial assistance to **small start-up firms**
- Offer subsidies or other kinds of help to support **special firms/industries** (e.g., environmentally friendly products, wind power and solar power, etc.)
- Protect **domestic firms** from foreign competition arising from imports. (e.g., tariffs, quotas)

Why governments intervene in markets

3. Provide support to households on low incomes

- Subsidies
- Price ceilings (a maximum price set below the equilibrium price, in order to make goods more affordable to people on low incomes)
- Direct provision of services (free education, free health care)
- Transfer payments (unemployment benefits, child benefits, maternity benefits, etc.)



4. Influence the levels of production of firms

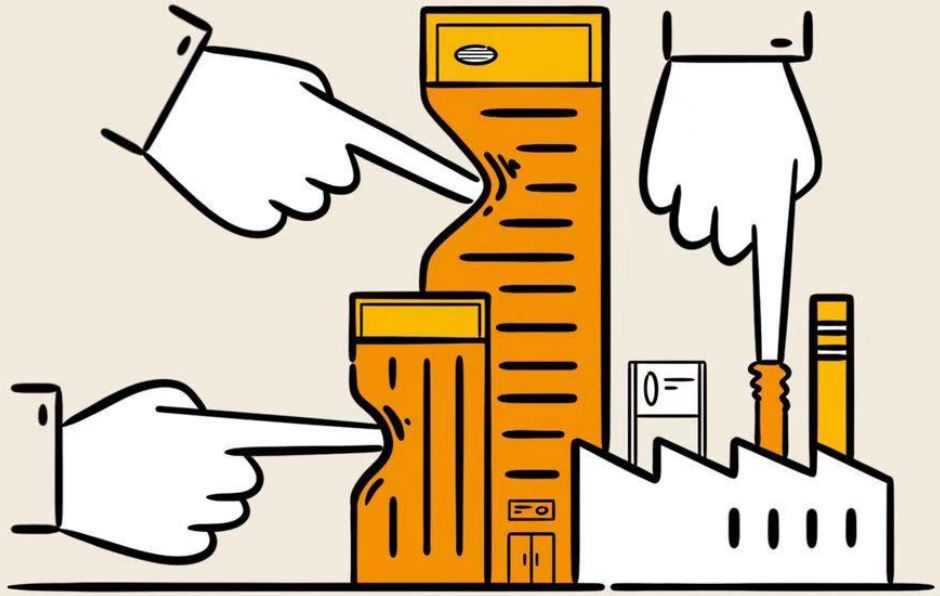
- Increase the firm's level of production by different approaches.

Why governments intervene in markets

5. Influence levels of consumption of households/consumers

- Encourage the consumption of merit goods (education, health care, etc.)
  - ✓ Encouragement approaches: subsidies, direct provision of services, nudges, command and control methods.
- Reduce consumption of demerit goods (cigarettes, fatty foods)
  - ✓ Discouragement approaches: indirect taxes, nudges, command and control methods.

* Command and control is the government laws and regulations that must be followed.



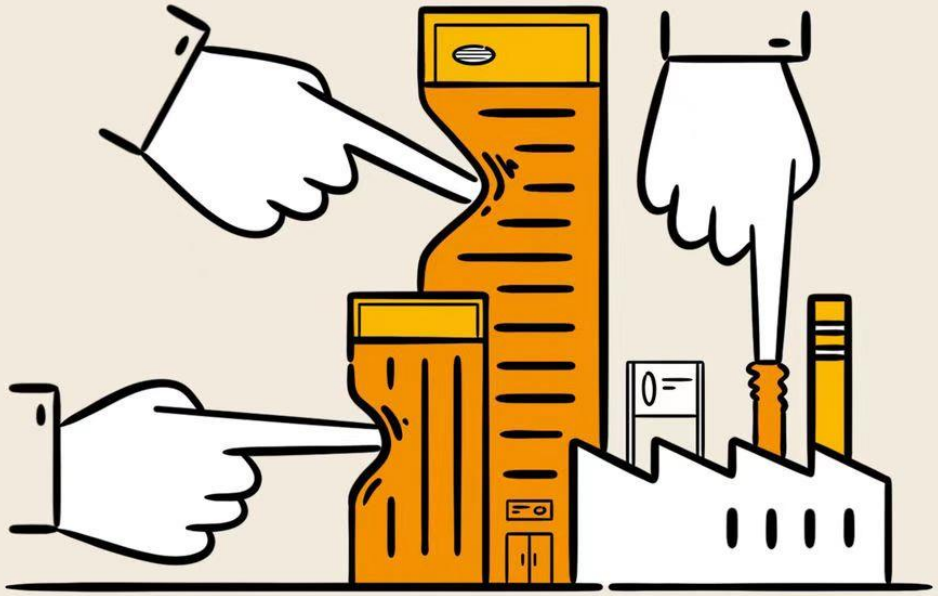
Why governments intervene in markets

6. Correct market failure

- Market failure is the failure of the market to achieve allocative efficiency. (too large or too small quantities of goods/services)

7. Promote equity (equality)

- Income and wealth distributions



Government intervention approaches in Microeconomics:

1. Indirect taxes
2. Subsidies
3. Price controls:
   - Price ceilings
   - Price floor
4. Direct provision of services
5. Command and control regulation and legislation
6. Consumer nudges

Approaches we focus in this chapter

- **Purpose:** try to influence demand or supply for a good or service, thus affecting market outcomes.


Price Control

Price Control

- **Price control** refers to the setting of minimum or maximum prices by the government (or private organisations) so that prices are unable to adjust to their equilibrium level determined by demand and supply.

- Price controls result in **market disequilibrium**, and therefore in shortages(excess demand) or surpluses(excess supply).

→ **Persisting market disequilibrium**

Government Approaches:

- Price ceilings
- Price floors

Price Ceiling

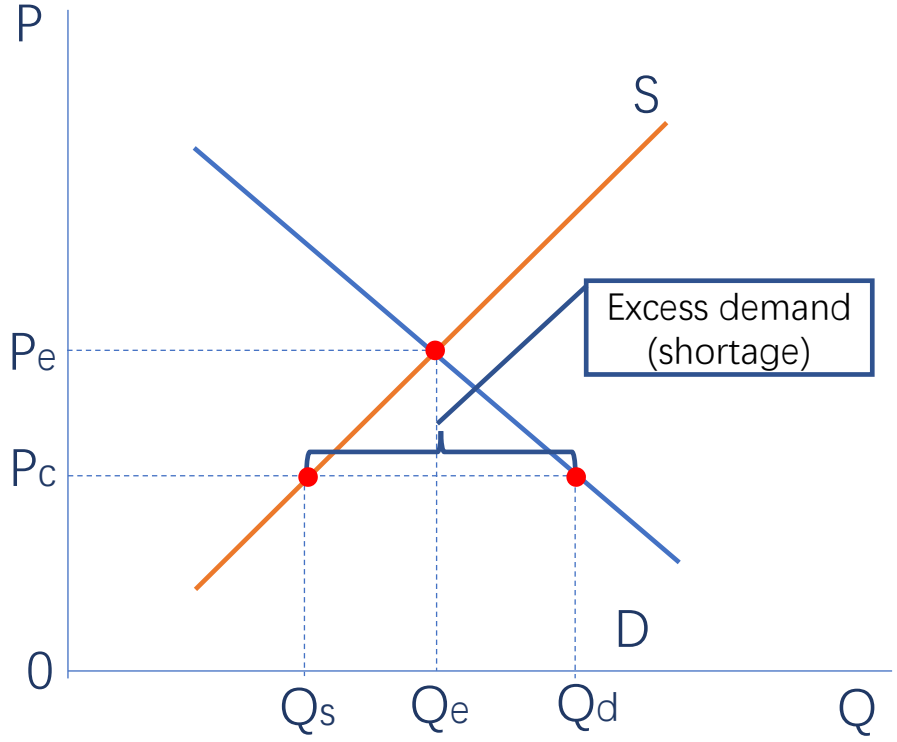
Price ceilings

- **Price ceiling** is a **maximum price** set **below** the equilibrium price, in order to make goods more affordable to people on low incomes.

- It must be below the equilibrium price, otherwise the price ceiling would have no effect.

Illustration of price ceiling

- Initial equilibrium point with **P_e** and **Q_e** determined by demand and supply.
- Government set the P_c (price ceiling) at a level below P_e.
- At **Pe with $Q_d > Q_s$**, leading to a **shortage (excess demand)**.
- Persisting market disequilibrium since the market cannot force the price up to P_e, the price hits the legally set price ceiling.
- **Lower Q_s supplied and sold** than at the equilibrium price.



Consequences
– for markets

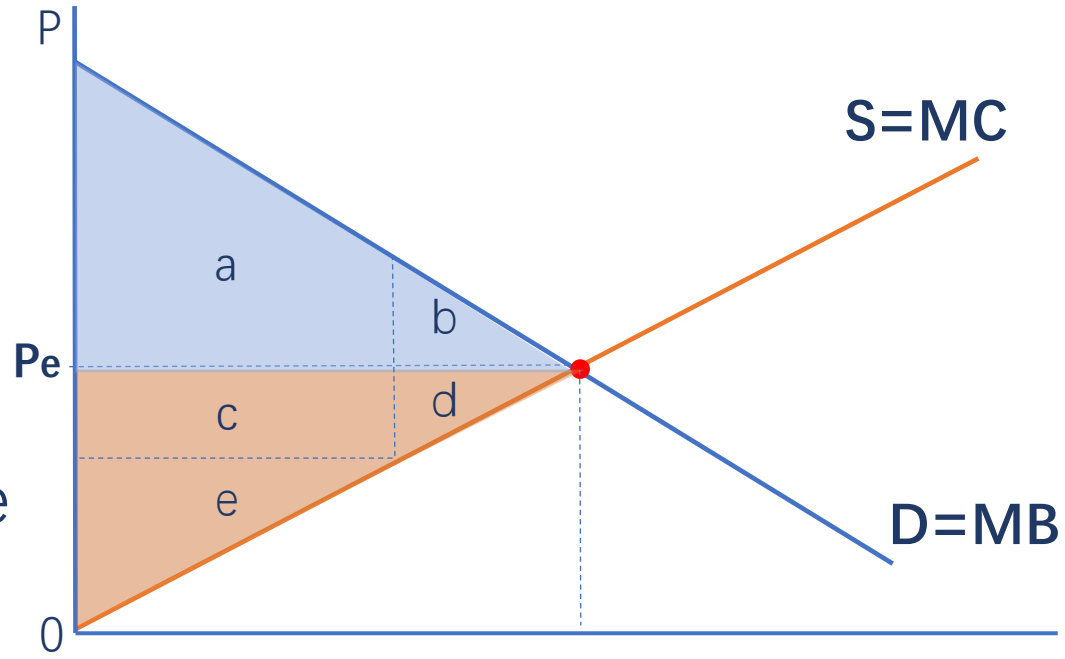
5. Negative welfare impacts

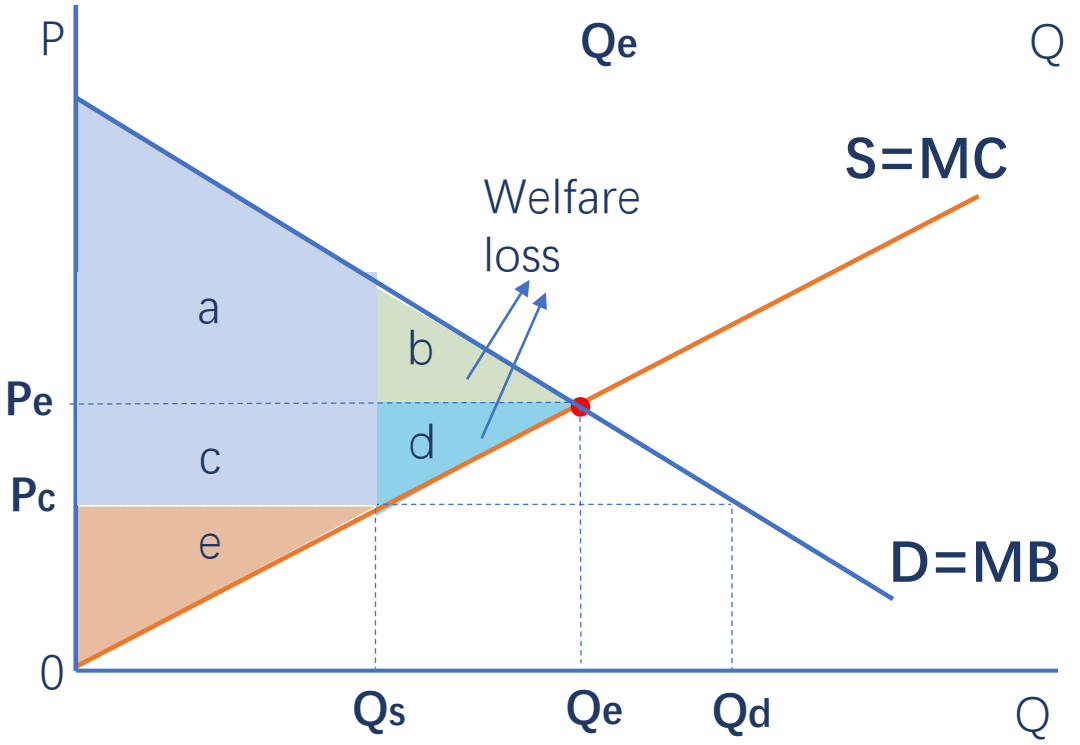
In free market, allocative efficiency with consumer surplus and producer surplus. Pe &Qe

- Consumer surplus = a+b
- Producer surplus = c+d+e
- **Social surplus = a+b+c+d+e**

If a price ceiling, P_c is imposed, Q_s is produced and consumed.

- Consumer surplus = a+c
- Producer surplus = e
- **Social surplus = a+c+e**
- Welfare loss due to price ceiling = b+d





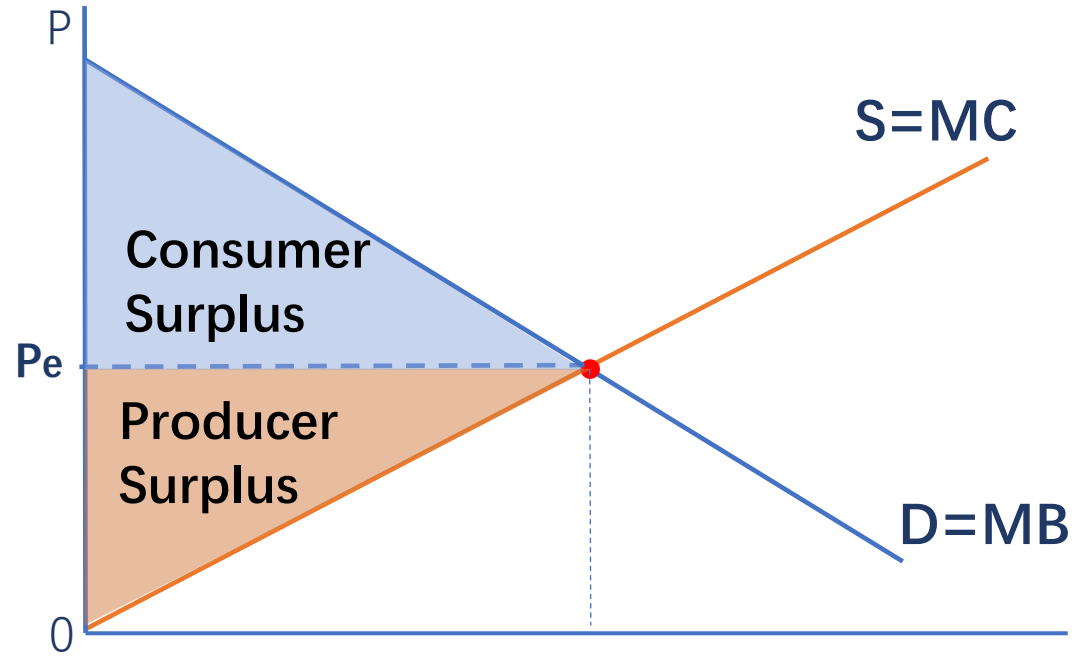
Consequences
– for markets

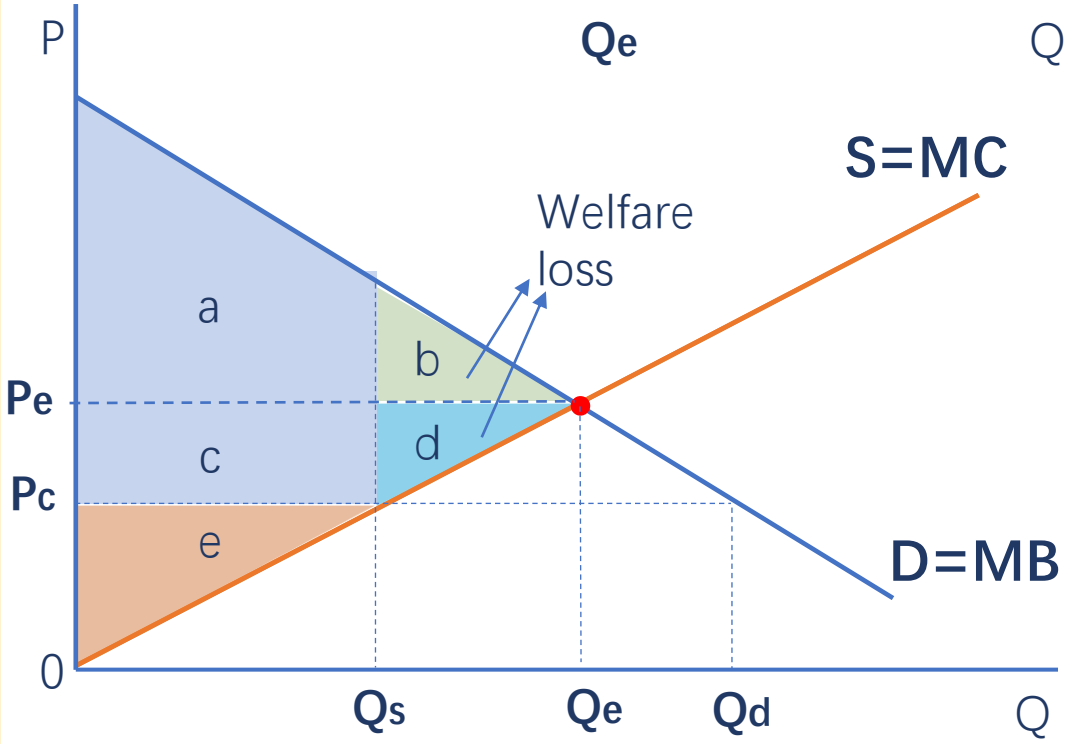
Welfare loss (deadweight loss) represents social surplus or welfare benefits that are lost to society because resources are not allocated efficiently.

Allocative inefficiency → MB>MC at Qs.

The benefit consumers receive from the last unit of the good they buy is greater than the marginal cost of producing it.

→ **Underallocation of resources** to its production.





Consequences – for markets

1. Shortages

Since at the lower price P_c, $Q_d > Q_s$, not all interested buyers are able to buy the product. The shortage = $Q_d - Q_s$

2. Non-price rationing

- Rationing: a method of dividing up something among possible users.
- Free market use price rationing approach. But for products with price ceiling, **the price mechanism no longer achieves its rationing function.**
- Non-price rationing:
  - Waiting in line, fist-come-first-served
  - Distribution of coupons
  - Favouritism

Consequences – for markets

3. **Underground (or parallel) markets**
   - Underground markets involve buying/selling transactions that are unrecorded, and are usually illegal.
   - With price ceiling, scalpers buy a big amount of goods at the maximum legal price, and then illegally reselling it at a price above the legal maximum.

4. **Underallocation of resources to the good and allocative inefficiency.**
   - Not enough resources are allocated to the production of the good, resulting in underproduction relative to the social optimum.
   - Society is worse off due to underallocation of resources and allocative inefficiency.

