DP IB Economics: HL

Your notes

2.3 Competitive Market Equilibrium

Contents

Market Equilibrium & Disequilibrium

Your notes

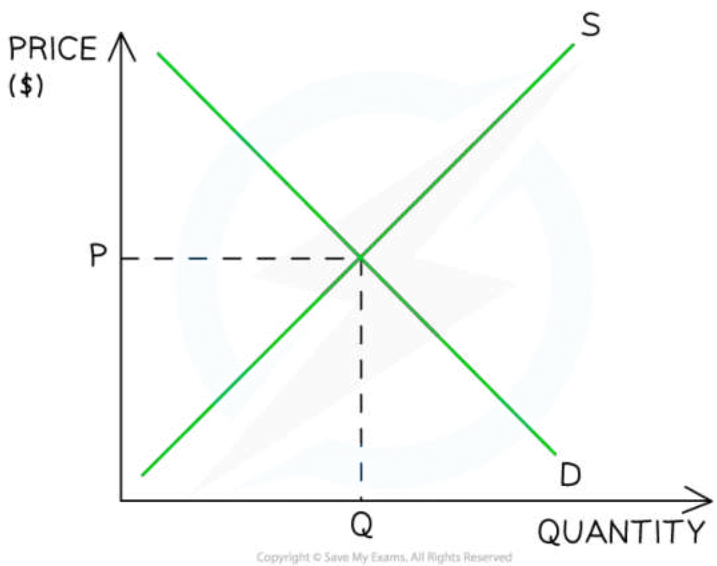
Market Equilibrium

- In a **market system**, prices for goods/services are determined by the **interaction of demand and supply**
  - A **market** is any place that brings **buyers** and **sellers** together
  - Markets can be **physical** (e.g. McDonald's) or **virtual** (e.g. eBay)
- Buyers and sellers meet to **trade** at an **agreed price**
  - Buyers agree the price **by purchasing** the good/service
  - If they do not agree on the price then they **do not purchase** the good/service and are exercising their **consumer sovereignty**
- Based on this interaction with buyers, **sellers** will gradually **adjust their prices** until there is an **equilibrium price** and **quantity** that works for both parties
  - At the equilibrium price, **sellers** will be satisfied with the **rate/quantity** of sales
  - At the equilibrium price, **buyers are satisfied** with the **utility** that the product provides

Equilibrium

- Equilibrium in a market occurs when **demand = supply**
- At this point, the price is called the **equilibrium or market-clearing price**
  - This is the **price** at which sellers are clearing (selling) their stock **at an acceptable rate**

Your notes



A graph showing a market in equilibrium with a market clearing price at P & quantity at Q

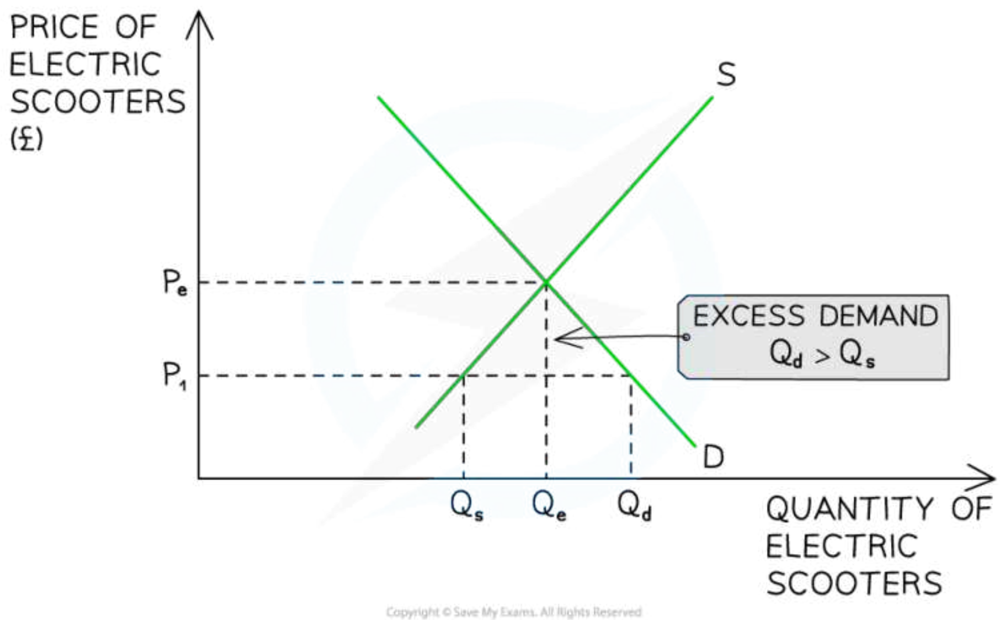
- Any price **above or below** P creates **disequilibrium** in this market
  - Disequilibrium occurs whenever there is **excess demand** or **excess supply** in a market

Market Disequilibrium

Disequilibrium: Excess Demand

- **Excess demand** occurs when the demand **is greater** than the supply
  - It can occur when **prices are too low** or when **demand is so high** that supply cannot keep up with it

Your notes



A graph that depicts the condition of excess demand in the market for electric scooters

Diagram Analysis

- At a price of P_1, the **quantity demanded** of electric scooters (Q_d) is **greater** than the **quantity supplied** (Q_s)
- There is a **shortage** (excess demand) in the market equivalent to **Q_sQ_d**

