



AQA A Level Economics



Your notes

3. Price Determination in Competitive Markets

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Your notes

Demand Curves

An Introduction to Demand

- Demand is the amount of a good/service that a consumer is willing and able to purchase at a given price in a given time period
 - **Effective demand** is demand supported by the necessary purchasing power (the **ability** to pay)
 - If a consumer is willing to purchase a good, but cannot afford to, it is **not effective demand**
- A **demand curve** is a graphical representation of the **price** and **quantity demanded (QD)** by consumers
 - If the data were plotted, it would be an **actual curve**. Economists, however, use straight lines so as to make analysis easier
- **The law of demand** states that there is an inverse relationship between price and quantity demanded (QD), **ceteris paribus**
 - When the price rises, the QD falls
 - When the price falls, the QD rises

Individual and Market Demand

- **Market demand** is the combination of all the **individual demand** for a good/service
 - It is calculated by adding up the individual demand at each price level

The Monthly Market Demand for Newspapers in a Small Village

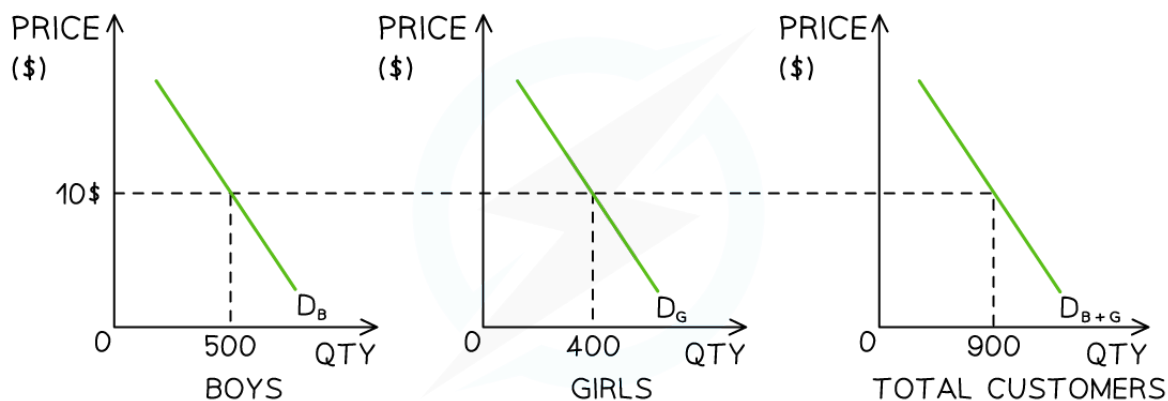
Customer 1	Customer 2	Customer 3	Customer 4	Market Demand
30	15	4	4	53

- **Individual and market demand** can also be represented graphically

Diagram: Market Demand for Children's Swimwear



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Boys, girls and total customer demand curves for children's swimwear in July

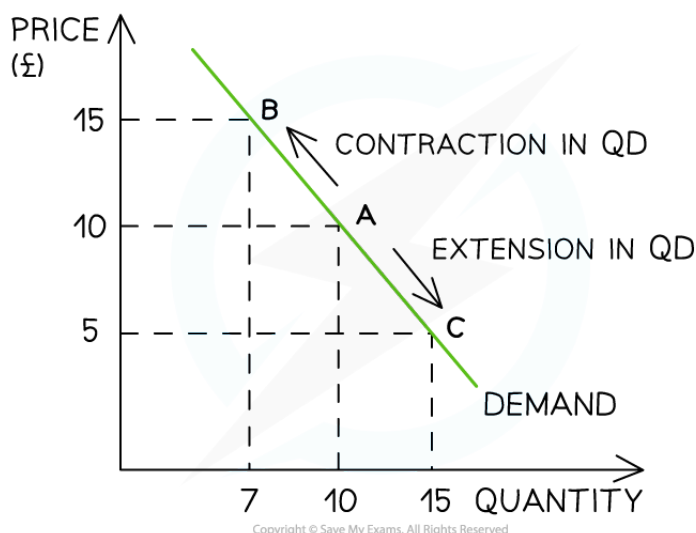
Diagram analysis

- A shop sells both boys and girls swimwear
- In July, at a price of \$10, the demand for boys swimwear is 500 units and girls is 400 units
- At a price of \$10, the shops **market demand** during July is 900 units

Movements Along a Demand Curve

- If **price** is the only factor that changes (**ceteris paribus**), there will be a change in the quantity demanded (**QD**)
 - This change is shown by a **movement along the demand curve**

Diagram: Movement Along a Demand Curve



A demand curve shows a contraction in quantity demanded (QD) as prices increase and an extension in quantity demanded (QD) as prices decrease