Consequences – for stakeholders

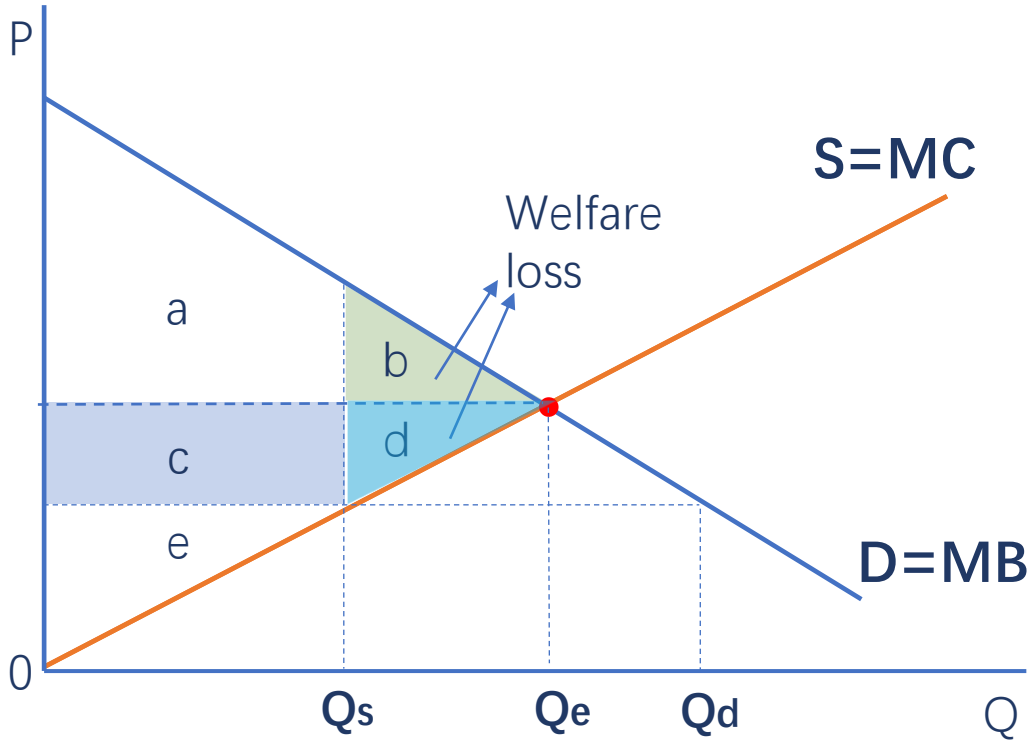
Stakeholders are individuals or groups of individuals who have an interest in something and are affected by it.

1. Consumers

- Shortage
- Gain area c (buy goods at lower price)
- Lose area b (unsatisfied buying needs)

2. Producers

- Worse off – sell a smaller quantity of the good at a lower price.
- Total revenue ↘
- Transfer producer surplus (area c) to consumers, Lose area d (welfare loss)
- Non-price rationing
- Degradation of quality



Consequences – for stakeholders

3. Workers

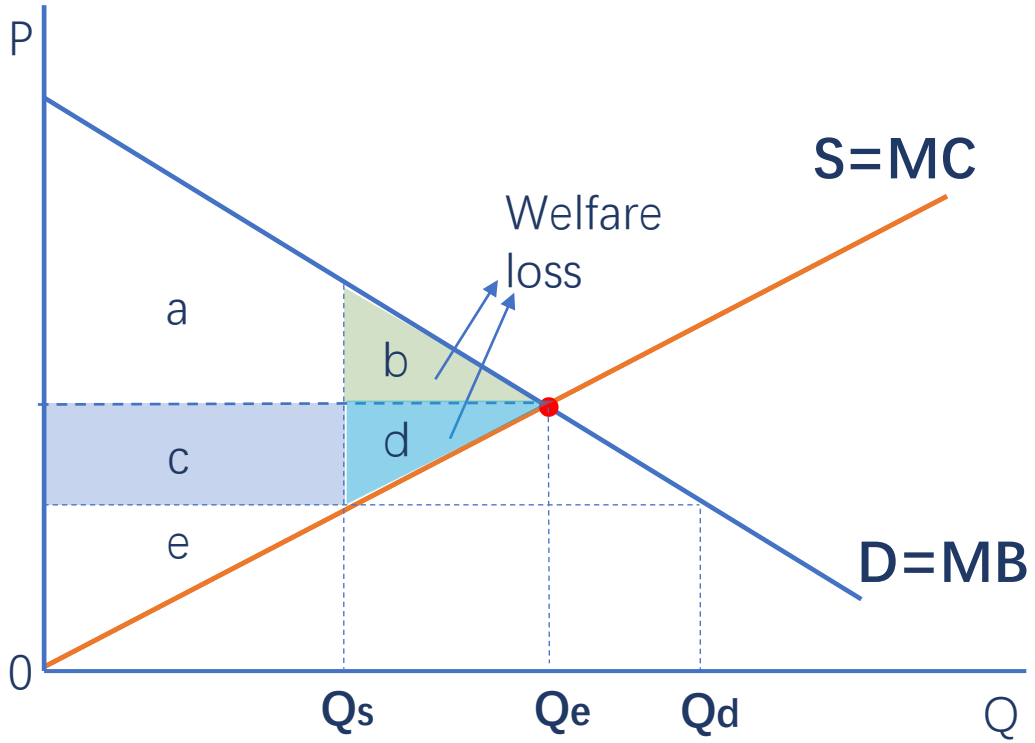
- Output ↘ → employment ↘
- Worse off

4. Government

- For government budget: no effect.
- Cost of pricing evaluation and supervision.
- Gain political popularity.

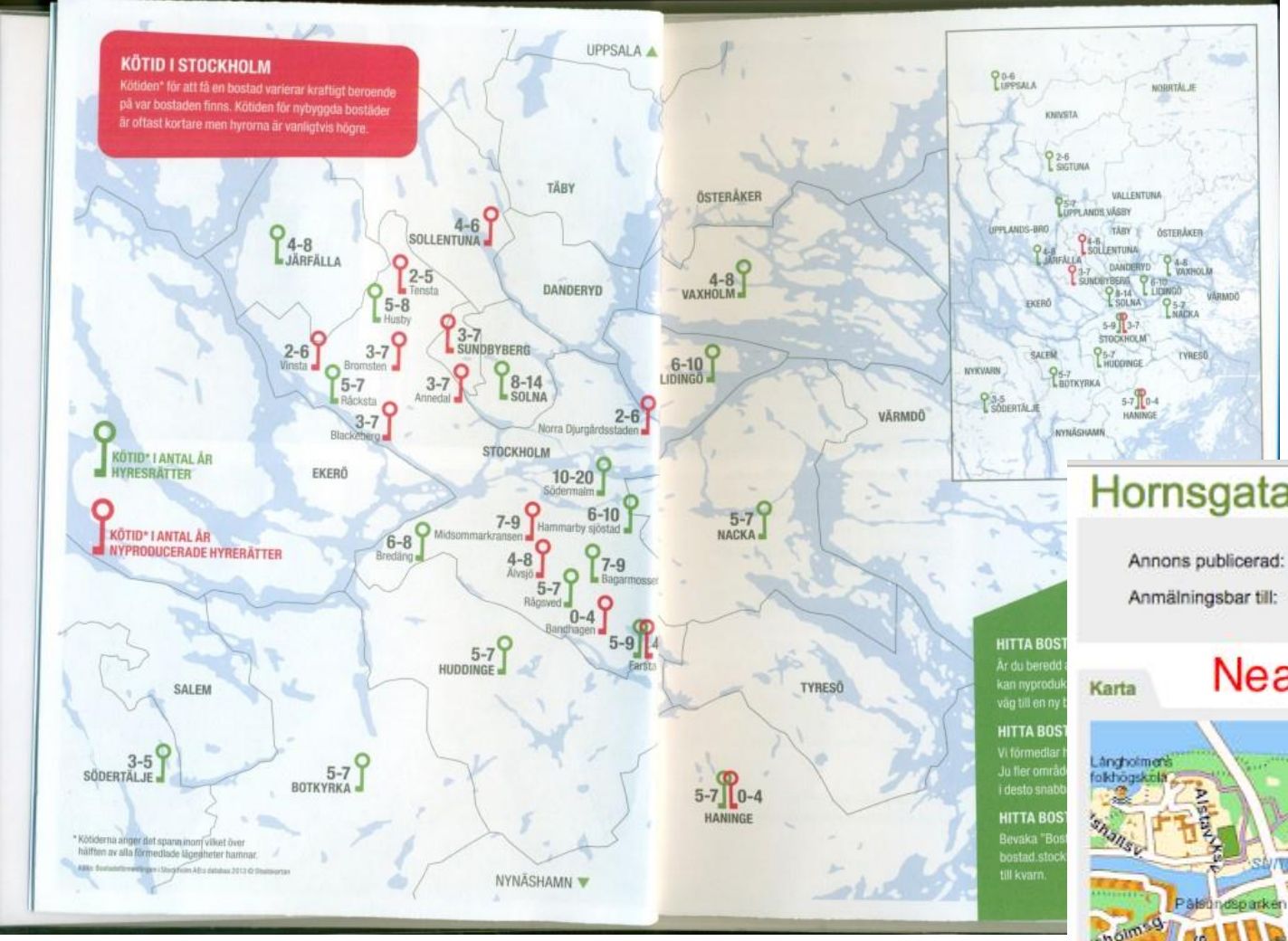
5. Society

- Underground market
- Allocative inefficiency & welfare loss, resource under-allocation.



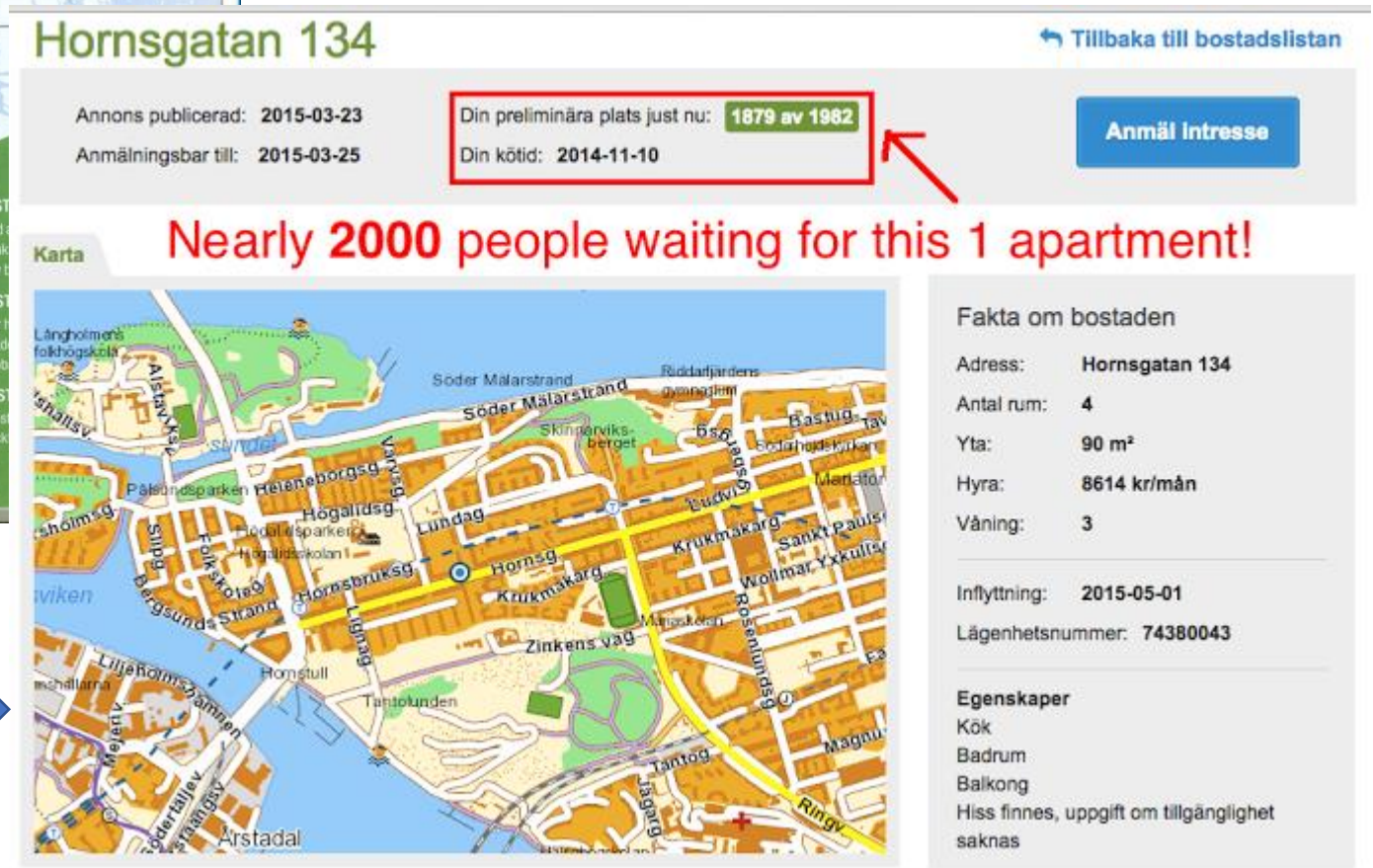
Example of rent control

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



scan of a booklet sent to a rental applicant by Stockholm City Council's rental housing service

In 2015, an apartment in inner Stockholm became available. In just 5 days, 2000 people had applied for the apartment. The person who got the apartment had been waiting in the official housing queue since 1989!



Consequences of rent control (price ceiling)

For tenants:

- Lower price, Housing become more affordable to low-income earners.
- Shortage of housing (no flat to live)
- For those tenants already have place to live → lower rental cost
- For people who are searching for place to live → hard to find flat/house to live.
- Long waiting list of interested tenants.

For landlord:

- Low rent results in low rental revenue → run-down and poorly maintained rental house.
- Non-price rationing (e.g. favoritism, “key money” “shoe money”, etc.)

Short-run vs long run

- Short-run: relatively inelastic of demand and supply, landlord have to rent out their flat/house, most tenants have flat to live.
- Long-run: more landlord sell their flat/house, or change it for commercial usage, etc. → leave the market;
- lower price attract more people to seek flat/house. (move to city with rent control, move out from their parent’s house)

Consequences of rent control

For Government:

- Gain political popularity
- Cost of pricing evaluation
- Supervision cost

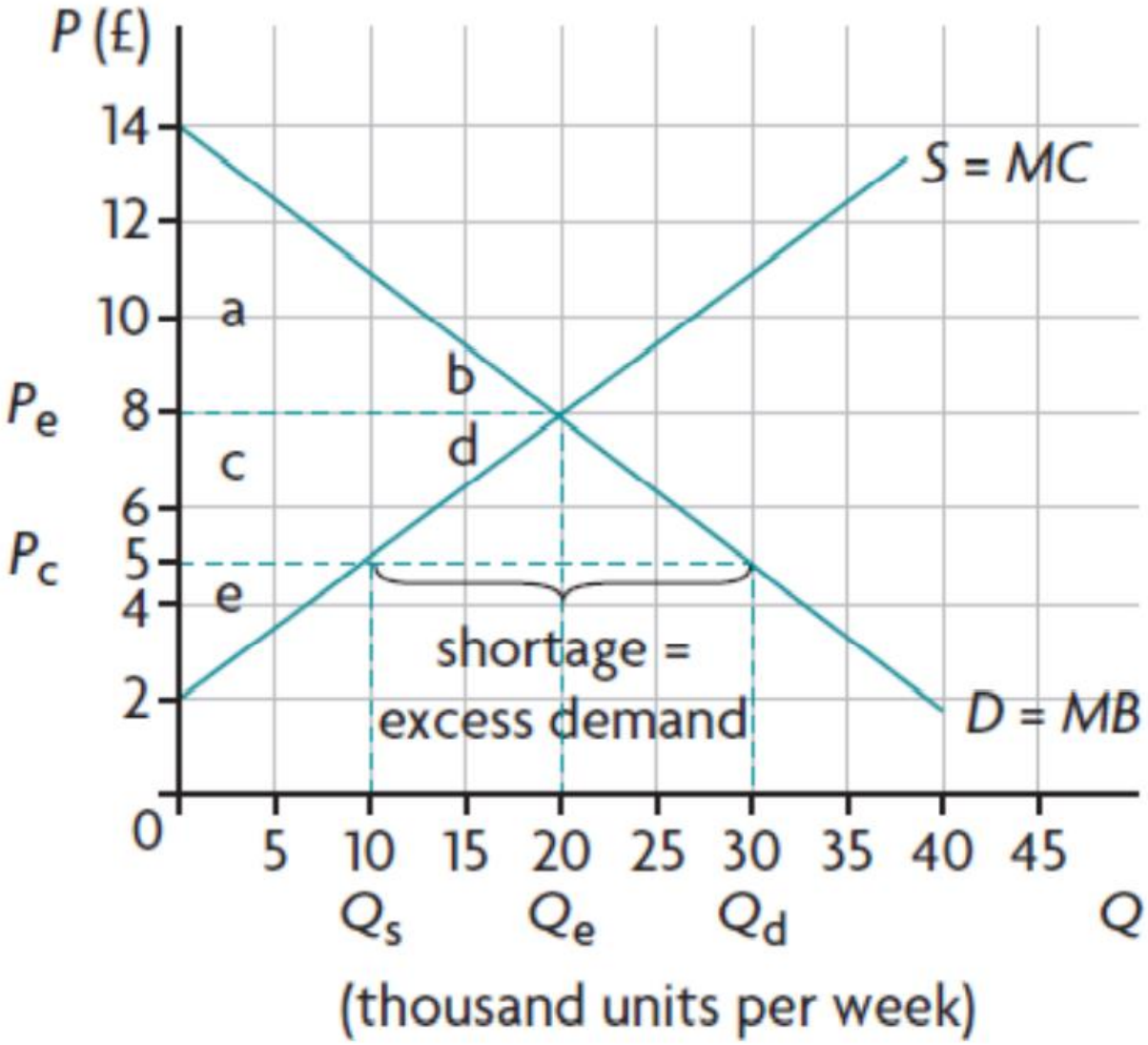
For society:

- Underground market where tenants sublet their apartments at rents above the legal maximum.
- Potential social insecurity

Other examples of price ceiling

- Gasoline price ceiling
- Food price control
- Price ceiling on Prescription drugs
- Wartime pricing