Market Response

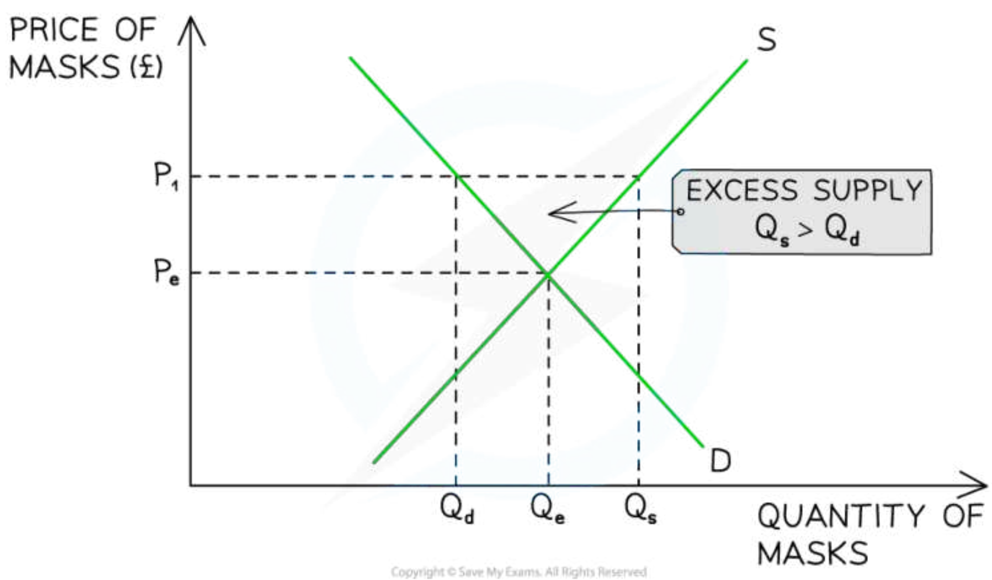
- This market is in **disequilibrium**
  - Sellers are frustrated that products are selling so quickly at a **price** that is obviously **too low**
  - Some buyers are frustrated as they will **not be able to purchase** the product
- Sellers realise they can **increase prices** and generate more **revenue** and **profits**
- Sellers gradually **raise prices**
  - This causes a **contraction in QD** as some buyers **no longer desire** the good/service at a higher price
  - This causes an **extension in QS** as other sellers are more **incentivised to supply** at higher prices

Your notes

- In time, the market will have **cleared the excess demand** and arrive at a position of **equilibrium, P_eQ_e**
  - Different markets take different lengths of **time to resolve disequilibrium**
  - E.g. Retail clothing can do so in a few days. Whereas the housing market may take several months, or even years

Disequilibrium: Excess Supply

- **Excess supply** occurs when the supply **is greater** than the demand
  - It can occur when **prices are too high** or when **demand falls unexpectedly**
- During the later stages of the pandemic, the market for face masks was in **disequilibrium**



A graph that depicts the condition of excess supply in the market for Covid-19 face masks during the later stages of the pandemic

Diagram Analysis

- At a price of P_1, the **quantity supplied** of face masks (Q_s) is **greater** than the **quantity demanded** (Q_d)
- There is a **surplus in the market** (excess supply) equivalent to **Q_dQ_s**

Market Response

- This market is in **disequilibrium**

Your notes

- Sellers are frustrated that the masks are **not selling** and that the **price** is obviously **too high**
- Some buyers are frustrated as they **want to purchase** the masks but are not willing to **pay the high price**
- Sellers will gradually lower **prices** in order to generate more **revenue**
  - This causes a **contraction in QS** as some sellers **no longer desire** to supply masks
  - This causes an **extension in QD** as buyers are **more willing** to purchase masks at **lower prices**
- In time, the market will have **cleared the excess supply** and arrive at a position of **equilibrium, P_eQ_e**

Examiner Tips and Tricks

Memorise the rule that shortages arise when the price is **below** equilibrium whereas surpluses arise when the price is **above** the equilibrium.

Functions of the Price Mechanism

Your notes

The Price Mechanism

- **The price mechanism is the interaction of demand and supply in a free market**
- This interaction **determines prices** which are the means by which **scarce resources are allocated** between competing wants/needs
- **Adam Smith** referred to the **functions** of the **price mechanism** as the **'mystery of the invisible hand'**
- The price mechanism fulfils **two functions** in the relationship between buyers and sellers

1. Resource allocation

- **Signalling:** prices provide information to producers and consumers about where resources are wanted (markets with increasing prices) and where they are not (markets with decreasing prices)
- **Incentive:** when prices for a good/service rise, it **incentivises producers** to reallocate resources from a less profitable market to this market in order to **maximise their profits.** Falling prices **incentivise the reallocation** of resources to new markets

2. Rationing

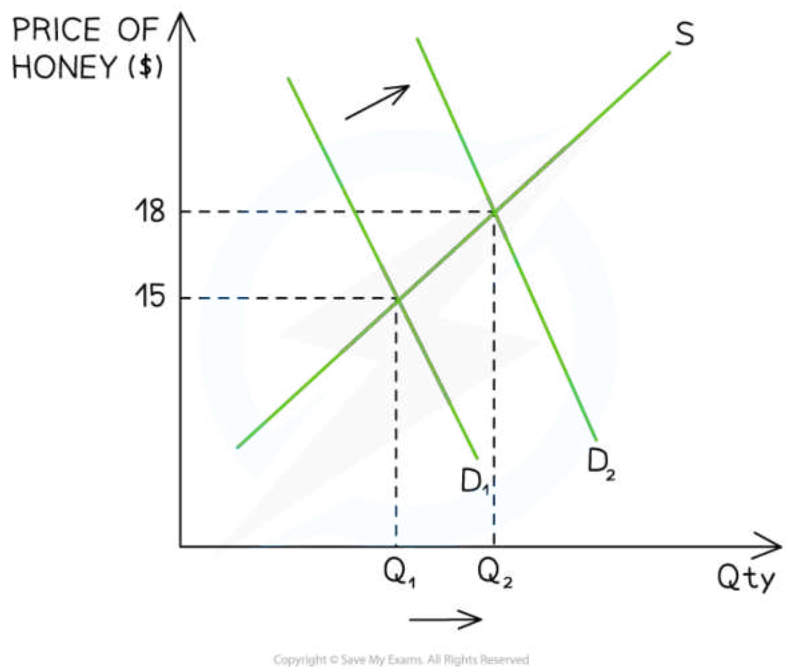
- Prices ration scarce resources
- When resources become **scarcer** the price will **rise** further. Only those who can afford to pay for them will receive them
- If there is a **surplus** then **prices fall** and more consumers can afford them

The Price Mechanism at Work

- The price mechanism operates in all markets including **local**, **national** and **global**

1. Price mechanism in a local market

- Long Island, USA has a rich history of agriculture and many producers set up farm shops selling directly to the public. In recent years, honey consumption has increased



A diagram showing the increase in demand for honey in a local market, Long Island

Diagram Analysis

- Due to a change in one of the **non-price determinants of demand** (most likely change in tastes), the demand for honey in the local market has **increased from $D_1 \rightarrow D_2$** and the **price has increased** from $15 to $18
  - The higher price serves to **ration** a valuable product. Those consumers who can afford to purchase it at $18, receive it
  - The higher price **incentivises** producers to allocate more **factors of production** to producing honey and this is evident from the **extension in supply** from Q_1 to Q_2
  - The shift in demand **signals** to other producers that **demand for honey is strong** and they should consider **entering** the market

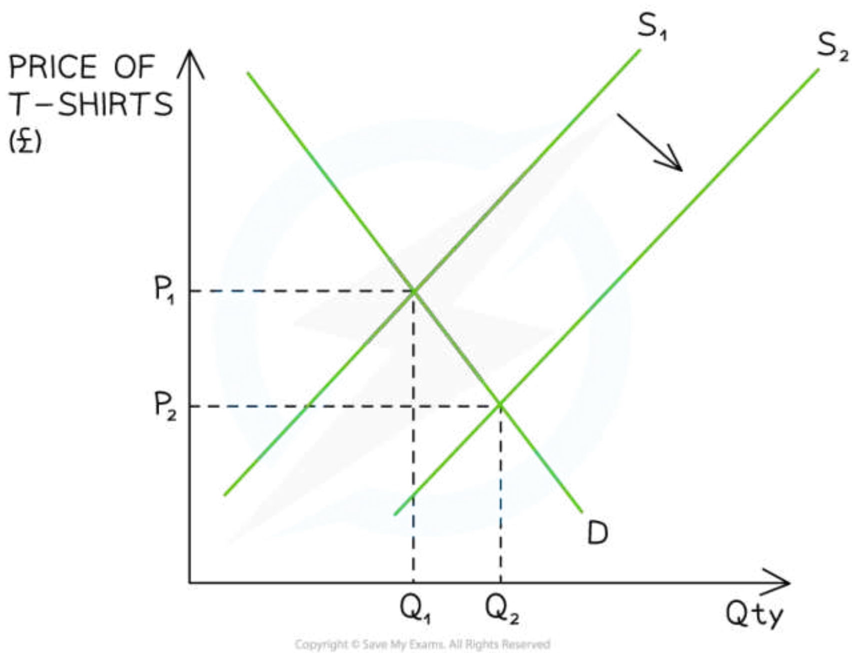
Examiner Tips and Tricks

It can get confusing to explain some of the differences between the two functions. Thinking about it in the following way helps to simplify the process. If there is a shift in demand/supply the market is sending a **signal** to consumers and producers. If there is a **movement** along one of the curves, this is as a result of the **incentive function.**

Your notes

2. Price mechanism in a national market

- The T-Shirt market in the UK is highly competitive. In 2018 the price of cotton fell