Calculating the effects of price ceiling



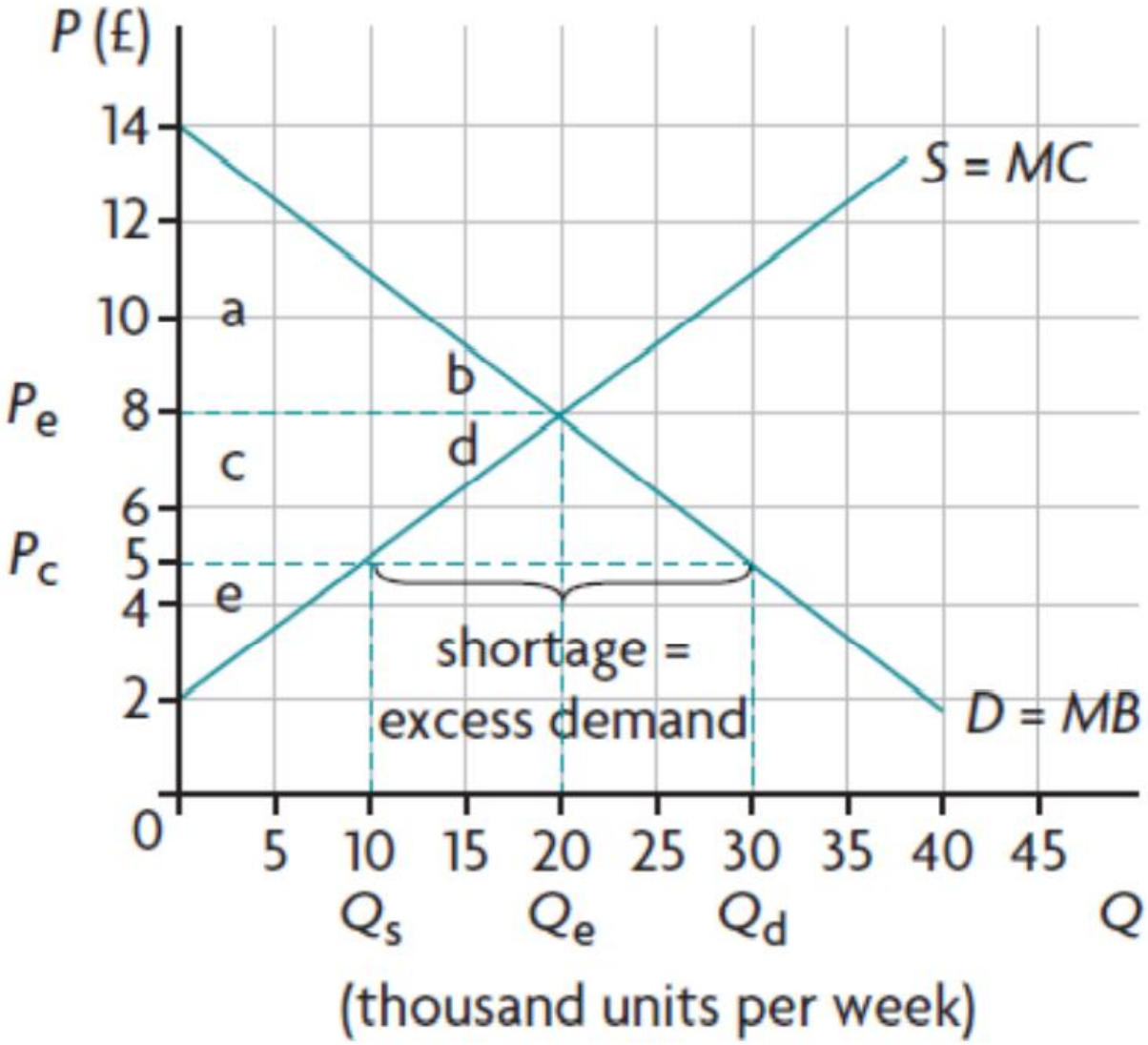
Consumer expenditure:

- Before: P_e x Q_e = 8 x 20,000=£160,000
- After: P_c x Q_s = 5 x 10,000 = £50,000

Producer revenue:

- Before: P_e x Q_e = 8 x 20,000= £160,000
- After: P_c x Q_s = 5 x 10,000 = £50,000

Calculating the effects of price ceiling



- **Consumer surplus:**
- Before: ($P_{intercept\ of\ D} - P_e$) x $Q_e/2$
  = (14-8) x 20,000/2= £60,000
- After (trapezium): (11-Pc)+(14- Pc) x Qs/2
  = 15 x 10,000/2 = £75,000

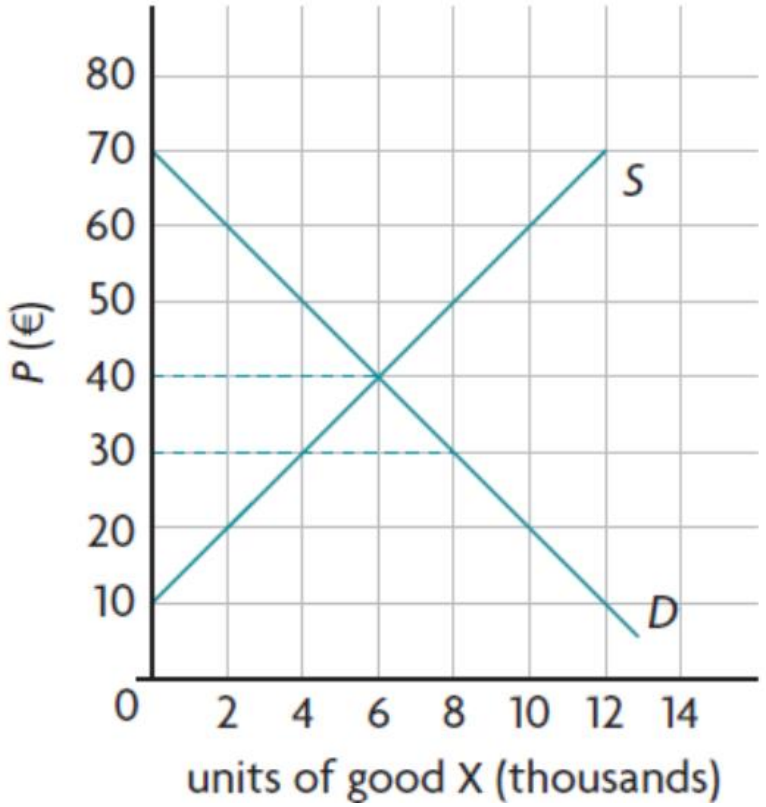
- **Producer surplus:**
- Before: ($P_e - P_{intercept\ of\ S}$) x $Q_e/2$
  = (8-2)*20,000/2 = £60,000
- After: (P_c - $P_{intercept\ of\ S}$) x $Q_e/2$
  = (5-2)*10,000/2 = £15,000

- **Welfare loss:**

= 60,000+60,000-75,000-15,000 = £30,000

=Area of triangle (11-5)(Q_e-Q_s)/2 = £30,000

1. The diagram shows a price ceiling of €30 that has been set for good X. Calculate:
   a. The shortage (excess demand)
   b. The change in consumer expenditure
   c. The change in producer revenue
   d. The change in consumer surplus
   e. The change in producer surplus
   f. Welfare loss



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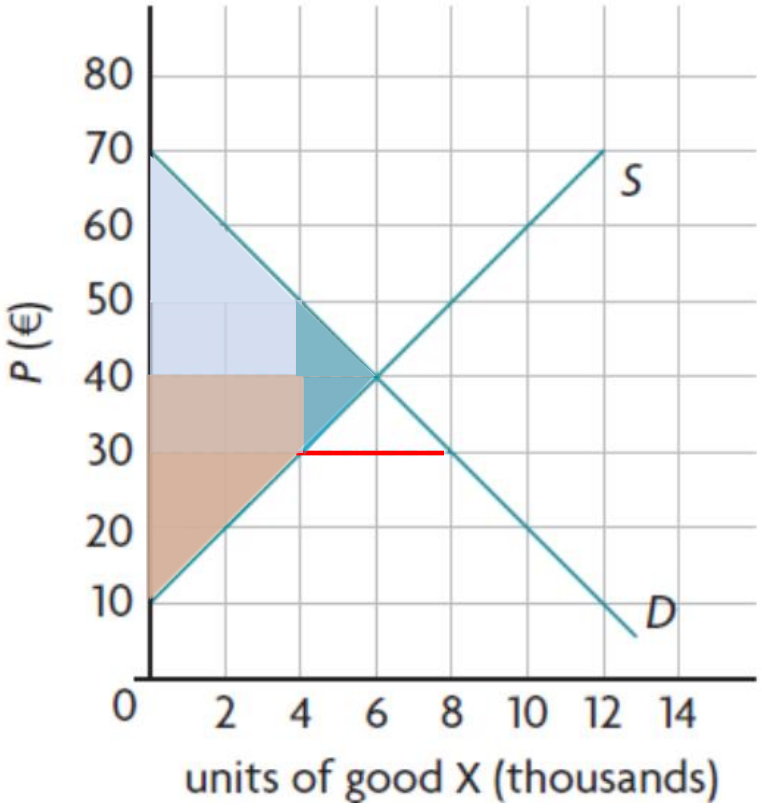


a. The shortage (excess demand)

Qd-Qs = 8000-4000=4000 units

b. The change in consumer expenditure

Original consumer expenditure = P * Q = 40*6000=€240,000
Consumer expenditure after price ceiling = P*Q=30*4000= € 120,000
Δ in consumer expenditure = 240,000-120,000 = €120,000 (decreased)

c. The change in producer revenue

Original producer revenue= P * Q = 40*6000=€240,000
Producer revenue after price ceiling = P*Q=30*4000= € 120,000
Δ in producer revenue= 240,000-120,000 = €120,000 (decreased)

d. The change in consumer surplus

Original CS = 6,000*(70-40)/2= € 90,000
CS after price ceiling = [(50-30)+(70-30)]*4000/2= € 120,000
Δ in CS = 120,000-90,000 = €30,000 (increased)

e. The change in producer surplus

Original PS = 6,000*(40-10)/2= € 90,000
PS after price ceiling = 4,000*(30-10)/2 = € 40,000
Δ in PS = 90,000-40,000 = €50,000 (decreased)

f. Welfare loss

Welfare loss = Original social welfare – current social welfare
= (90,000+90,000)-(120,000-40,000)= €20,000
OR Welfare loss = (50-30)*(6000-4000)/2 = € 20,000


Price Floor

Price floors

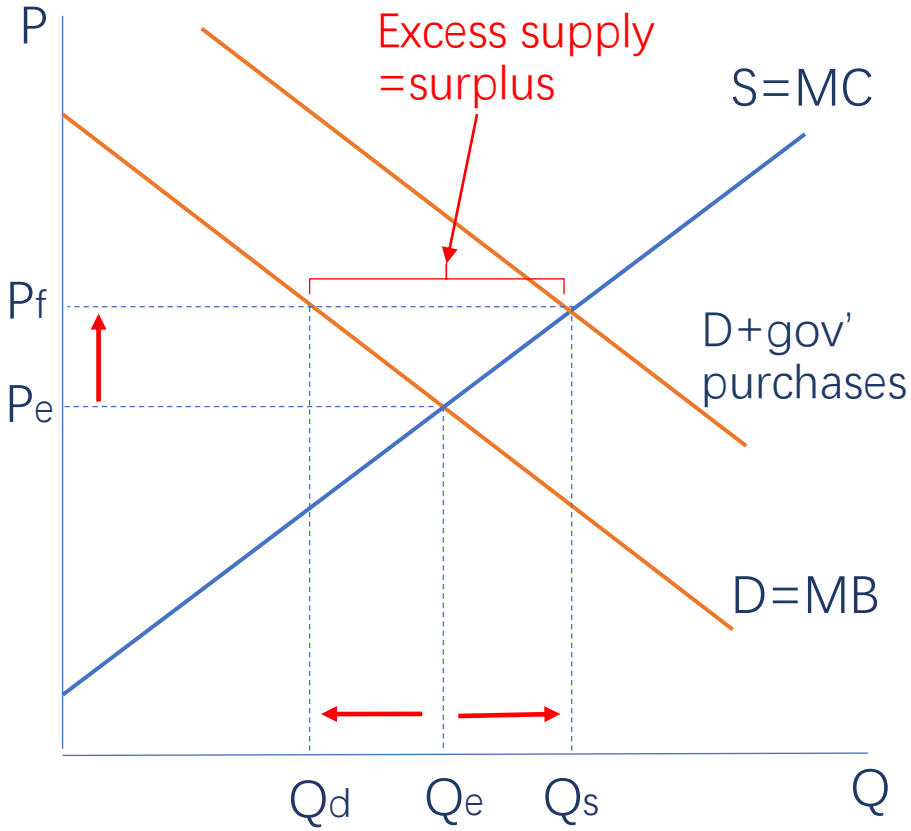
A **price floor** is a minimum price set below the equilibrium price, in order to provide income support to farmers or to increase the wages of low-skilled workers.

- If it were below the equilibrium price, the price floor would have no effect.
- **Reasons:**
  1. Provide income support for farmers.
  2. Protect low-skilled, low-wage workers by offering minimum wage.

Consequences for market

1. Surpluses

- Original equilibrium at **Pe** and **Qe**.
- Government set the price on **Pf** above the market equilibrium price.
- Quantity demand fall to **Qd**, Quantity supply increase to **Qs**, leads to excess supply(surplus)of **Qs-Qd**.



Sometimes, the government **buys up** the excess supply to maintain the price floor at Pf.

- Demand curve shift to **D+gov' purchases**.

→Problematic consequences for Government to deal with those surplus:

a. Store it. (additional storage cost)
b. Sell it abroad (subsidy to the producer to lower the price)

Consequences for market

2. **Firm inefficiency.**
   - Inefficient firms with high costs of production do not face incentives to cut costs by using more efficient production methods.

3. **Overallocation of resources to the production of the good and allocative inefficiency.**
   - Larger than optimum quantity produced.

Consequences for market

4. Negative welfare impacts

Under free market:

- Consumer surplus = a+b+c
- Producer surplus = d+e
- MB = MC

After setting price floor:

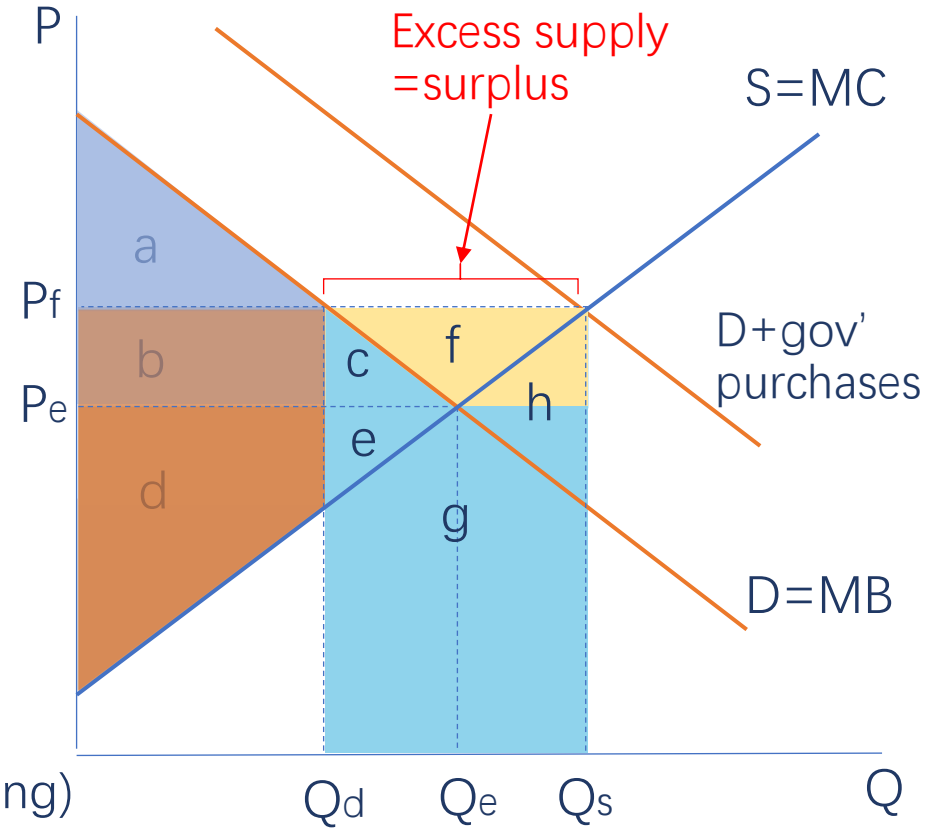
a. Without government purchasing

- Consumer surplus = a
- Producer surplus = b+d
- Welfare loss = c+e

b. With government purchasing:

- Consumer surplus = a
- Producer surplus = b+c+d+e+f
- Government spending = Pf x (Qs-Qd) = c+e+f+g+h
- Welfare loss = (original CS+PS) – (current CS+PS-Gov. spending)
  = (a+b+c+d+e)-[(a+b+c+d+e+f)-(c+e+f+g+h)]

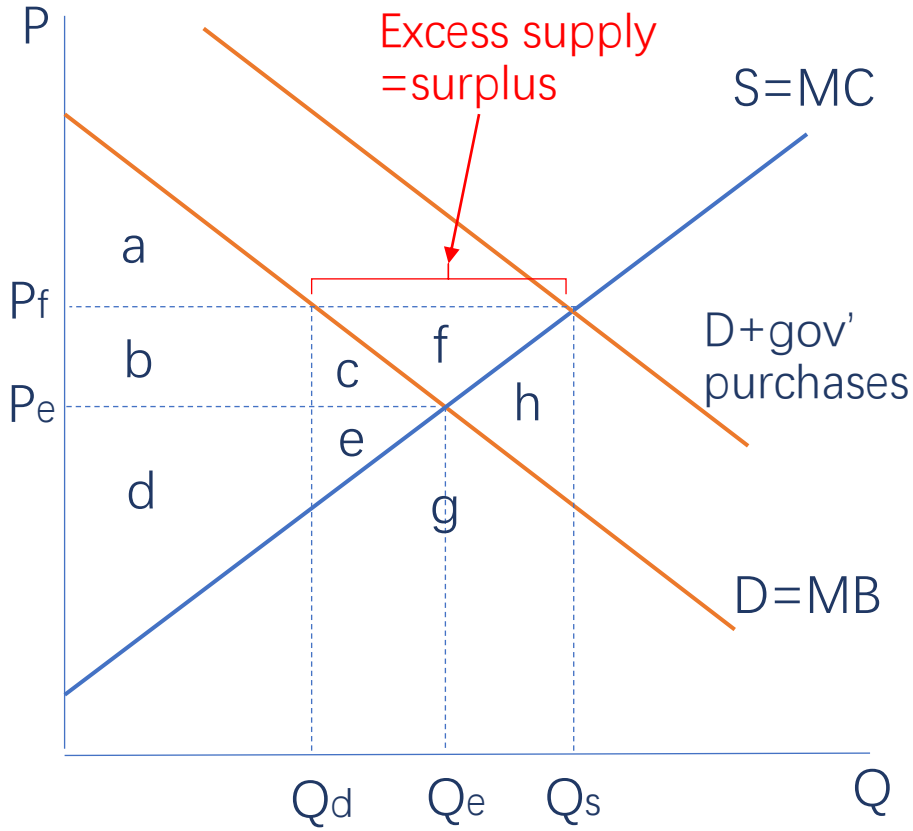
=c+e+g+h (blue area)



Consequences for market

Overallocation of resources (overproduction) or **Allocative inefficiency**.

- **MB < MC**: too much of the good is produced.



Consequences for stakeholders

For consumers:

- Price paid ↗, Quantity demanded ↘
- Transfer CS b,c to producers.
- Worse off

For producers:

- Price sold ↗, Quantity demanded ↗
- Total revenue ↗
- Better off

For workers：

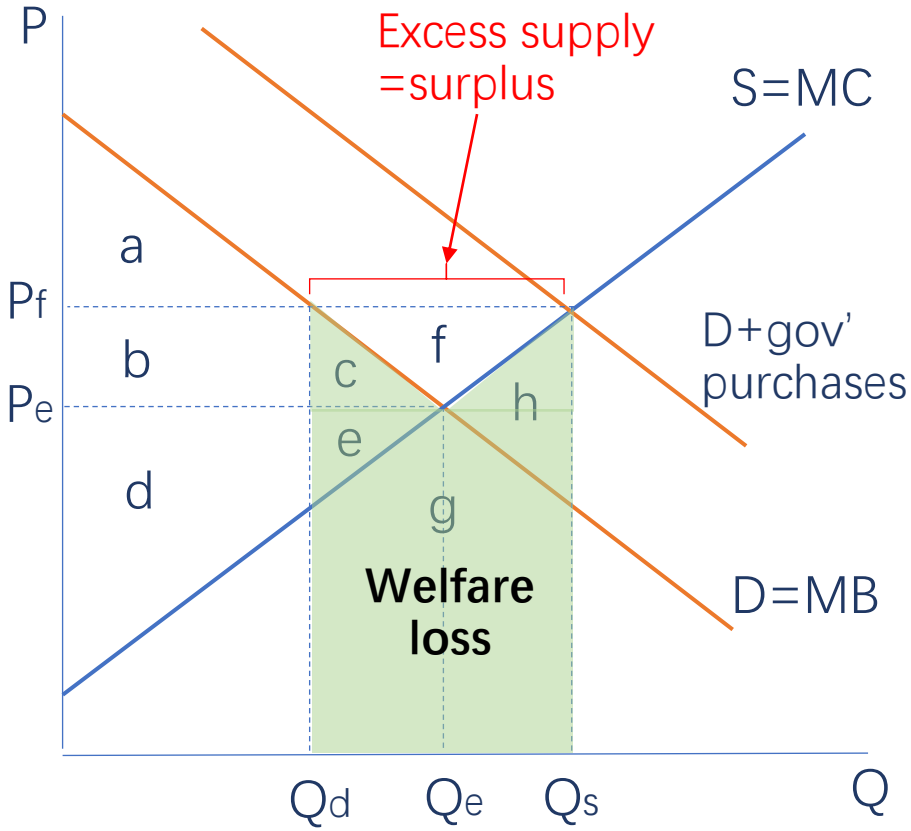
- More workers being employed.

For government:

- Less government funds to spend on other desirable activities in the economy.
- Further cost of storing the surplus or subsidizing it for export.

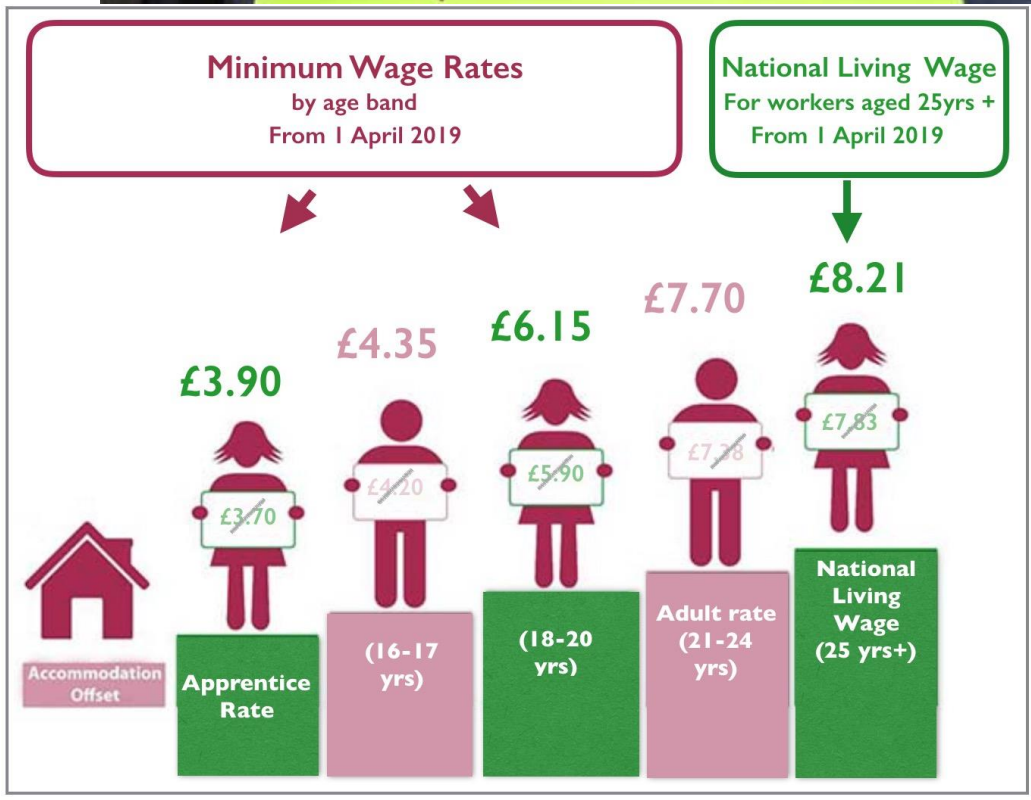
For stakeholders in other countries

- Lower world price lead to underallocation of resources.
- Waste of resources



Minimum wages

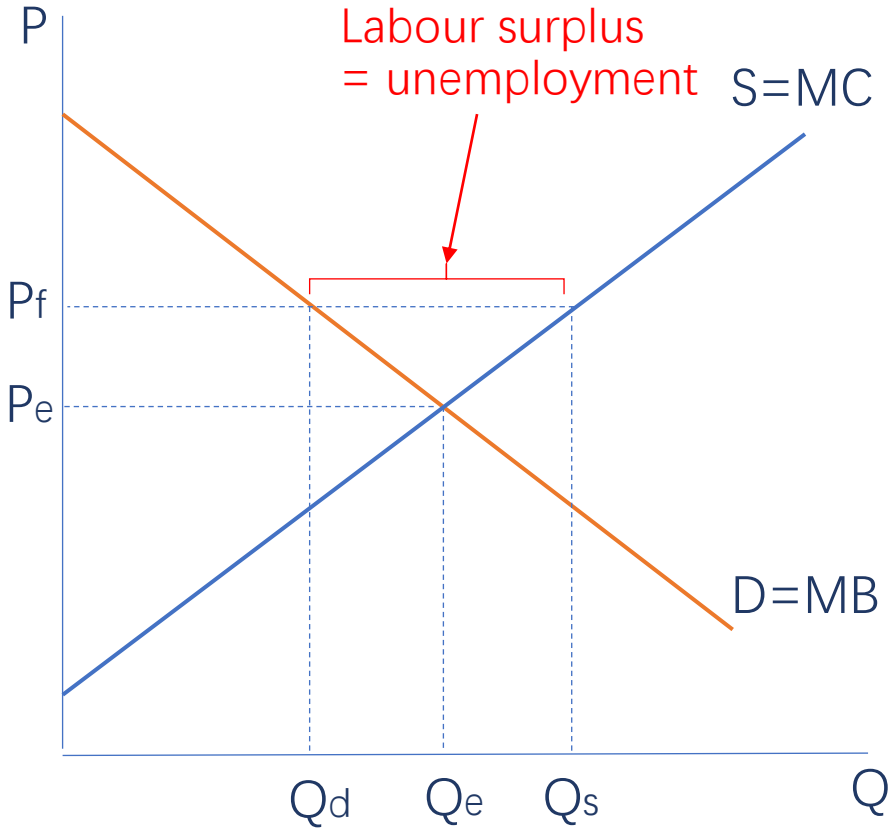
- The minimum wage determine the minimum price of labour that an employer must pay.
- The objective is to **guarantee an adequate income to low-income workers**, who tend to be mostly unskilled.



Consequences of minimum wages

For the economy:

- Labour surplus (Q_s-Q_d) and unemployment
  - (Q_e-Q_d) – decrease in Q of labour demanded.
  - (Q_s-Q_e) – increase in Q of labour supplied.
- Illegal workers at wages below the minimum wage
- Misallocation of labour resources
- Misallocation in product markets



Consequences of minimum wages

For firms (employers of labour):

- Higher cost of labour → higher cost of production
- Worse off

For workers (suppliers of labour)

- Increased quantities of supply (more labour supply, more working hours, change from part-time to full-time.)
- **Gain**: for those who have jobs, they received wage higher than before.
- **Loss**: people might lose their job, especially those unskilled workers (replaced by skilled workers)

For consumers of general goods/services:

- Labour cost↗ → supply of products↘ → higher product price and lower quantities

More possible consequences of minimum wages

- **Increased Poverty rate**: Higher minimum wage may cause employers to cut back on the number of workers or the hours, this would increase the poverty rate.

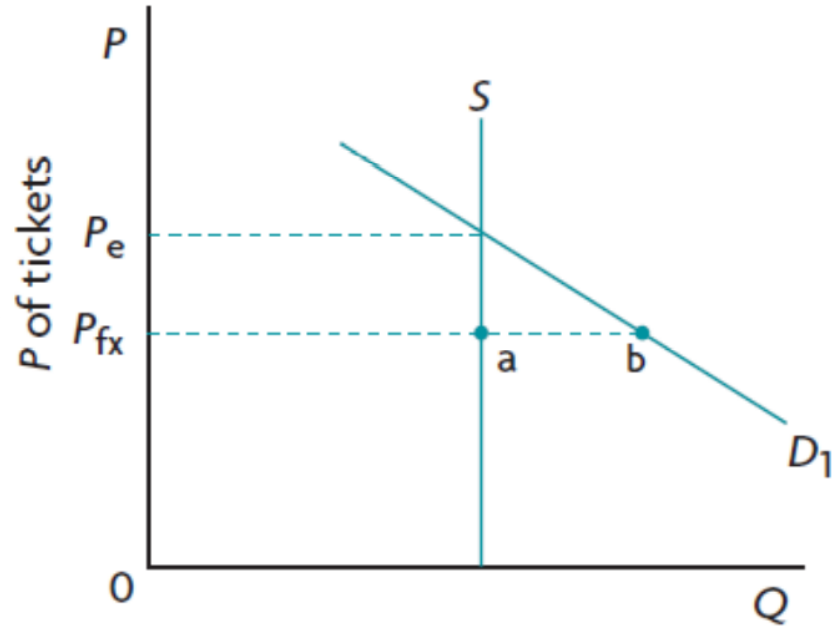
  → higher payment of unemployment benefit by government.

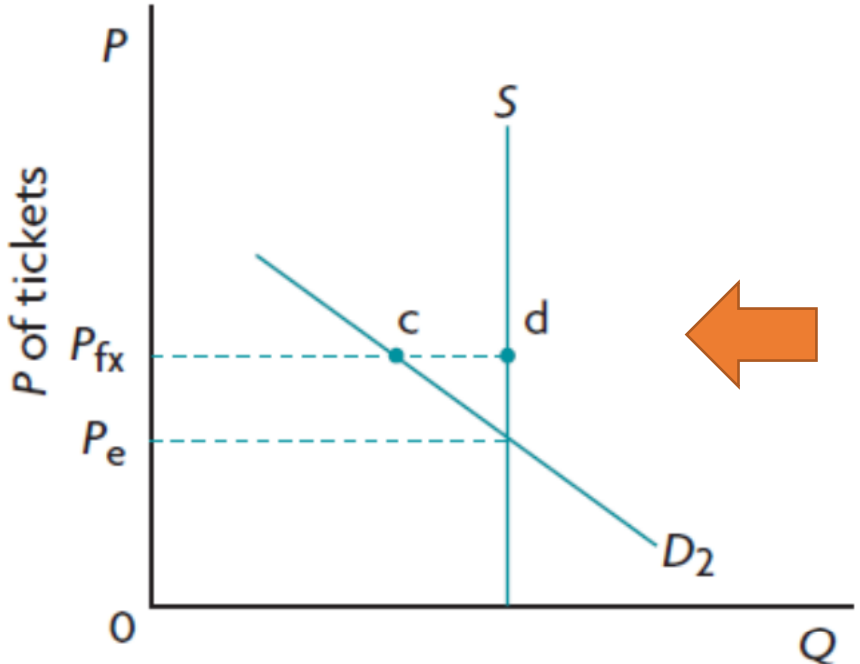
- **Effect on Minorities**: the rise in minimum wage might actually harm the minorities that they were designed to support. In general, minority population is the "low-productivity" workers lack the skills, training, education, and experience to hold the high paying jobs.
- **Reduced Training Opportunities**: Increasing the minimum wage actually puts low-skill work into an artificially high floor, which actually reduces their chances of learning and training for new job skills, rendering it harder for low-skilled workers to achieve moderate-paying jobs.

Setting fixed prices

When there is fixed price setting and fixed supply quantity for a goods/services with **perfectly inelastic supply** (e.g. ticket for theatres, movies and sports events)

When there is **large demand D1**, if the price could respond to market forces, it would rise to Pe, but with fixed price P_{fx}, a **shortage** of tickets arises equal to the horizontal difference between points a and b.

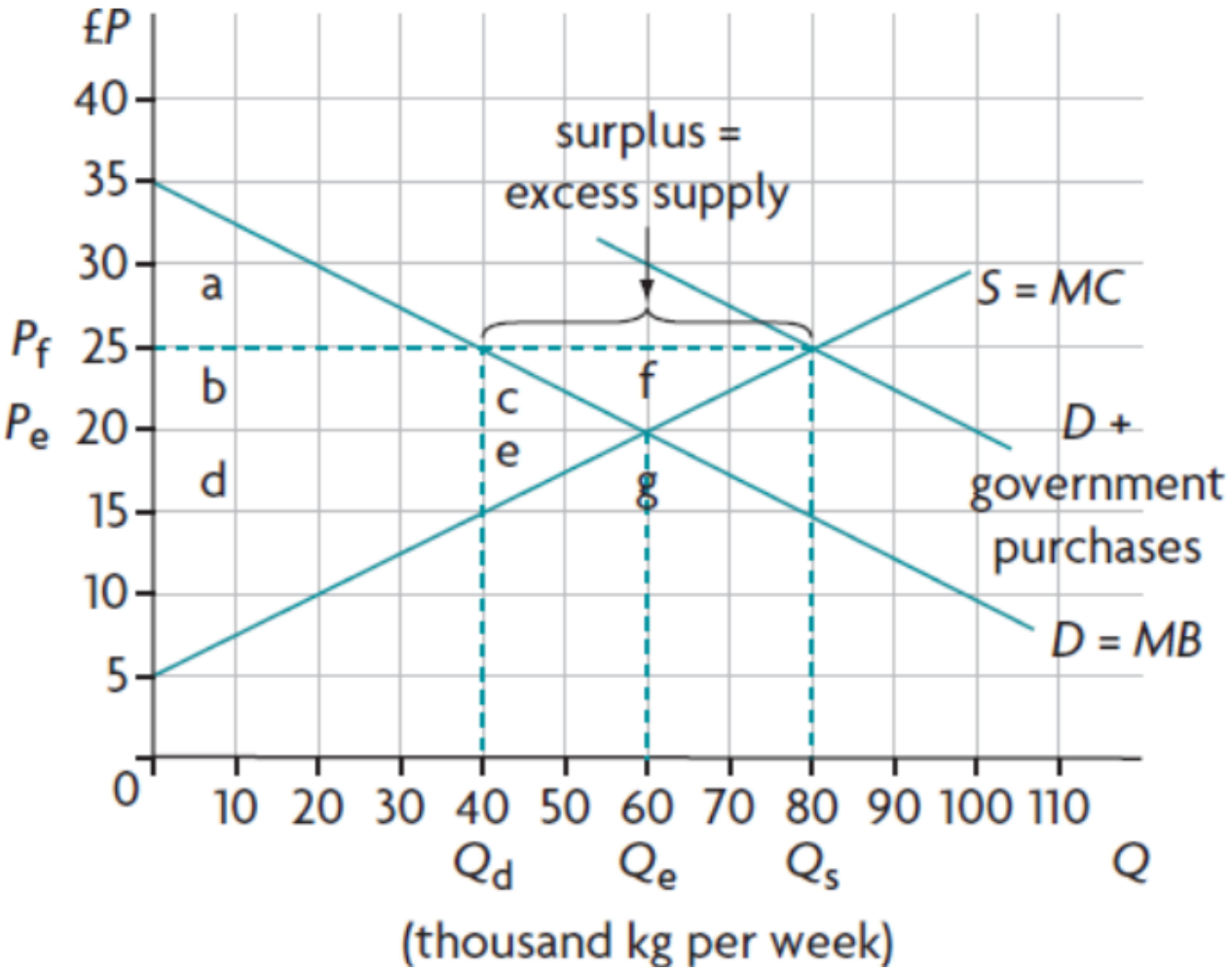




When there is **low demand D2**

fixed price Pfx will lead to ticket **surplus** (d-c)

Calculation the effect of price floors



P_e = £20, Q_e=60,000
P_f = £25, Q_d=40,000, Q_s= 80,000

Consumer expenditure:

- Before: P_e x Q_e = 20 x 60,000 =£1,200,000
- After: P_f x Q_d =25 x 40,000 = £1,000,000

Producer revenue:

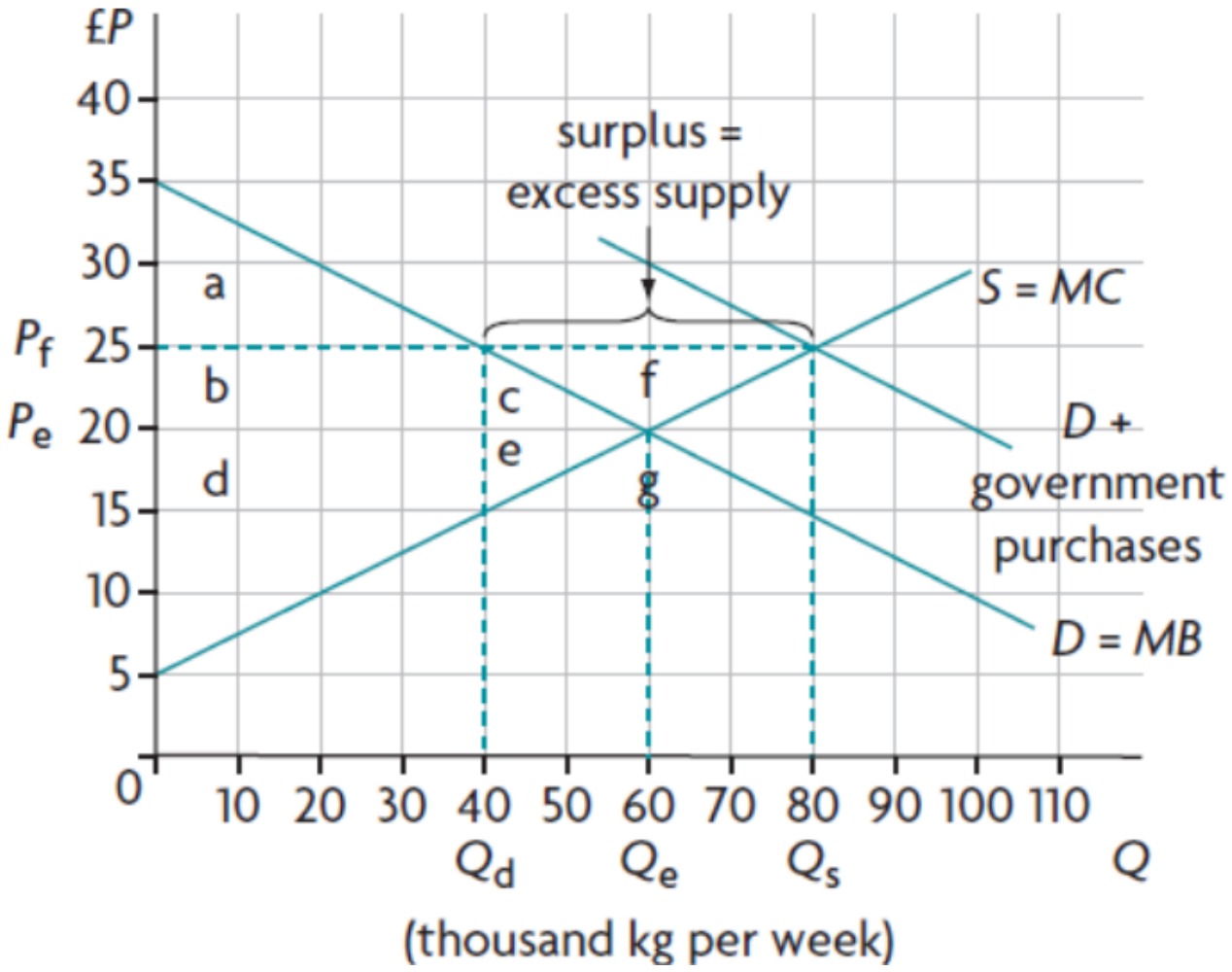
- Before: P_e x Q_e = 20 x 60,000 = £1,200,000
- After: P_f x Q_s =25 x 80 = £2,000,000