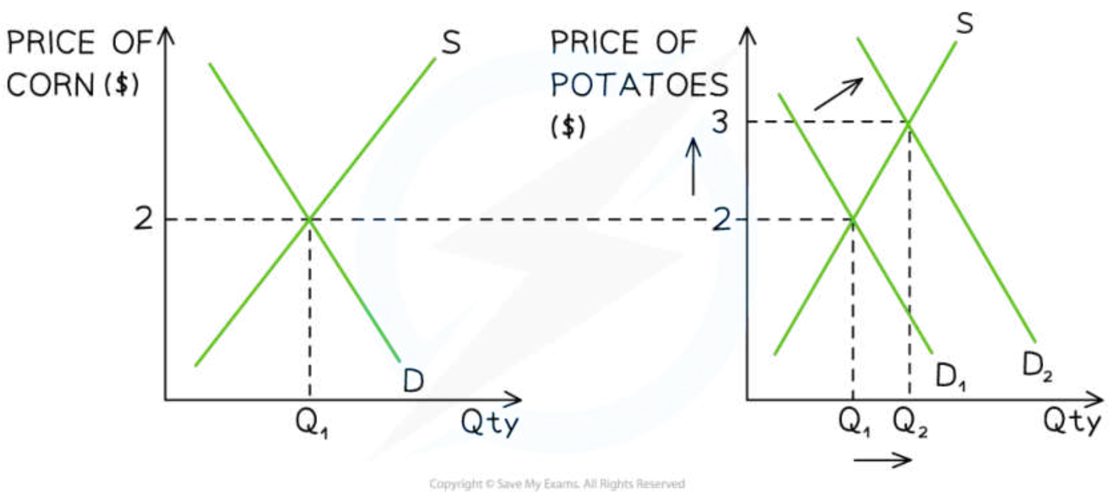
A diagram showing an increase in the supply of T-shirts in the UK market

Diagram Analysis

- Due to a change in one of the **non-price determinants of supply** (a decrease in costs of production), the **supply** of T-shirts in the UK has **increased** from $S_1 \rightarrow S_2$ and the **price has fallen** from P_1 to P_2
  - The **lower price** increases the number of consumers who can access this product. It is **rationed more widely** as there is an **excess in supply**
  - The lower price **incentivises** consumers to purchase more T-shirts and this is evident from the **increase in demand** from Q_1 to Q_2
  - The shift in supply **signals** to other producers that **there is excess supply** and they should consider **leaving** the market

3. Price mechanism in a global market

- **Cash crops** such as wheat, oats, barley, soy, corn, sunflowers etc. can be grown using the same **factors of production** (these are products in **competitive supply**)
  - Many countries **export** excess crops into the **world market**
  - **Producers** use world prices to guide their **production decisions**



A diagram showing the price mechanism at work in two related global markets, corn and potatoes

Diagram Analysis

- Farmers in France have been **producing corn** for many years and the market price is $2/kg
- The **price** of potatoes in **global markets** has been steady at $2/kg
- Due to a change in one of the **non-price determinants of demand** (possibly an increase in the global population), the demand for potatoes has **increased** from $D_1 \rightarrow D_2$ and the **price has increased** from $2/kg to $3/kg
  - The higher price serves to **ration** the potatoes. Those consumers who **can afford** to purchase potatoes for $3, receive them
  - The higher price **incentivises** producers to **allocate more factors of production** to producing potatoes and this is evident from the **extension in supply** from Q_1 to Q_2
- The shift in global demand **signals** to producers in France that **demand for potatoes is strong** and they should consider **switching some of their production** from corn to potatoes
  - If they do this, the supply of corn will shift to the left

Your notes

Examiner Tips and Tricks

Whenever you are faced with questions on the **functions of the price mechanism**, remember that the functions are built on the principle of **self-interest**. This will help you to explain each function.

For example, **lower prices incentivises consumers** to purchase **more** of the product with the same income. Conversely, the **incentive for producers** is the opposite encouraging them to **reallocate their factors of production** to producing more profitable products.

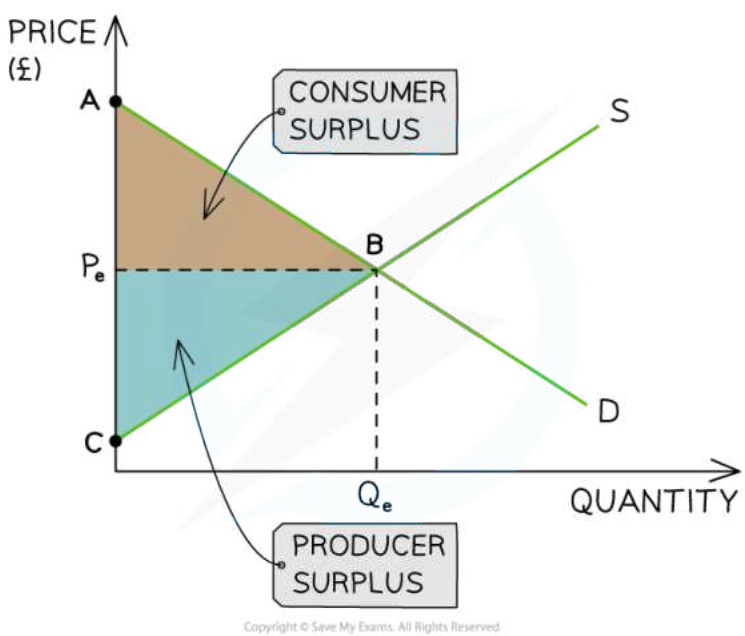
Each party acts in their own self interest

Consumer & Producer Surplus

Your notes

Consumer & Producer Surplus

- **Consumer surplus** is the difference between the amount the **consumer is willing to pay** for a product and the price they have **actually paid**
  - E.g. If a consumer is willing to pay £18 to watch a movie and the price is £15, their **consumer surplus** is £3
- **Producer surplus** is the difference between the amount that the **producer is willing to sell** a product for and the price they **actually do**
  - E.g. if a producer is willing to sell a laptop for £450 and the price is £595, their **producer surplus** is £145