Government expenditure:

- =P_f x (Q_s-Q_d) =25 x 40,000 = £1,000,000

  OR = producer revenue -Consumer expenditure
  =2,000,000-1,000,000 = £1,000,000

Calculation the effect of price floors



P_e = 20, Q_e=60,000

P_f = 25, Q_d=40,000, Q_s= 80,000

Consumer surplus:

- Before: ($P_{intercept\ of\ D}$ – P_e) x Q_e/2
  = (35-20) x 60,000/2= £450,000
- After: ($P_{intercept\ of\ D}$ – P_f) x Q_d /2
  = (35-25) x 40,000/2 = £200,000

Producer surplus:

- Before: (P_e - $P_{intercept\ of\ S}$) x Q_e/2
  = (20-5)*60,000/2 = £450,000
- After: (P_f - Pintercept of S) x Q_s/2
  = (25-5)*80,000/2 = £800,000

Welfare loss:

Area of f = (25-20)(80,000-40,000)/2= £100,000

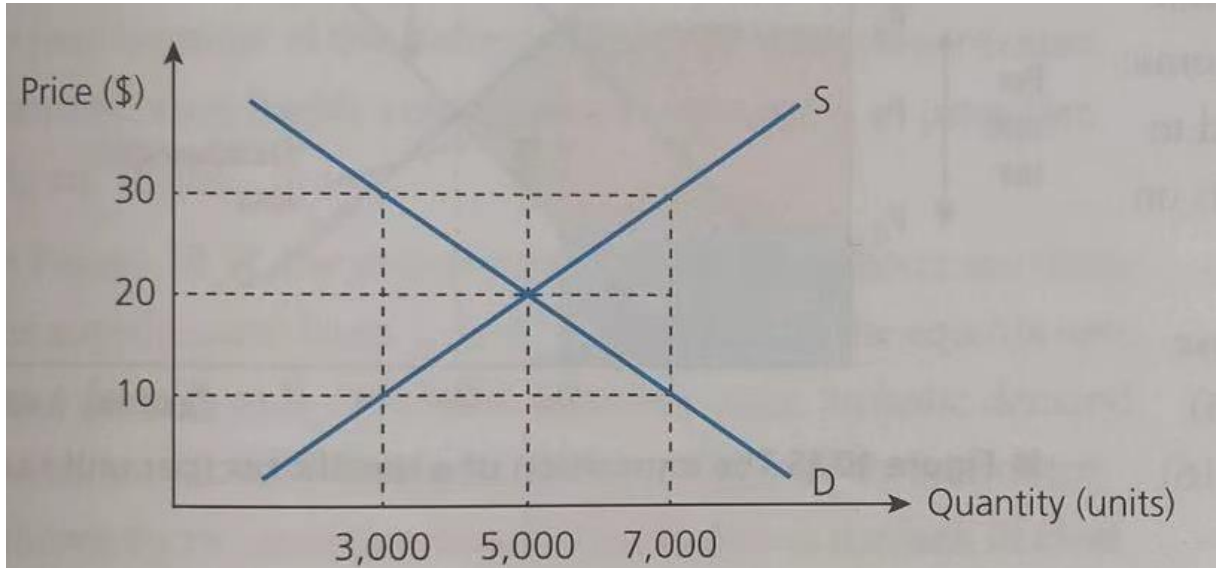
Welfare loss = Gov' spending-100,000 = £900,000

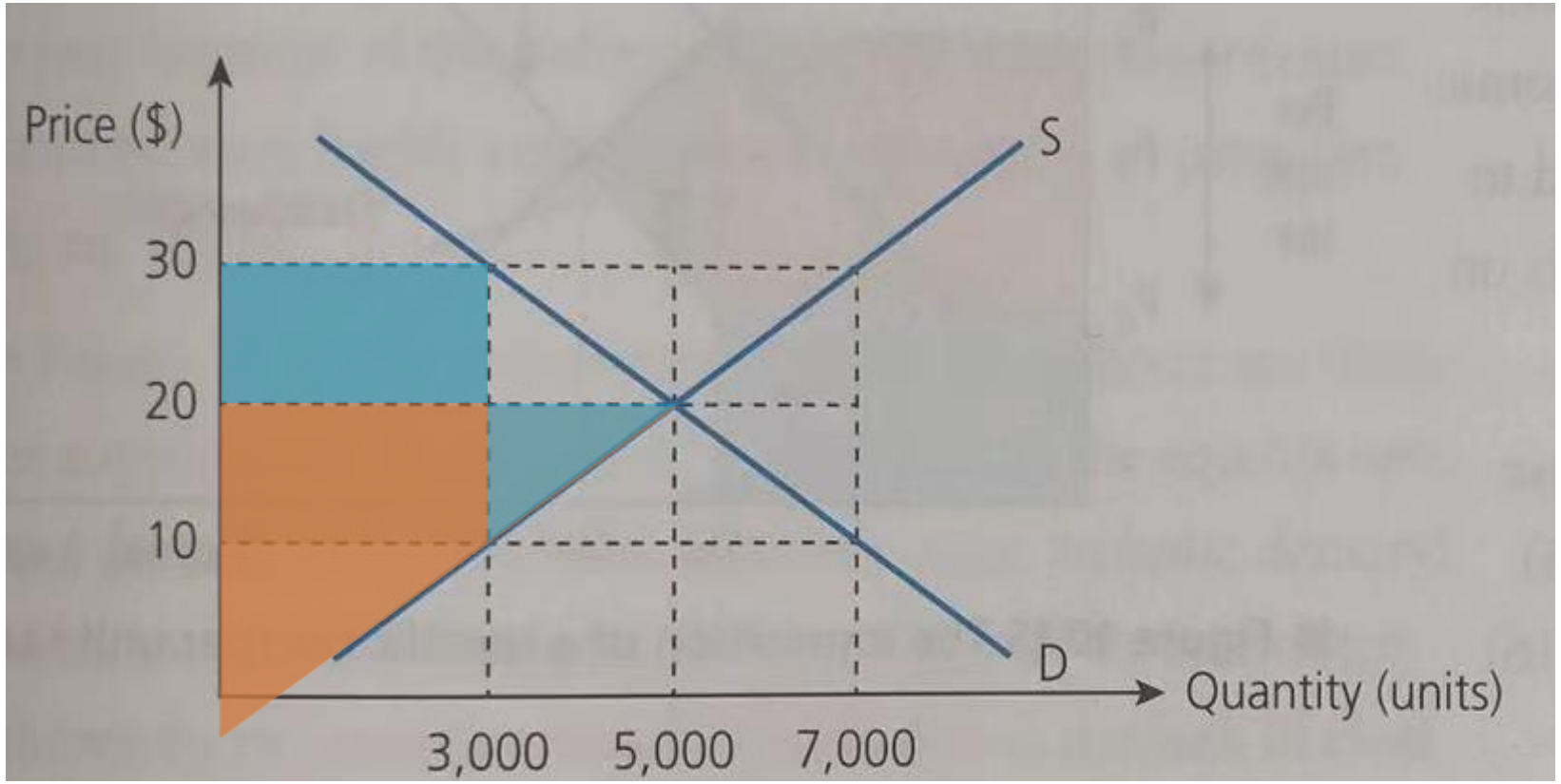
1. Calculate the change of consumer spending following the imposition of price floor of $30 for the product.

2. Calculate the change of producer surplus following the imposition of price floor of $30 for the product (without government purchase)

3. Calculate the change of consumer surplus following the imposition of price floor of $30 for the product.

4. When the price is set at $30, state the resulting impact on quantity and calculate the value.





II Calculation and Diagram

1. Calculate the change of consumer spending following the imposition of price floor of $30 for the product. (2P)

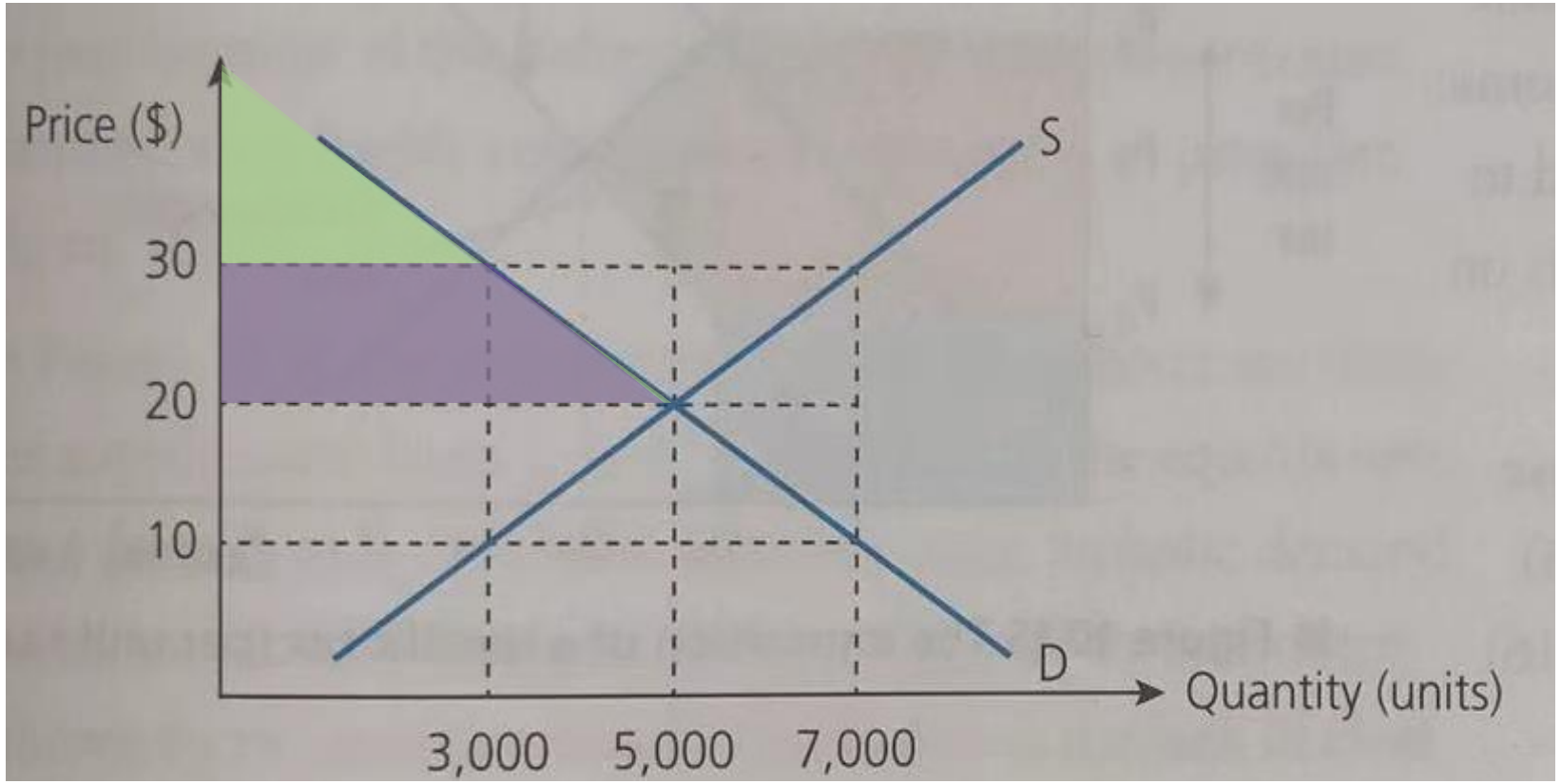
30*3000 - 20*5000 = 90,000 - 100,000 = - $10,000

The consumer spending decreased by $10,000.

2. Calculate the change of producer surplus following the imposition of price floor of $30 for the product (without government purchase). (2P)

Δ of PS= - (20-10)*(5000-3000)/2 + (30-20)*3000 = $20,000

The producer surplus increased by $20,000.



3. Calculate the change of consumer surplus following the imposition of price floor of $30 for the product. (2P)

Δ of CS = (3000+5000) * (30-20)/2 = $40,000

The consumer surplus decreased by $40,000.

4. When the price is set at $30, state the resulting impact on quantity and calculate the value. (2P)

The quantity demanded decreased from 5000 units to 3000 units, the quantity supplied increased from 5000 units to 7000 units.

There are 4000 surpluses. OR the total quantity being purchased decreased by 2000 units.


Indirect taxes

Type of taxes

Taxation is one of the most important instruments for income and wealth redistribution, because it can lower inequalities by taking more taxes from the rich than from the poor, and is used to finance a broad variety of government expenditures.

- **Direct taxes –** involving payment of the tax by the taxpayers directly to the government → **a levy imposed on income**
- **Indirect taxes -** Indirect taxes are imposed on spending to buy goods and services. → **a levy imposed on expenditure**

Indirect Taxes

Definition: Taxes levied on spending to buy goods and services, called indirect because, whereas payment of some or all of the tax by the consumer is involved, they are paid to the government authorities by the suppliers (firms), that is, indirectly.

"indirect" – they are paid partly by consumers, but are paid to the government by producers (firms). – imposed on expenditure

- **Excise taxes:** taxes imposed on particular goods/services. (gasoline, cigarettes, alcohol, etc.)
  - Specific taxes: fixed amount of tax per unit of the good/service sold.
  - Ad valorem taxes: fixed % of the price of the good/service.
- **General expenditure taxes** - Taxes on spending on all (or most) goods and services. (general sales tax in US, Value-added taxes VAT in European, China)
- **Custom duties**, also known as tariffs.

Why government impose indirect taxes

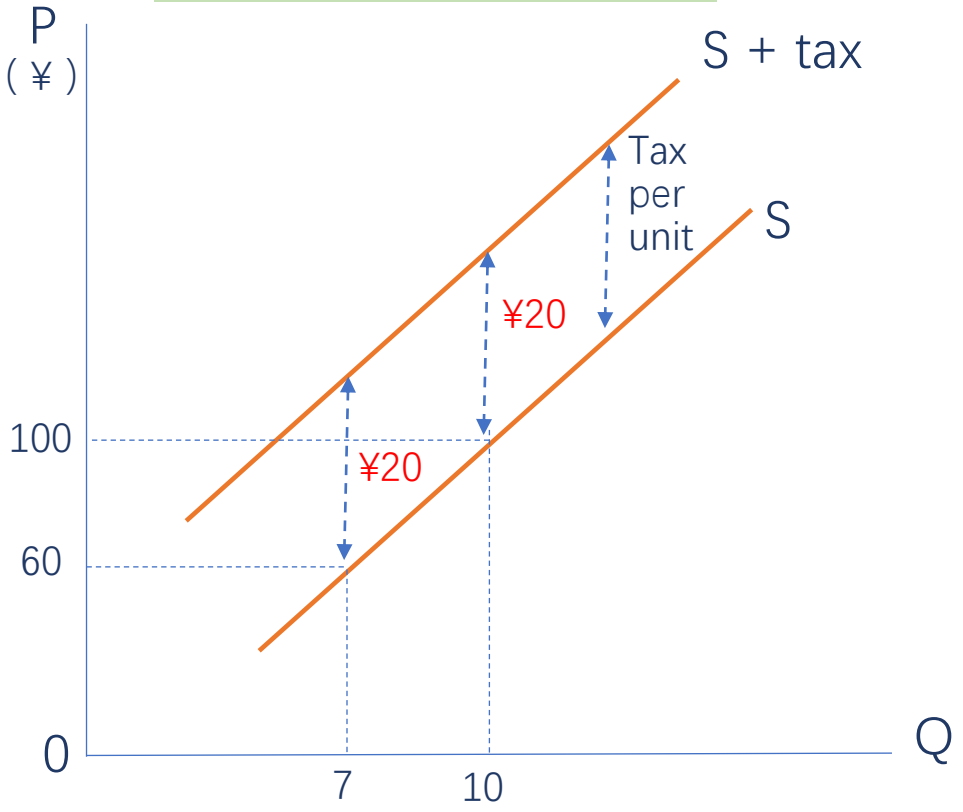
1. Source of **government revenue**.
   - the lower the price elasticity of demand for a good, the greater the government revenue generated.
2. A method to **discourage consumption** of goods that are harmful for the individual. (cigarette, alcohol, etc.)
   - Imposed on products like cigarette, alcohol, etc. ('vice taxes' or 'sin taxes')
3. It can be used to **redistribute income**.
   - Tax goods that can only be afforded by high-income earners, like expensive cars, boats, furs, jewelry, etc.
   - Impose indirect tax on those goods can narrowing income differences between higher income and lower income earners.
4. Improve the allocation of resources by **correcting negative externalities**.
   - If there are market imperfections which preventing the achievement of allocative efficiency, excise taxes can be used to try to improve the allocation of resources

*In this chapter, we assume that the economy begins with allocative efficiency.

Specific tax VS Ad Valorem Tax

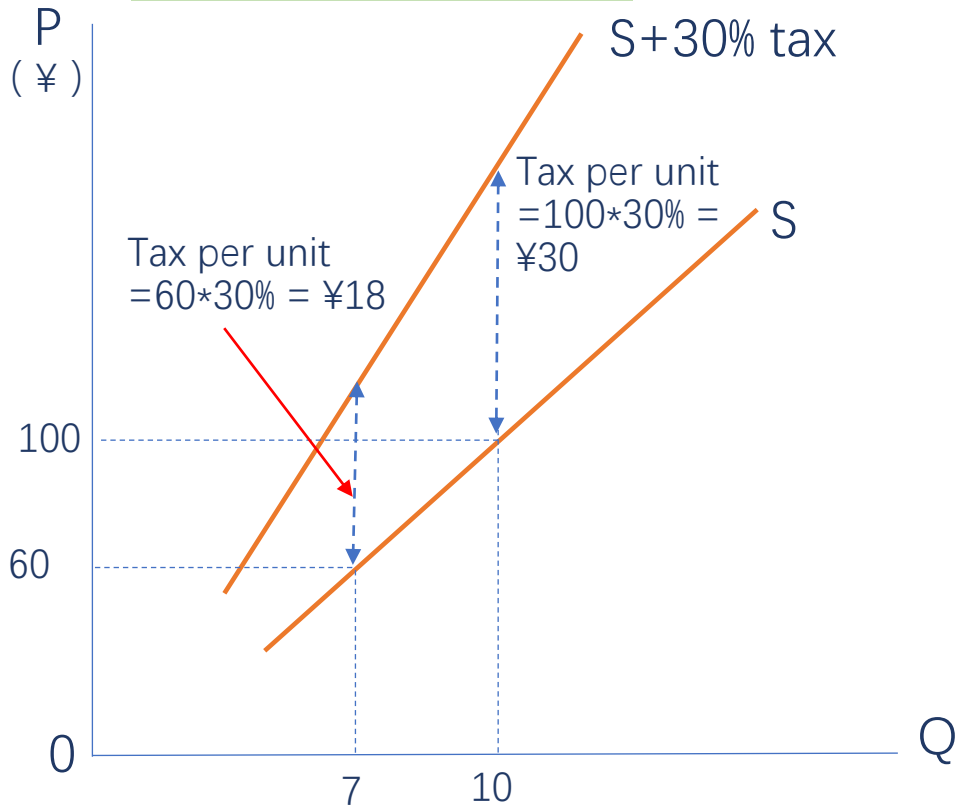
Specific tax

fixed amount of tax per unit of the good/service sold



Ad Valorem tax

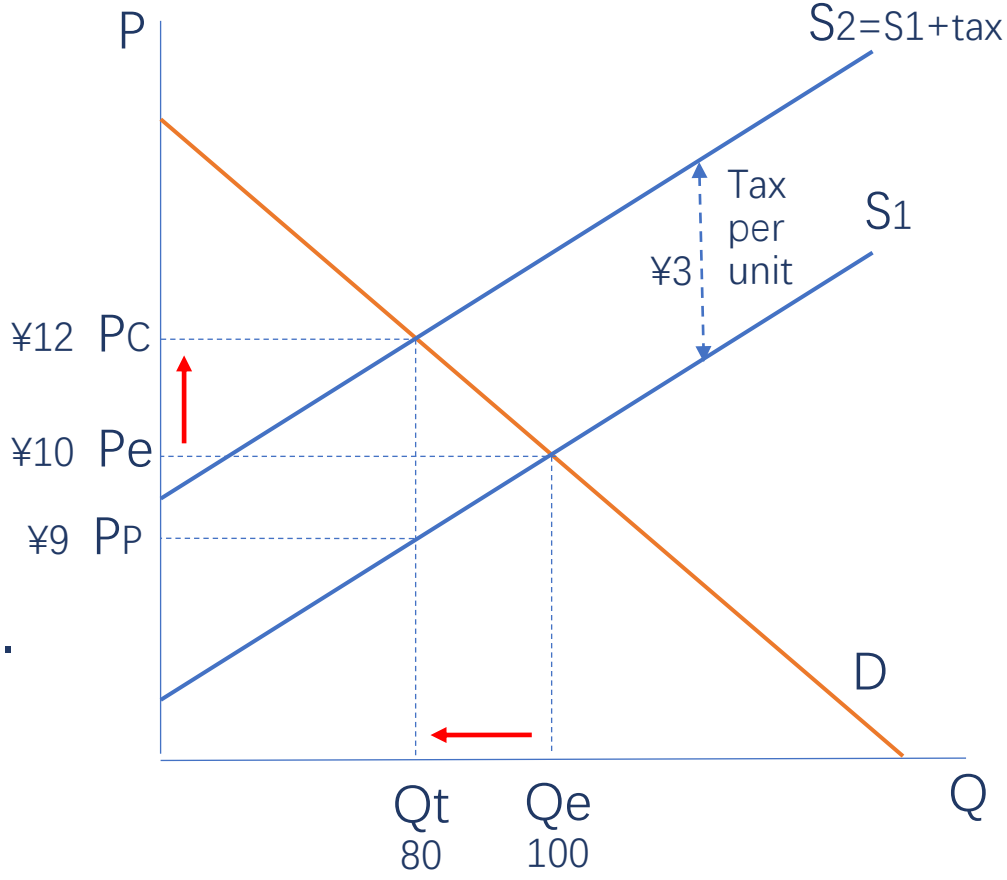
fixed % of the price of the good/service



For every level of output the firm is willing and able to supply to the market, it must receive a price that is higher than the original price by the amount of the tax. This involves a shift of the supply curve upward by the amount of the tax.