A market diagram illustrating consumer and producer surplus

Diagram Analysis

- The area between the **equilibrium price** and the **demand curve** represents the **consumer surplus** in the market (ABP_e)
  - **The consumer surplus** lies underneath the demand curve

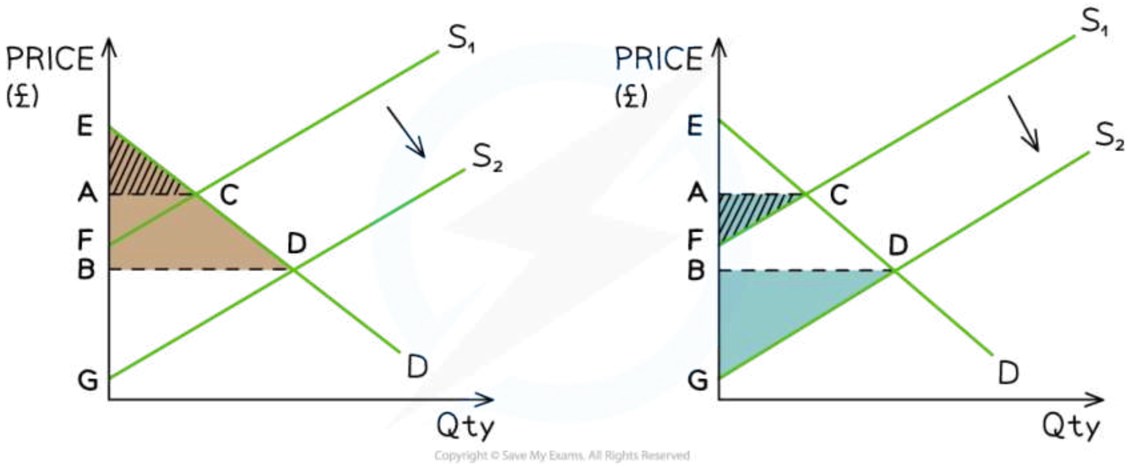
Your notes

- The area between the **equilibrium price** and the **supply curve** represents the **producer surplus** in the market (CBP_e)
  - Producer surplus lies **above the supply curve**
- When the market is at **equilibrium** the producer and consumer surplus are **maximised**
- Consumer surplus + producer surplus = **social/community surplus**
  - Any **disequilibrium** reduces the social surplus

How Market Changes Affect Producer & Consumer Surplus

- Any change to a **non-price determinant of supply or demand** will cause a shift in the relevant curve
- This shift will change the **consumer and producer surplus** in the market

1. An increase in supply



A non-price determinant of supply has changed and the diagram on the left shows the resulting change to consumer surplus while the diagram on the right shows the change to producer surplus

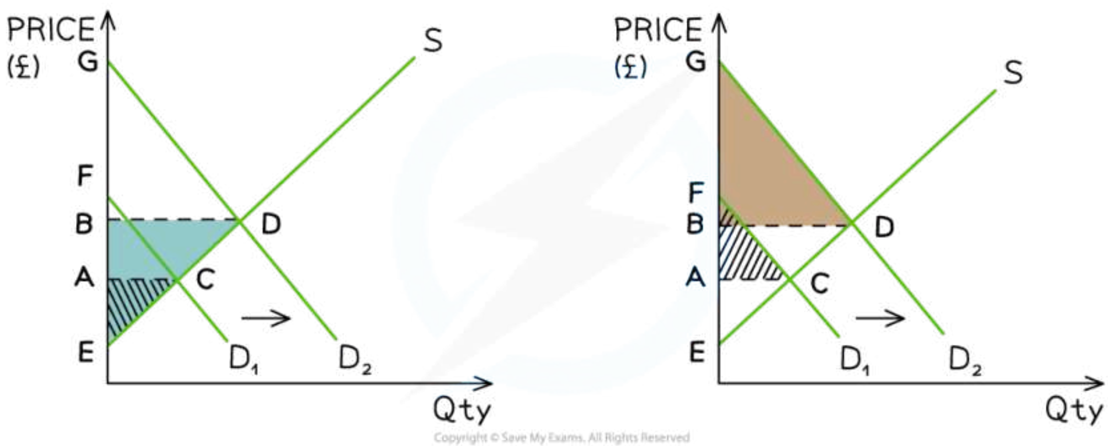
Diagram Analysis

- **Prior to the change** in supply
  - **Consumer surplus** was equivalent to ACE and **producer surplus** was equivalent to ACF

Your notes

- **Social surplus** was equivalent to ECF
- **After the change**, supply increased from $S_1 \rightarrow S_2$
  - **Consumer surplus** is now equivalent to BED and **producer surplus** is equivalent to BDG
  - **Social surplus** is equivalent to DEG
- **Both** the consumer surplus and producer surplus have **increased** as a result of the increased supply in the market

2. An increase in demand



A non-price determinant of demand has changed and the diagram on the left shows the resulting change to producer surplus while the diagram on the right shows the change to consumer surplus

Diagram Analysis

- **Prior to the change** in demand
  - **Producer surplus** was equivalent to ACE and **consumer surplus** was equivalent to ACF
  - **Social surplus** was equivalent to ECF
- **After the change**, demand increased from $D_1 \rightarrow D_2$
  - **Producer surplus** is now equivalent to BED and **consumer surplus** is now equivalent to BDG
  - **Social surplus** is equivalent to DEG

Your notes

- **Both** the producer surplus and consumer surplus have **increased** as a result of the **increased demand** in the market

Examiner Tips and Tricks

Understanding changes to **consumer and producer surplus** is useful when analysing the impact of **government intervention** such as indirect taxes, subsidies and price controls.