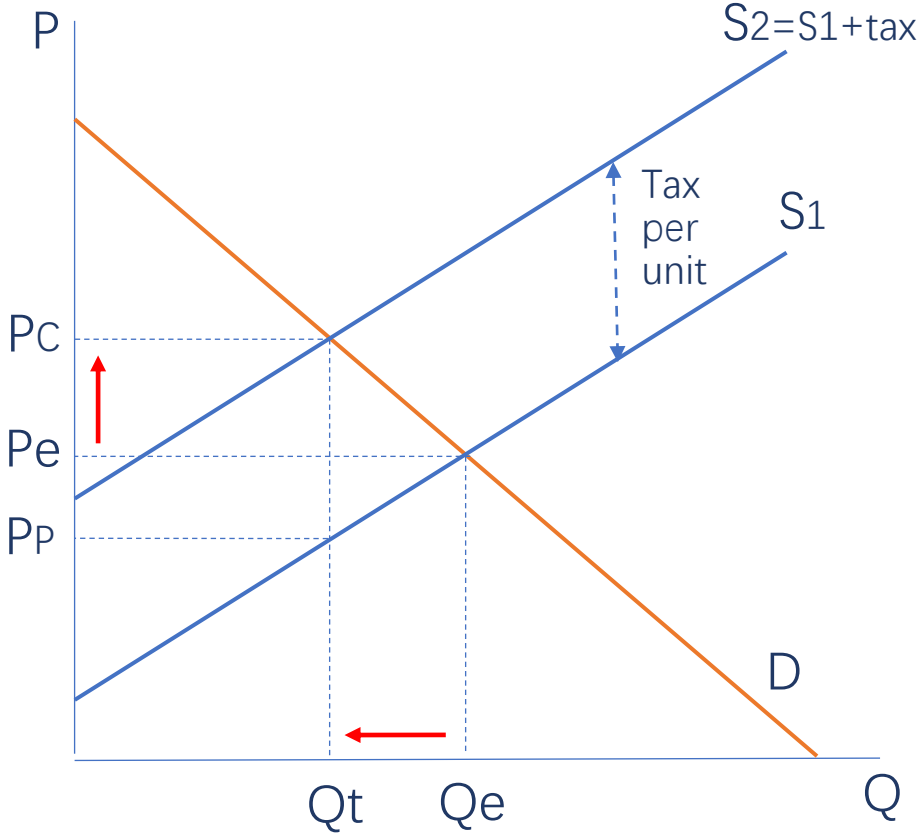
Illustration of indirect taxes

- Original pre-tax equilibrium price Pe and Qe
- Government imposes Specific tax on the good, S_1 shifts upwards to S_2, The imposition of a specific tax will **parallel shift** the supply curve to the left by the value of the tax.
- D curve unchanged. 'drive a wedge'
- P_C= the price consumer paid
- P_C-P_P = the tax amount paid to government.
- P_P= the price producer received.



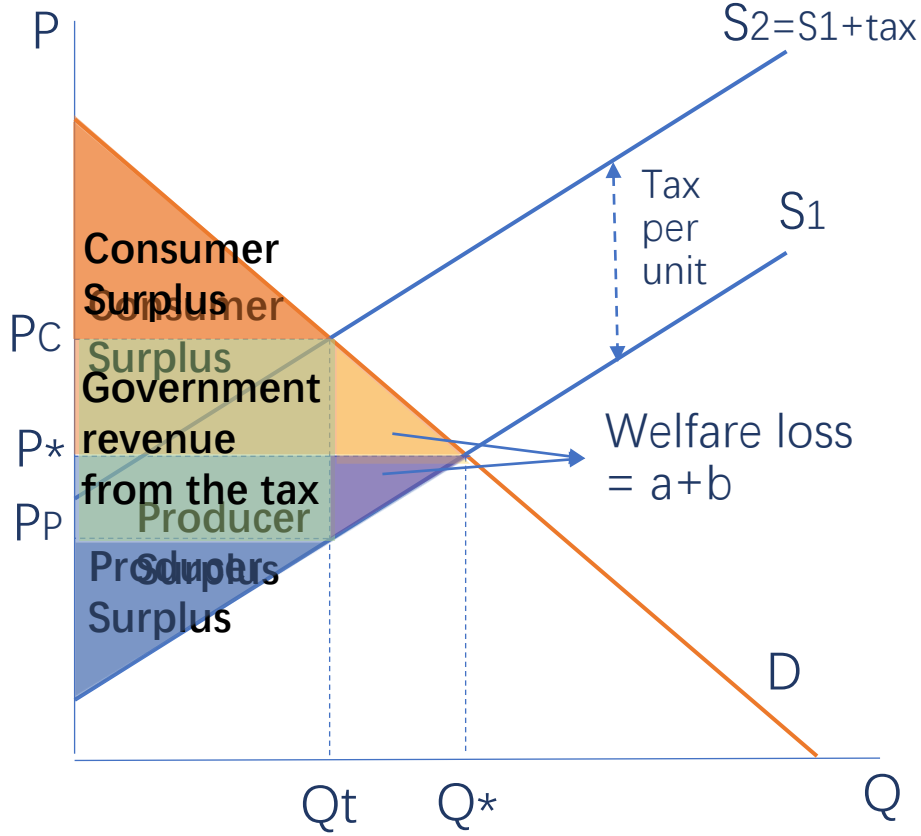
The market outcomes

1. **Equilibrium quantity** produced and consumed falls from Qe to Qt
2. **Equilibrium price** increases from Pe to Pc which is the price paid by consumers.
3. **Consumer expenditure** on the good is given by the price of the good per unit times the quantity of units bought; it therefore changes from Pe*Qe to Pc*Qt
4. **Price received by the firm** falls from Pe to Pp which is Pp = Pc – tax per unit
5. The **firm's revenue** falls from Pe*Qe to Pp*Qt
6. The government receives tax revenue, given by (Pc-Pp)*Qt or the amount of tax per unit times the number of units sold.
7. There is an underallocation of resources to the production or the good: Qt is less than the free market quantity, Qe



Consequences for various stakeholders

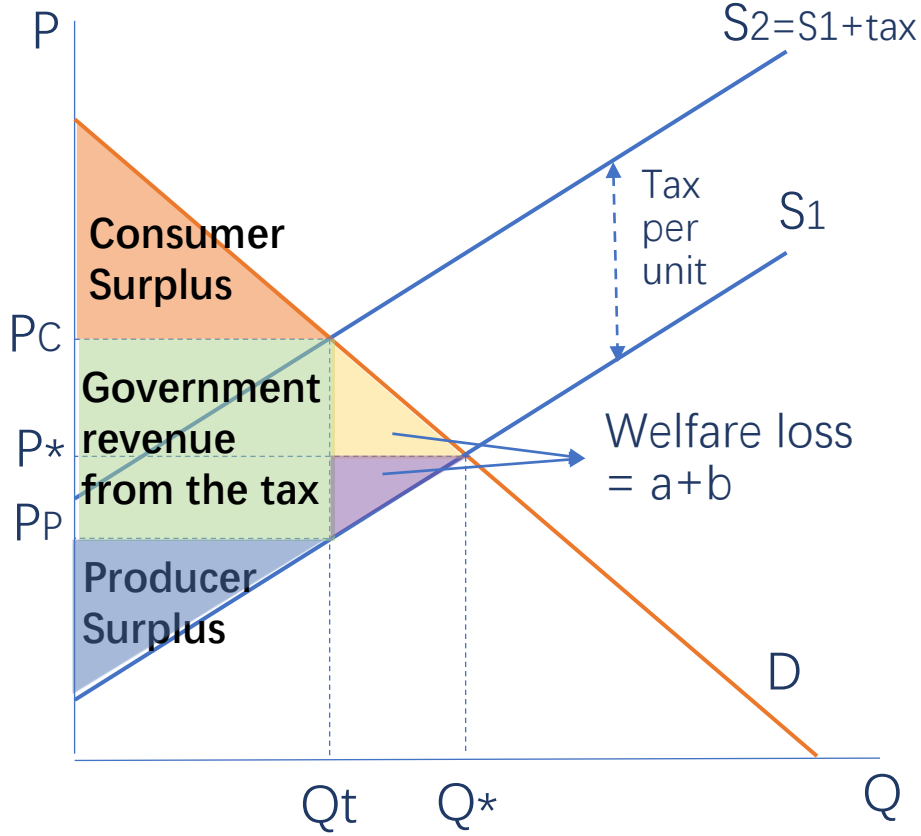
- **For consumers:**
  a. Price paid ↗, quantity bought ↘
  b. Not buying
  → Worse off
- **For producers:**
  a. Price receive ↘, quantity sell ↘ → Total revenue ↘
  b. Out of market
  → Worse off
- **For the government:**
  - Gain $(P_C - P_P) * Q_t$ for the government budget
- **For workers**
  - Lower amount of output → fewer workers needed → unemployment ↗
- **Society as a whole**
  - New social surplus = CS+PS+GS
  - Welfare loss a+b → completely lost
  - $Q_T - Q^*$ are not sold: The value of these units to buyers is greater than the cost of producing them
  - Worse off



Consequences for various stakeholders

We call it Underallocation of resources (underproduction) or **Allocative inefficiency.**

- **MB > MC**: too little of the good is produced and consumed relative to the social optimum.



Indirect taxes V.S allocation of resources

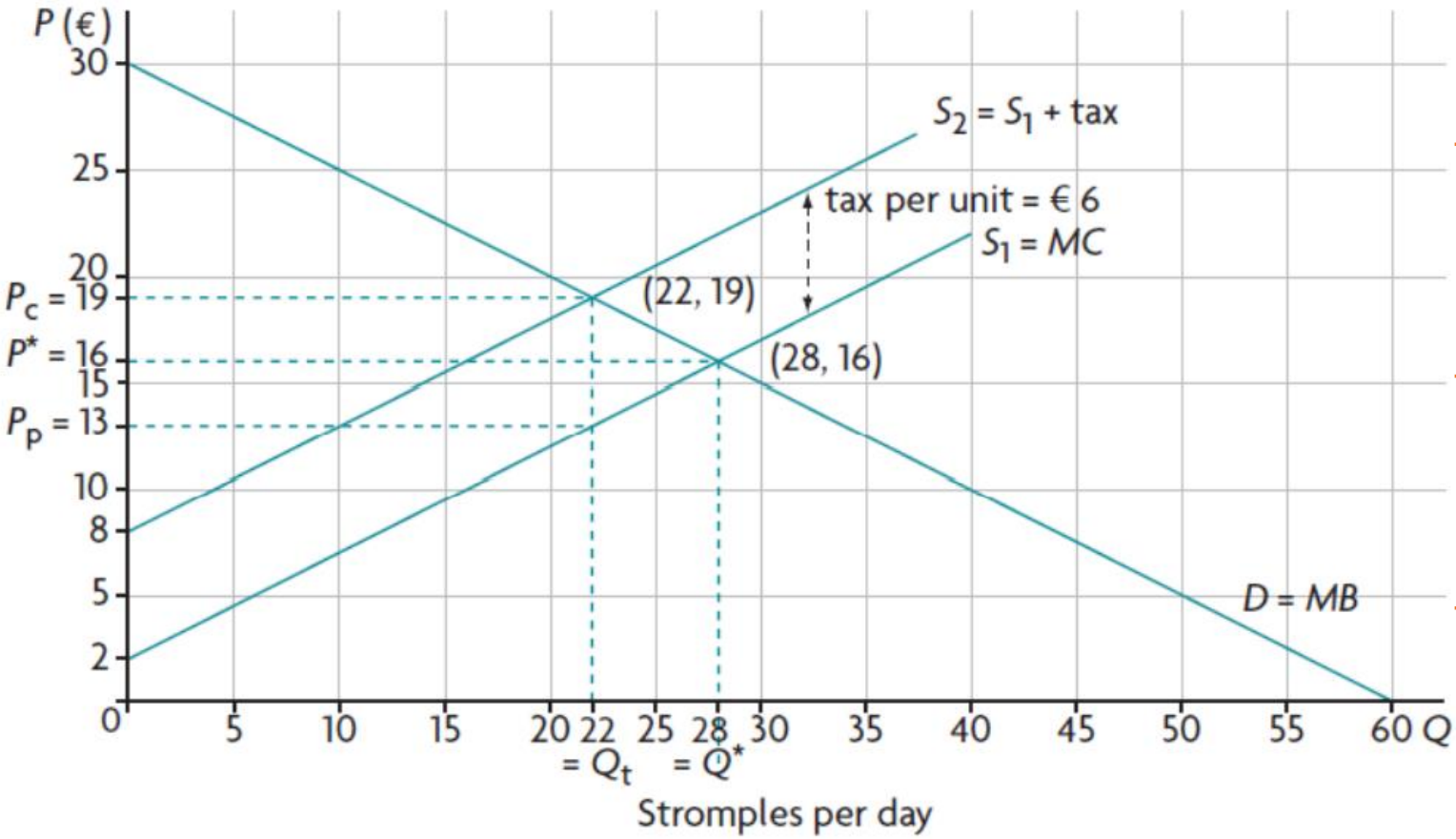
- Tax have the effect of changing the allocation of resources.
  - Impose tax on special products:

    → Demand: price ↗, Consumers' spending on those products ↘

    → Supply: Producer's revenue ↘, produce less.

  As a result, excise taxes affect the allocation of resources.

Calculation - the effect of indirect taxes



P* = €16, Q*=28

Pc = €19, Qc=22, Pt= €13

Consumer expenditure:

- Before tax: P* x Q* = 16 x 28= €448
- After tax: Pc x Qt =19 x 22 = €418

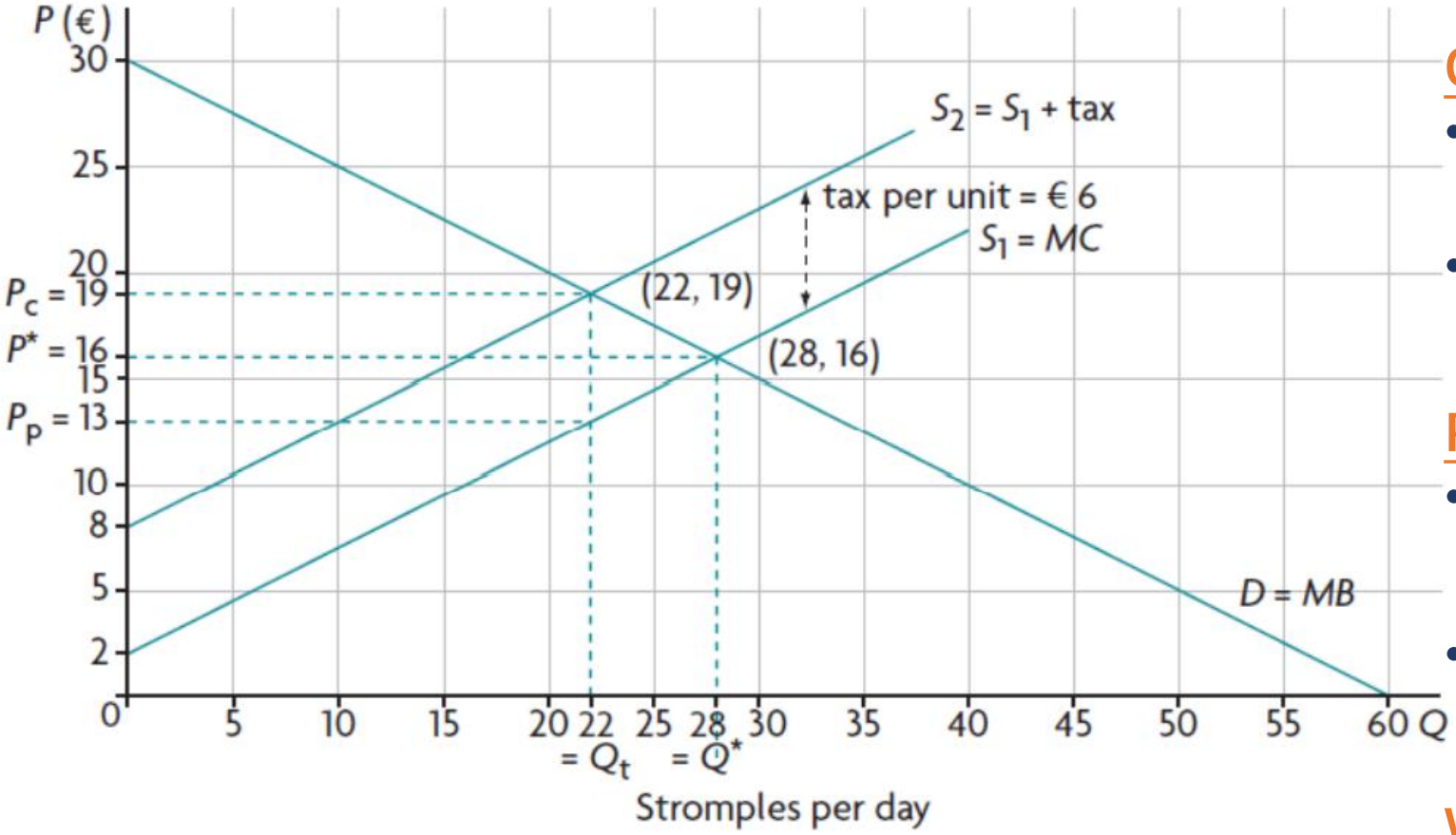
Producer revenue:

- Before tax: P* x Q* = 16 x 28= €448
- After tax: Pt x Qt =13 x 22 = €286

Government revenue:

- =(Pc-Pt) x Qt=(19-13) x 22= €132
- =(taxed) Consumer expenditure – producer revenue = €132

Calculation - the effect of indirect taxes



P* = €16, Q*=28

Pc = €19, Qc=22, Pt= €13

Consumer surplus:

- Before tax: ($P_{intercept\ of\ D} - P^*$) x Q*/2 = (30-16) x 28/2= €196
- After tax: ($P_{intercept\ of\ D} - P_c$) x Q_t /2 = (30-19) x 22/2 = €121

Producer surplus:

- Before tax: ($P^* - P_{intercept\ of\ S1}$) x Q*/2 = (16-2)*28/2 = €196
- After tax: ($P_t - P_{intercept\ of\ S1}$) x Qt/2 = (13-2)*22/2 = €121

Welfare loss:

= 196+196-121-121-132 = €18

=Area of triangle $(P_c-P_p)(Q^*-Q_t)/2$ = €18

Tax incidence and price elasticity of demand and supply

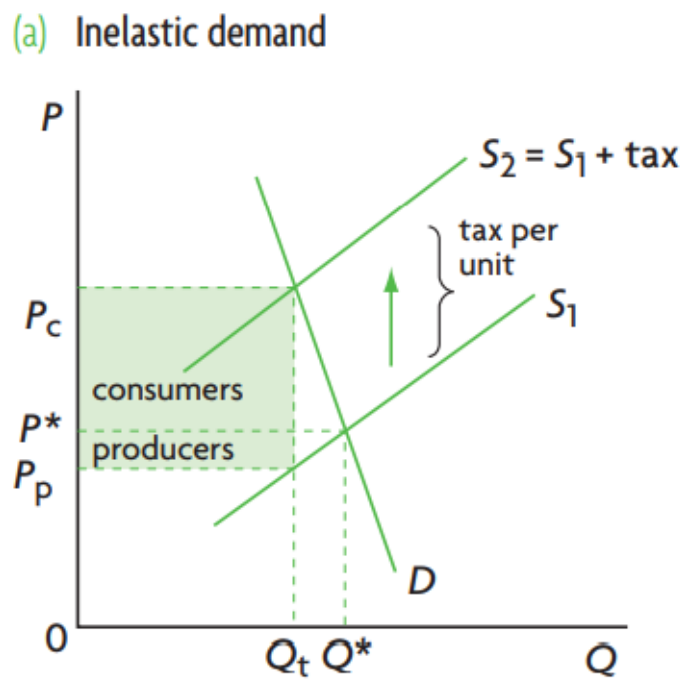
- When a good is taxed, part of the tax is paid by consumers and part by producers; therefore the tax burden is shared between the two. But how is the tax burden shared between them?