In essay responses, even if it is **not explicitly mentioned**, you can **refer to these concepts** when evaluating dynamic (changing) markets and the impacts on **different stakeholders.** It demonstrates excellent economic knowledge and analysis.

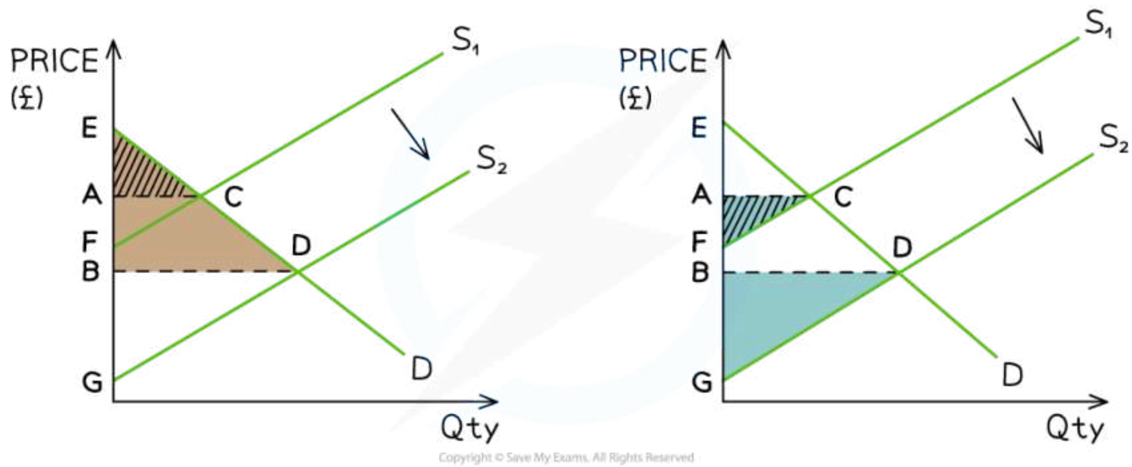
Calculating Consumer & Producer Surplus from a Diagram

- Producer and consumer surplus can be **calculated from a diagram** using a standard formula for calculating the area of a triangle

$$\text{Producer or consumer surplus} = \frac{\text{b x h}}{2}$$

- The following steps should be applied to each calculation
  - Identify the current equilibrium price
  - Draw a **horizontal line** from it to the Y axis
  - Ensure that both the **demand and supply curves pass through the Y axi**s so as to complete the two surplus triangles
  - Using the formula, calculate the **producer surplus** from the triangle which lies **below the equilibrium price** (area above the supply curve)
  - Using the formula, calculate the **consumer surplus** from the triangle which lies **above the equilibrium price** (area beneath the demand curve)
- It is also possible to calculate a **change to consumer or producer surplus** following a specific event
  - In the diagram below, assume that rice farmers in Vietnam **start using a new genetically modified seed** which increases yields (output)

Your notes



Calculating producer or consumer surplus from a diagram after the introduction of new technology increases output

Diagram Analysis

1. Consumer surplus in diagram on the left

- The initial equilibrium is found at point C
- The line AC separates the **original** consumer surplus from the producer surplus
- Consumer surplus **before the new seed** = ACE

$$\text{Consumer surplus before the new seed} = \frac{\text{b x h}}{2}$$

$$\text{Consumer surplus before the new seed} = \frac{(\text{AC}) \text{ x } (\text{AE})}{2}$$

- The application of the seed technology **shifts the supply curve to the right**, resulting in a **new equilibrium** at point D
- The line BD separates the **new** consumer surplus from the new producer surplus
- **Consumer surplus** after the new seed = BDE

Your notes

$$\text{Consumer surplus after the new seed} = \frac{\text{b x h}}{2}$$

$$\text{Consumer surplus after the new seed} = \frac{(\text{BD}) \text{ x } (\text{BE})}{2}$$

2. Producer surplus in diagram on the right

- Follow the same process as above
- Producer surplus **before the new seed** = ACF

$$\text{Producer surplus before the new seed} = \frac{\text{b x h}}{2}$$

$$\text{Producer surplus before the new seed} = \frac{(\text{AC}) \text{ x } (\text{AF})}{2}$$

- The application of the seed technology shifts the supply curve to the right, resulting in a **new equilibrium at point D**
- The line BD separates the **new consumer surplus** from the **new producer surplus**
- **Producer surplus** after the new seed = BDG

$$\text{Producer surplus after the new seed} = \frac{\text{b x h}}{2}$$

$$\text{Producer surplus after the new seed} = \frac{(\text{BD}) \text{ x } (\text{BG})}{2}$$

Worked Example

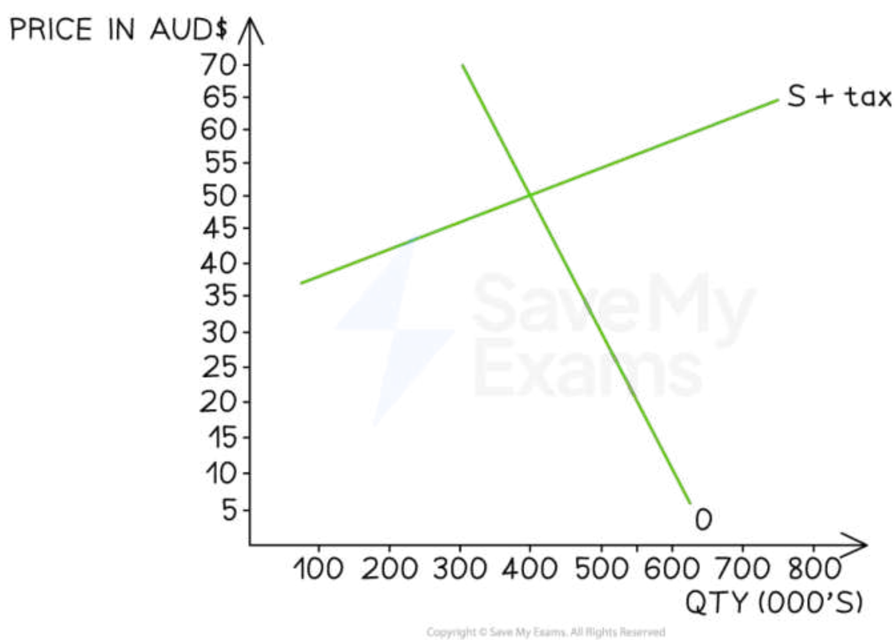
Australia has the highest taxes on cigarettes in the world. At the current market equilibrium, the price of a pack of 30's is AU$50 and is comprised of the components shown in the table below

Table 1

Components	Amount AU$ /30s pack
Selling price	50
Cost for suppliers	12
Profit for suppliers	3
Indirect tax	35

Figure 1 illustrates the market for cigarettes in Australia. D represents the demand for cigarettes in thousands of 30s packs a day. S + t represents the supply (incorporating the effects of the indirect tax) of thousands of 30s packs a day.

Figure 1



a) On figure 1, draw the market supply curve without the indirect tax having been added **[2]**

Answer:

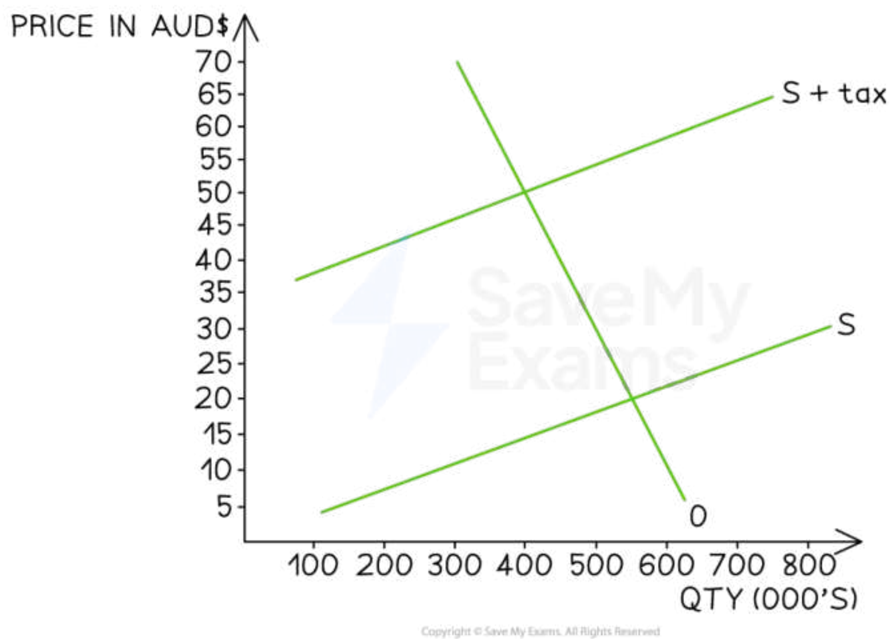
Step 1: Identify the indirect tax from the table

Your notes

AUD$ 35 per box of 30s

Step 2: Choose 2 quantity points and use them to draw in the original supply curve

Quantity points identified at AUD$ 35 less - 150, 000 and 550,000 - and draw the supply curve **[2 marks]**