- **The burden of a tax is referred to as tax incidence.**

- the **price elasticity of demand** and **price elasticity of supply** for the good being taxed decides the distribution of the incidence.

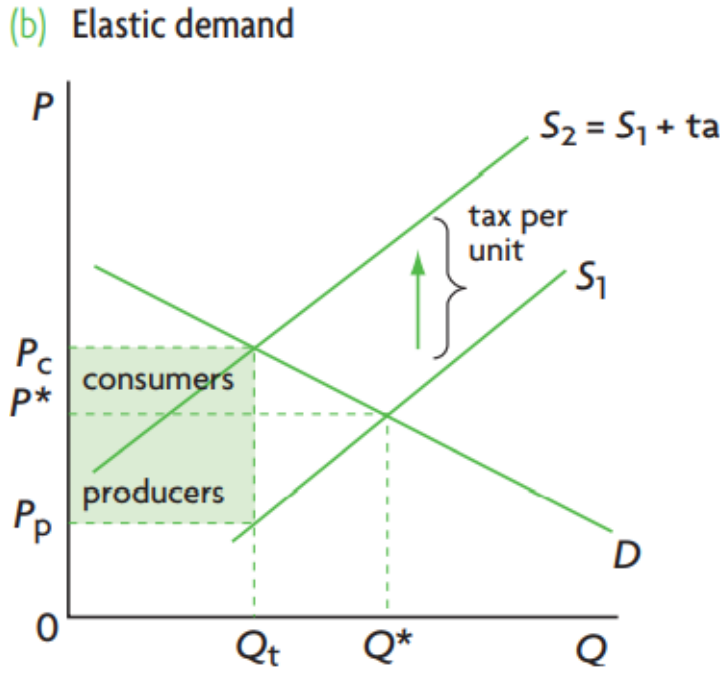
Incidence of indirect taxes and PED

- The **full amount of tax** = **(Pc − Pp) × Qt**
- The incidence of the tax is partly on consumers and partly on producers:
  - ➢ tax burden (incidence) of **consumers** = **(Pc − P*)×Qt**
  - ➢ tax burden (incidence) of **producers** = **(P* − Pp) × Qt**



- When demand is **inelastic**, as in Figure (a), most of the tax incidence is on consumers;
- When demand is **elastic**, as in Figure (b), most of the incidence is on producers.

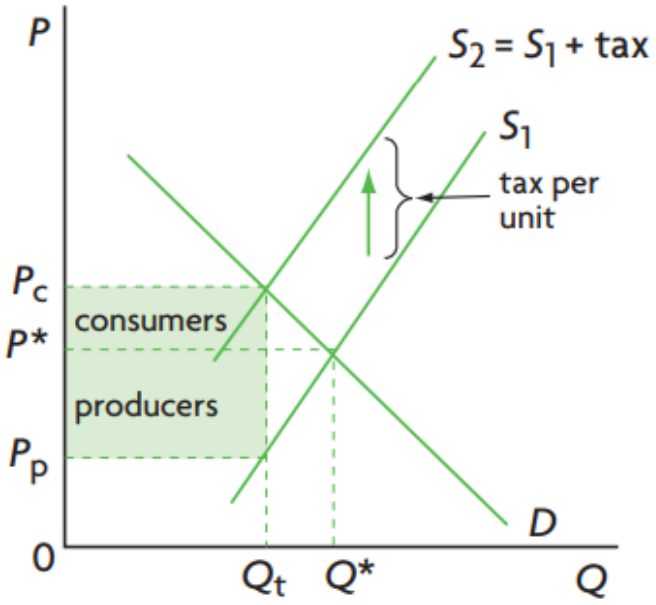
- When demand is inelastic, there is a relatively small drop in equilibrium quantity compared with when demand is elastic.



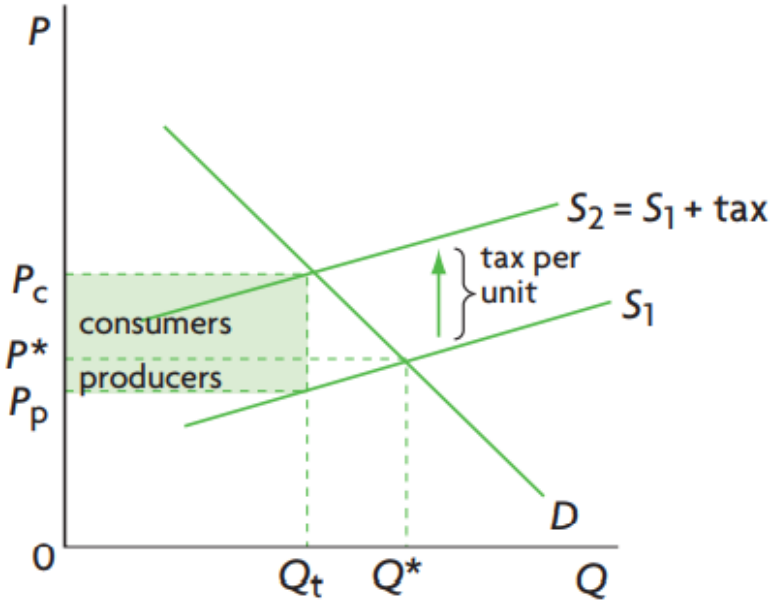
Incidence of indirect taxes and PES

- When supply is **inelastic**, as in Figure (a), most of the tax incidence is on producers.
- When supply is **elastic**, as in Figure (b), most of the tax incidence is on consumers.

(a) Inelastic supply



(b) Elastic supply

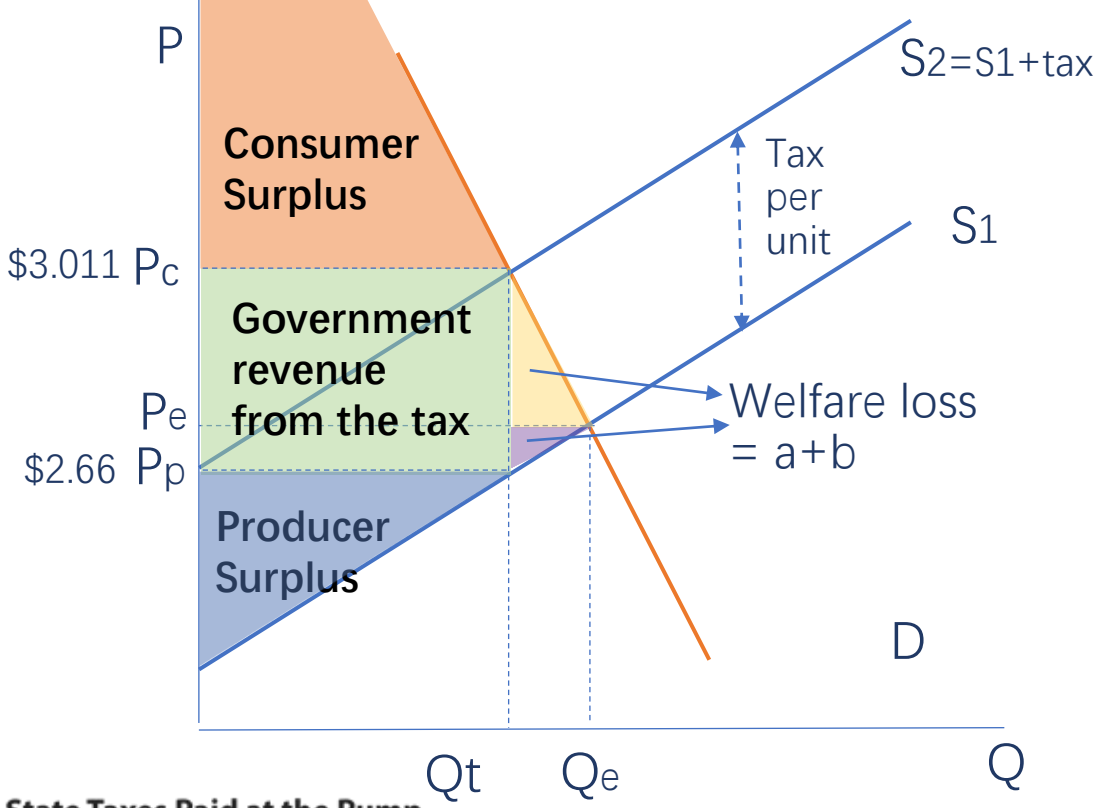


Putting PED and PES together

- The more elastic a schedule, the more of the tax burden that will fall on the other side.
- With elastic demand, producers have the higher tax incidence.
- With elastic supply, consumers have the higher tax incidence.

- With inelastic demand, most of the tax burden is on consumers;
- with inelastic supply, most of the tax burden is on producers.

➔ In general, the tax burden falls proportionately more on the group whose activities are less responsive to price changes

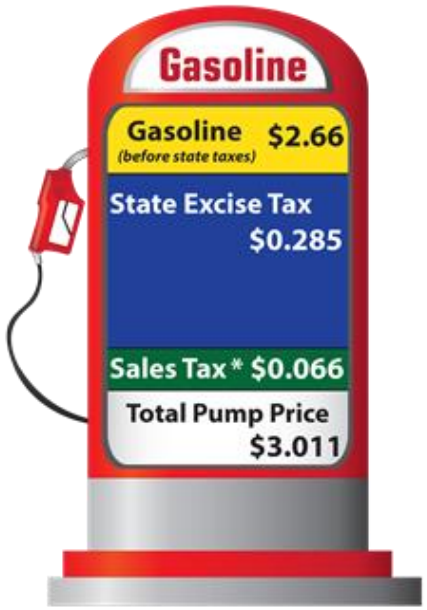


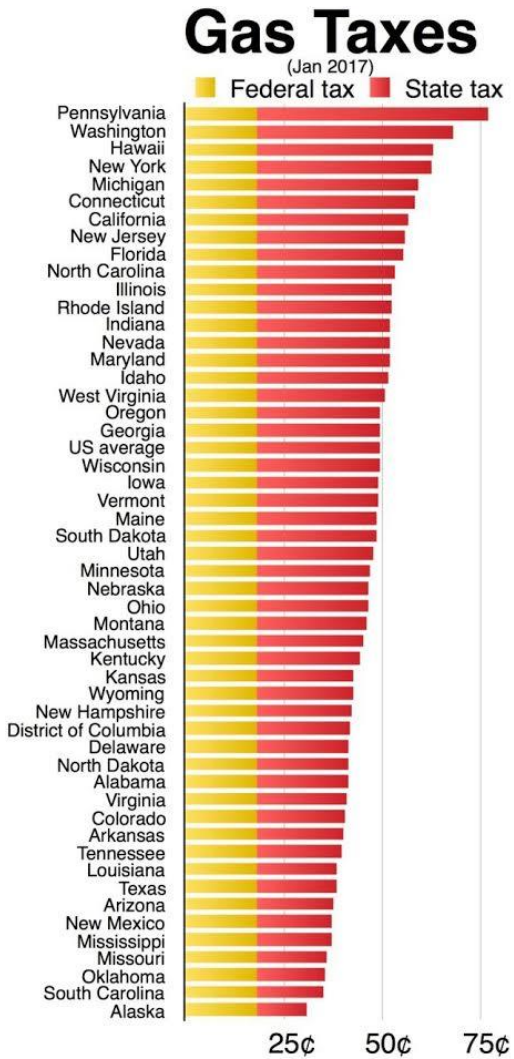
Case Evaluation

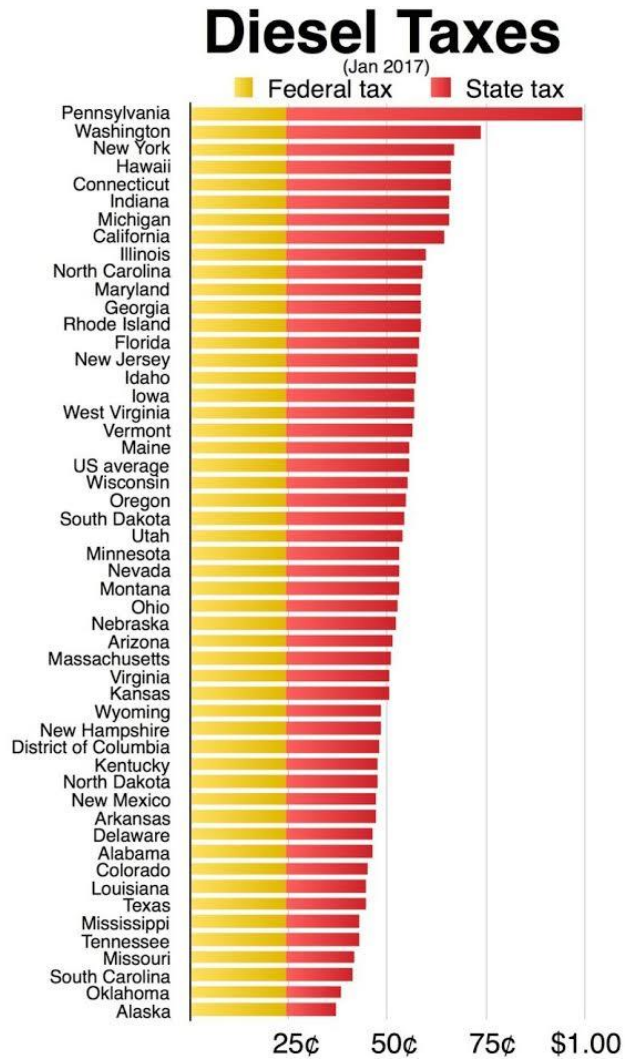
Consequences for stakeholders:

- Consumers
- Producers
- Government
- society

State Taxes Paid at the Pump








Subsidies

Subsidy

Definition: An amount of money paid by the government to firms for a variety of reasons: to prevent an industry from failing, to support producer's incomes, or as a form of protection against imports (due to the lower costs and lower prices that arise from the subsidy). A subsidy given to a firm results in a higher level of output and lower price for consumers. May also be paid to consumers as financial assistance or for income redistribution.

- Direct cash payment
- Low interest or interest-free loans
- The provision of goods/services by the government at below market price
- Tax relief

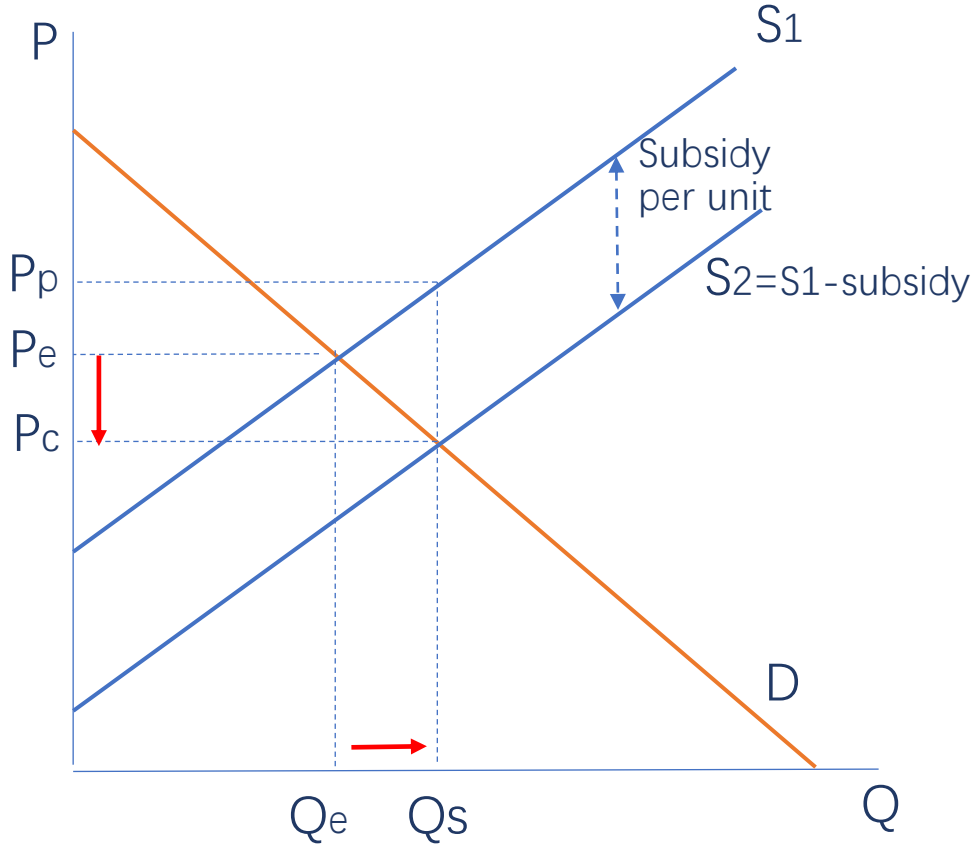
* In this chapter, we focus on specific subsidies, which the **government pay to producers with fixed amount per unit of output**.