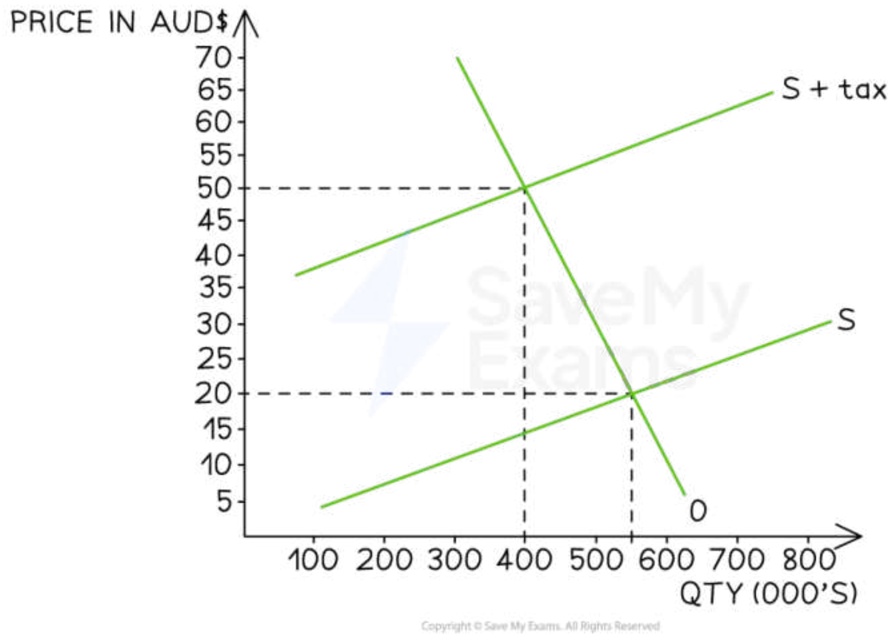
b) Using figure 1 and your answer to a), calculate the loss in consumer surplus as a result of the imposition of the indirect tax **[2]**

Answer:

Step 1: Identify the area on the diagram which represents the loss of consumer surplus and draw gridlines to mark it out

Draw gridlines to identify the two equilibrium points - price and quantity

Area A and B represent what has been lost from the overall original consumer surplus



Step 2: Calculate the area of A and B

$$\text{Loss of consumer surplus} = (\text{L x W of A}) + \frac{\text{b x h of B}}{2}$$

$$\text{Loss of consumer surplus} = 400{,}000 \text{ x } (50 - 20) + \frac{150{,}000 \text{ x } (50 - 20)}{2} \quad \textbf{[1 mark]}$$

$$\text{Loss of consumer surplus} = 12{,}000{,}000 + 2{,}250{,}000$$

$$\text{Loss of consumer surplus} = \text{AUD\$ } 14{,}250{,}000 \quad \textbf{[2 marks for the correct answer]}$$

Remember to read the units from the bottom of the graph and include them in your calculations. In this case they are presented in '000s. Also remember to include the correct unit for surplus calculations - it is always a monetary unit and in this case its is AUD$

Allocative Efficiency

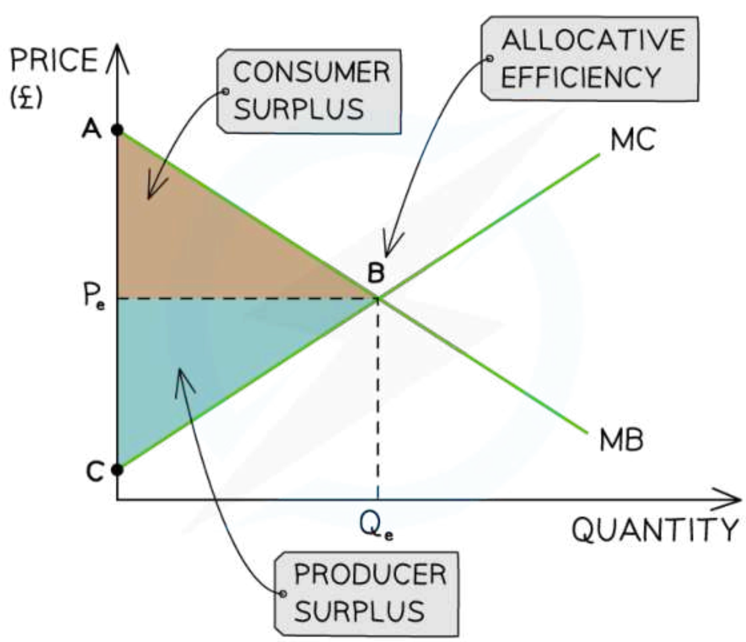
- **Efficiency** is a key concept in economics
- Economists generally identify **two types of efficiency** - **productive efficiency** and allocative efficiency

Your notes

An Explanation of Productive and Allocative Efficiency

Allocative Efficiency	▪ Occurs at the level of output where the **marginal utility** (marginal benefit) = **marginal cost (MB = MC)** ▪ At this point, **resources are allocated** in such a way that consumers and producers get the **maximum possible benefit** ▪ **No one can be made better off** without making someone else worse off ▪ There is **no excess** demand or supply
Productive Efficiency	▪ Occurs at the level of output where **average costs are minimised** ▪ There is **no wastage** of scarce resources and a high level of factor productivity

- Using the ideas of **marginal utility** (marginal benefit) and **marginal cost**, we can label the community surplus diagram slightly differently so as to reflect the benefits received by producers and consumers



Your notes

A diagram that reflects the maximisation of community surplus (allocative efficiency) when the marginal benefit equals the marginal cost

Diagram Analysis

- The demand curve represents the **marginal benefit (MB)** to the consumer
- The supply curve represents the **marginal cost (MC)** to the producer
- The market is in equilibrium at P_eQ_e
- Any change to the **allocation of resources** in this market will make either the consumer or producer worse off (excess demand or excess supply would occur)
- This market is **allocatively efficient when MB=MC**
- **Community surplus** is maximised at the point of allocative efficiency