Why governments grant subsidies

1. Increase **revenue of producers**.
2. Make certain goods (necessities) **affordable to low-income consumers**.
3. **Encourage production and consumption** of particular goods and services that are believed to be desirable for consumers. (education, electronic car, etc.)
4. Support the **growth of particular industries** in an economy. (support to solar industry)
5. **Encourage exports** of particular goods.
6. Improve the **allocation of resources** (reduce allocative inefficiencies)

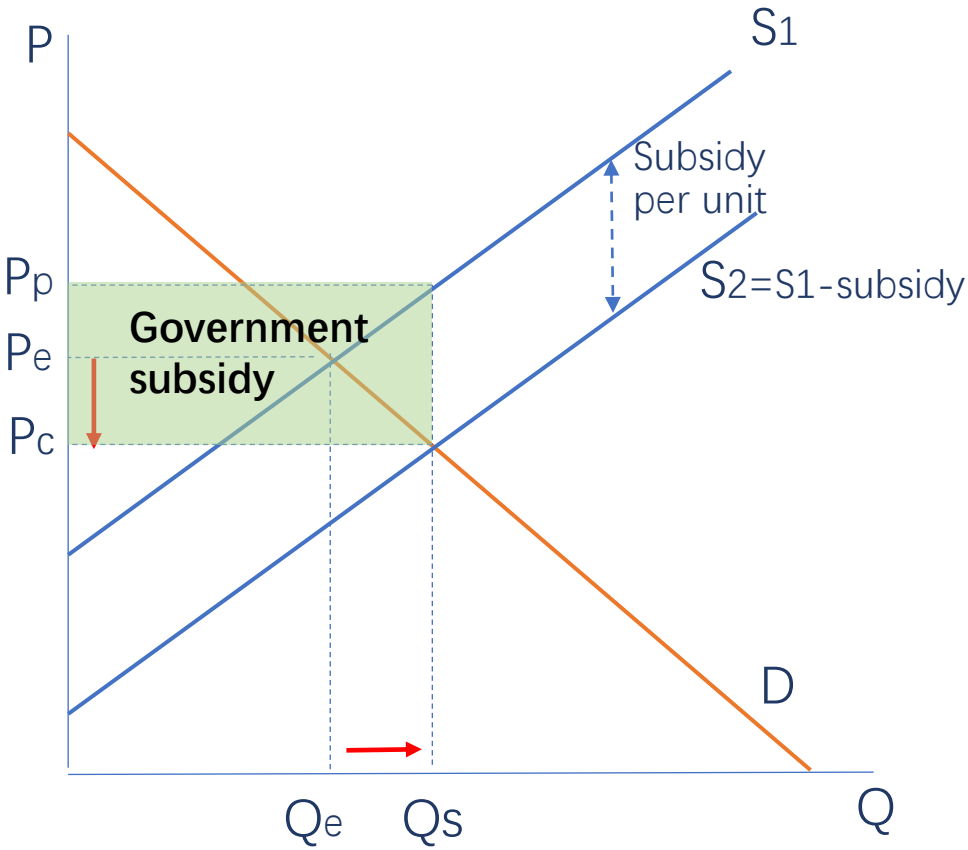
Illustration of subsidies

- Original pre-subsidy equilibrium price **P_e** and **Q_e**
- Government grants a subsidy consisting of a payment to the firm of a fixed amount for each unit of output sold, **S1 parallel shifts downwards by the amount of the subsidy to S2**, D curve unchanged.
- P_c= the price paid by consumer
- P_p - P_c = the subsidy paid by government.
- P_P= the price received by producer.
- Subsidy amount = $(P_p - P_c)$* Q_S



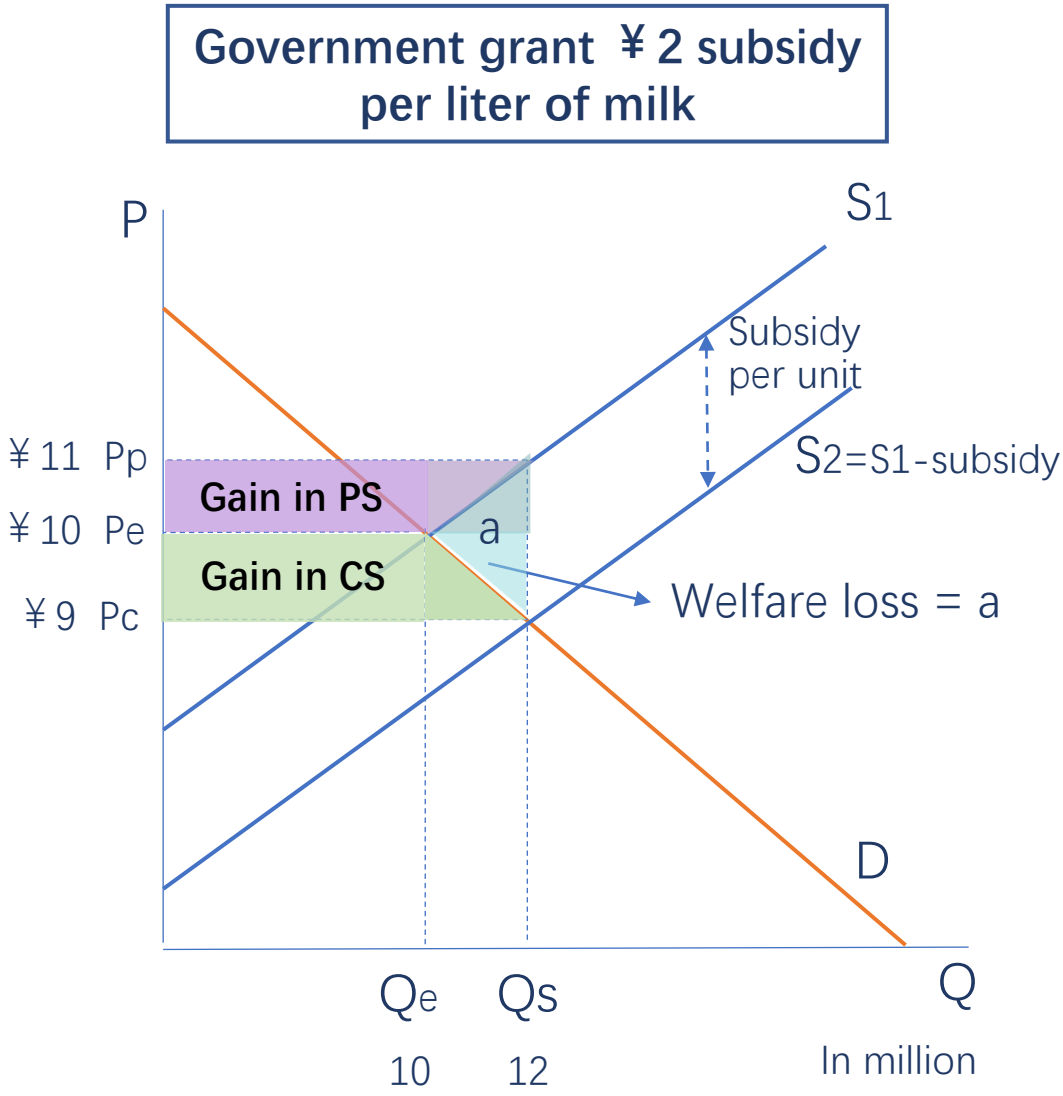
The market outcome of subsidy

- **Equilibrium quantity** produced and consumed increases from Q_e to Q_s
- The **equilibrium price** falls from P_e to P_c, this is the price **paid by consumers**
- The **price received by producers** increases from P_e to P_p.
- The amount of the subsidy is given by $(P_p - P_c)*Q_s$, or the amount of subsidy per unit multiplied by the number of units sold; this is the entire shaded area, and represents **government spending** to provide the subsidy.
- There is an **overallocation of resources** to the production of the good: Q_s is greater than the free market quantity, Q_e.



Consequences for various stakeholders

- **For consumers:**
  a. Existing consumers: Price paid ↘, quantity bought ↗
  b. New consumers join
  → Better off
- **For producers:**
  a. Existing producers: Price received ↗, quantity sold ↗ Total revenue ↗
  b. New producer join the market
  → Better off
- **For workers**
  - Higher amount of output → more workers needed
- **For the government:**
  - $(P_p - P_c) * Q_s$ Burden on its budget
  - Make the milk more affordable to low-income people.
  - Opportunity costs of the government spending.
- **Society as a whole**
  - Government subsidy = CS + PS + welfare loss a
  - Inefficient firms could sell in the market
  - Subsidies can reduce incentives for firms to cut costs or to be more competitive.

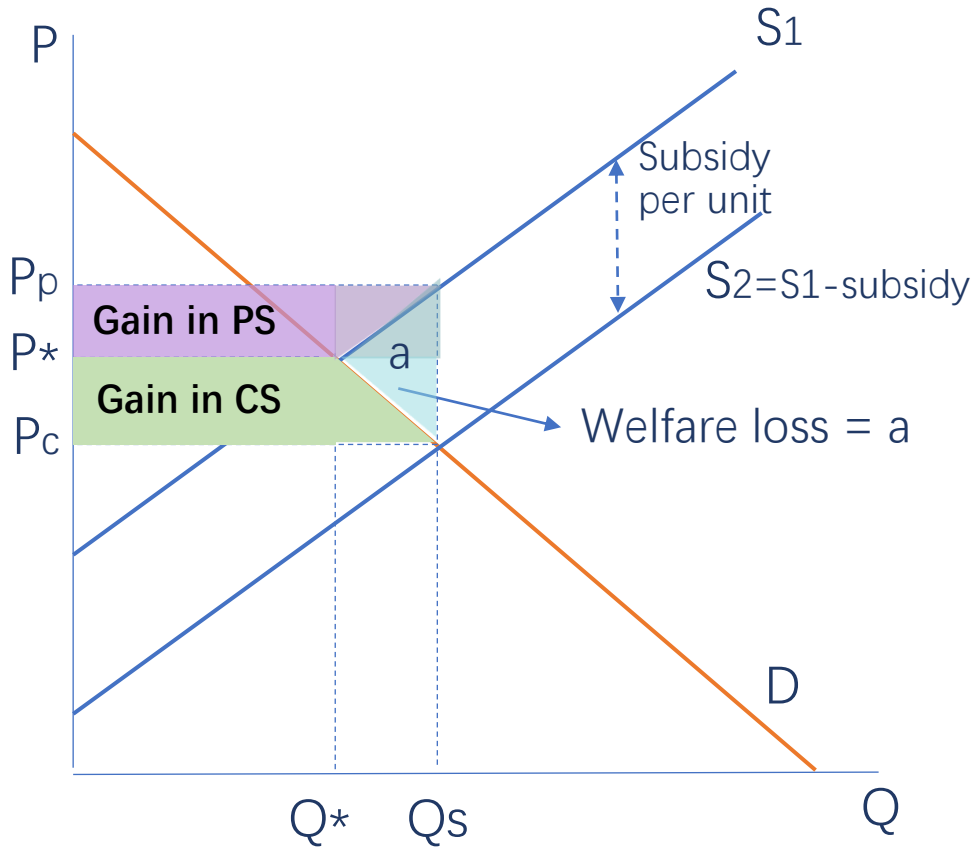


Consequences for various stakeholders

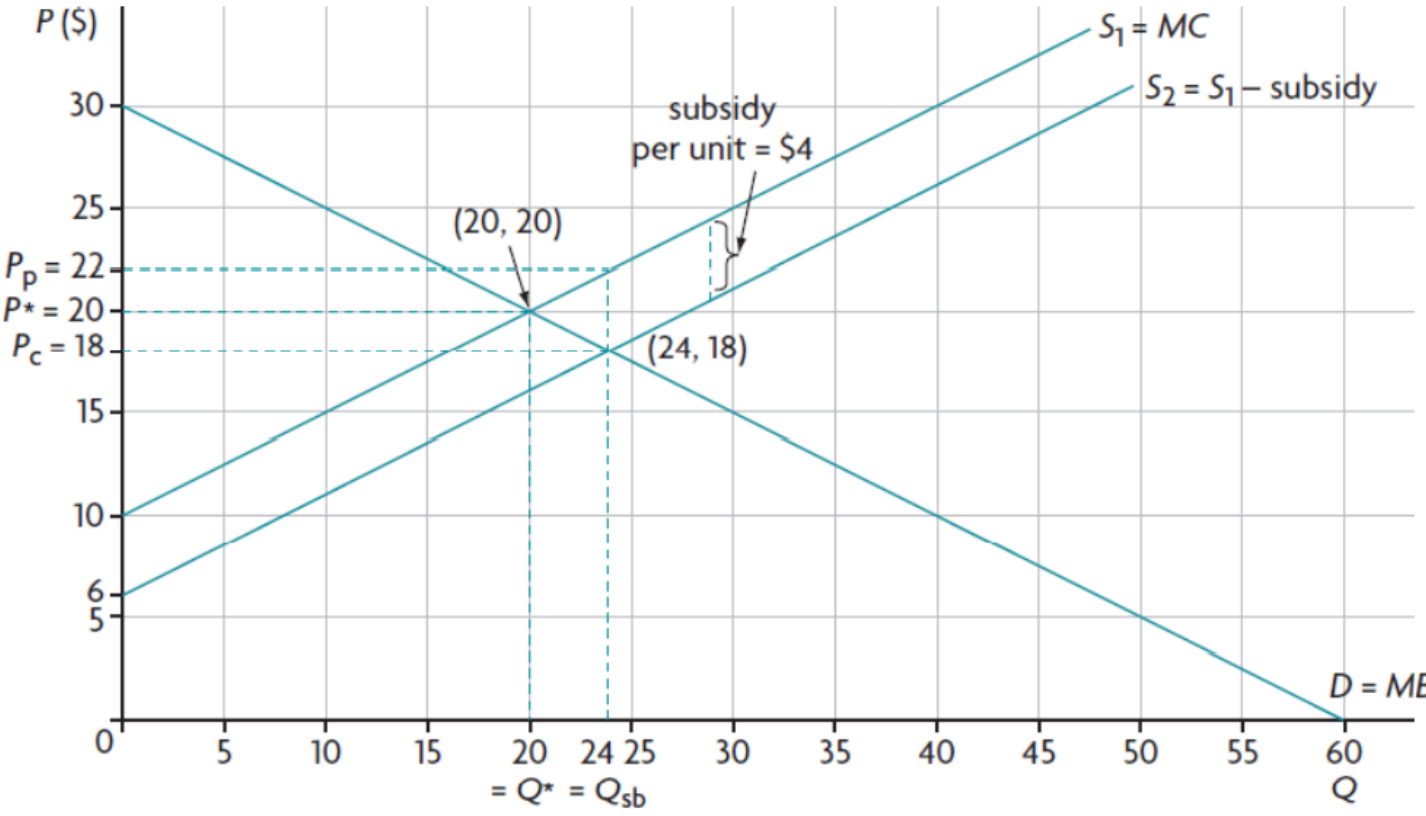
We call it **overallocation** of resources to the production of the good.

→ **Allocative inefficiency**.

- **MB < MC**: too much of the good is produced and consumed relative to the social optimum.



Calculation - the effect of subsidies



P* = $20, Q*=20

Pc = $18, Qs=24, Pp=$22

Consumer expenditure:

- Before subsidy: P* x Q* = 20 x 20=$400
- After subsidy: Pc x Qs =18 x 24 = $432

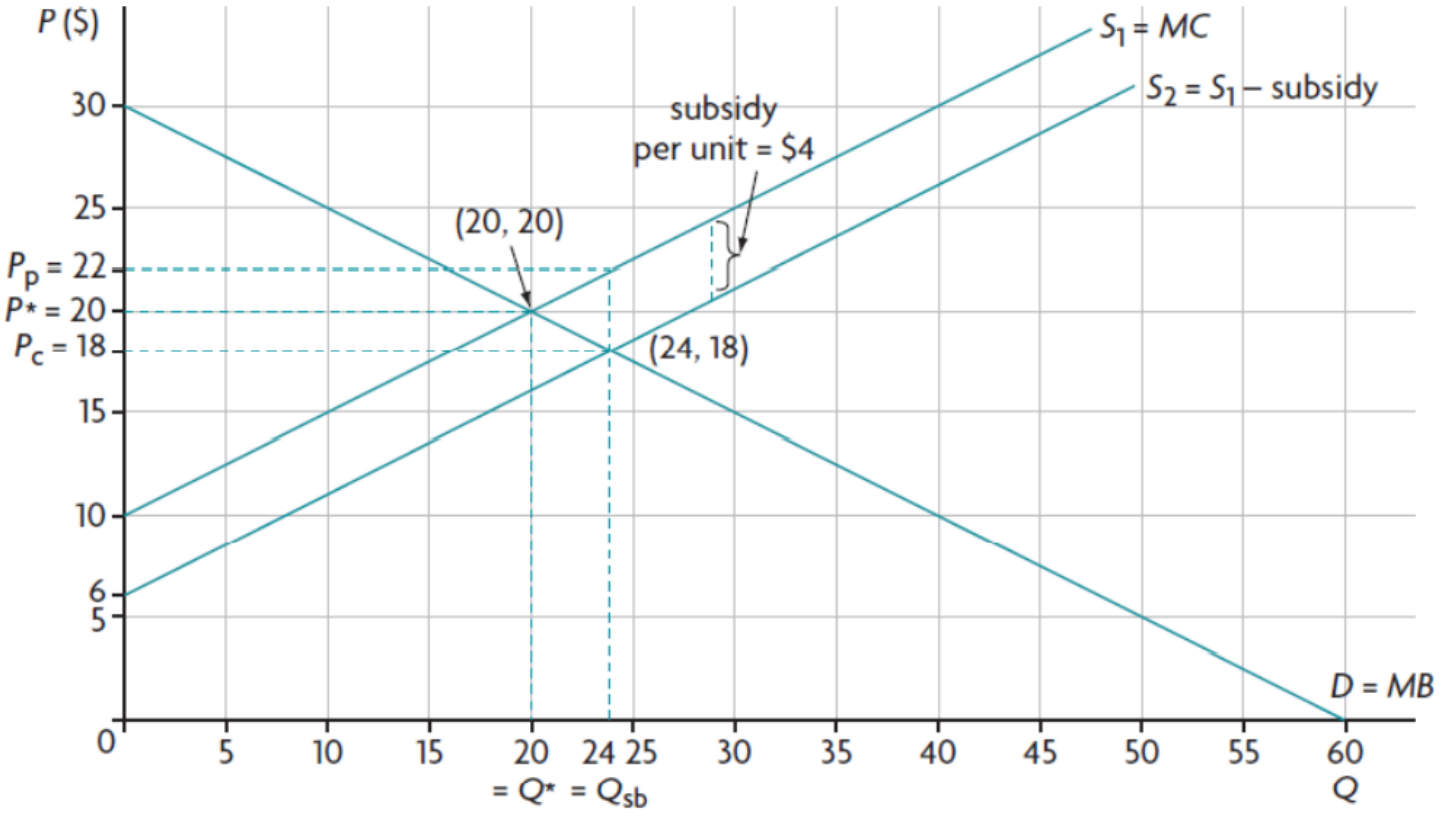
Producer revenue:

- Before subsidy: P* x Q* = 20 x 20=$400
- After subsidy: Pp x Qt =22 x 24 = $528

Government spending:

- =(Pp-Pc) x Qt=(22-18) x 24= $96
- =(subsided) producer revenue – Consumer expenditure = $96

Calculation - the effect of subsidies



P* = 20, Q*=20

Pc = 18, Qs=24, Pp= 22

Consumer surplus:

- Before subsidy: (Pintercept of D – P*) x Q*/2 = (30-20) x 20/2= $100
- After subsidy: (Pintercept of D – Pc) x Qc /2 = (30-18) x 24/2 = $144

Producer surplus:

- Before subsidy: (P* - Pintercept of S1) x Q*/2 = (20-10)*20/2 = $100
- After subsidy: (Ps - Pintercept of S1) x Qs/2 = (22-10)*24/2 = $144

Welfare loss:

= 144+144-100-100-96 = $8

=Area of triangle (Pp-Pc)(Qs-Q*)/2 = $8