Diagram analysis

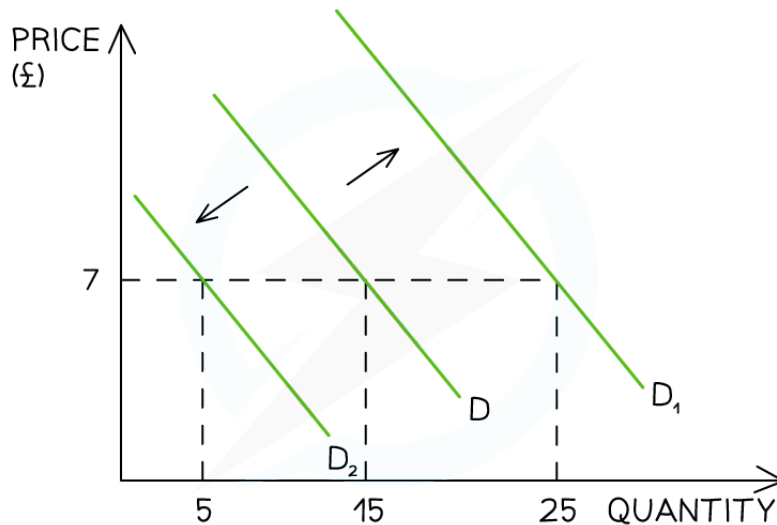
- An **increase** in price from £10 to £15 leads to a movement **up** the demand curve from point A to B
 - Due to the **increase** in price, the QD has **fallen** from 10 to 7 units
 - This movement is called a **contraction** in QD
- A **decrease** in price from £10 to £5 leads to a movement **down** the demand curve from point A to point C
 - Due to the **decrease** in price, the QD has **increased** from 10 to 15 units
 - This movement is called an **extension** in QD

The Conditions of Demand

- There are numerous factors that will **change the demand** for a good/service, **irrespective of the price level**. Collectively, these factors are called the **conditions of demand** and include
 - Changes in real income
 - Changes in tastes/preferences
 - Changes in the price of related goods (substitutes and complements)
 - Changes in the number of consumers

- Future price expectations
- Changes to each of the conditions of demand, **shift the entire demand curve** (as opposed to a movement along the demand curve)

Diagram: Shift of the Demand Curve



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Changes to any of the conditions of demand shift the entire demand curve left or right, irrespective of the price level

- For example, if a firm **increases** their **Instagram advertising**, there will be an **increase in demand** as more consumers become aware of the product
 - This is a **shift in demand** from D to D₁. The price remains unchanged at £7 but the **demand has increased** from 15 to 25 units

How Changes to the Conditions of Demand Shift the Entire Demand Curve at Every Price Level

Condition of Demand	Explanation	Impact	Shift	Impact	Shift
Changes in real income	<ul style="list-style-type: none"> ▪ Real Income determines how many goods and services can be purchased by consumers 	Income Increases	D Increases Shifts Right (D→D ₁)	Income Decreases	D Decreases Shifts Left (D→D ₂)



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	<ul style="list-style-type: none"> There is a direct relationship between income and demand for goods/services Normal goods have a positive relationship with income, as income rises, demand rises, and vice versa Inferior goods have an inverse relationship with income, as income rises, demand falls, and vice versa 				
Changes in taste/preferences	<ul style="list-style-type: none"> If goods/services become more desirable, then demand for them increases There is a direct relationship between changes in taste/preferences and demand Advertising or branding can change tastes/preferences 	Good becomes more preferable	D Increases Shifts Right ($D \rightarrow D_1$)	Good becomes less preferable	D Decreases Shifts Left ($D \rightarrow D_2$)
Changes in the prices of substitute goods (Related goods)	<ul style="list-style-type: none"> Changes in the price of substitute goods will influence the demand for a product/service There is a direct relationship between the price of good A and demand for good B E.g. The price of a Sony 60" TV (good A) 	Price of Good A Increases	D for Good B Increases Shifts Right ($D \rightarrow D_1$)	Price of Good A Decreases	D for Good B Decreases Shifts Left ($D \rightarrow D_2$)



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	increases so the demand for LG 60" TV (good B) increases				
Changes in the prices of complementary goods (Related goods)	<ul style="list-style-type: none"> Changes in the price of complementary goods will influence the demand for a product/service There is an inverse relationship between the price of good A and demand for good B For example, the price of printer ink (good A) increases so the demand for ink printers (good B) decreases 	Price of Good A Increases	D for Good B Decreases Shifts Left ($D \rightarrow D_2$)	Price of Good A Decreases	D for Good B Increase Shifts Right ($D \rightarrow D_1$)
Changes in the number of consumers	<ul style="list-style-type: none"> If the population size of a country changes over time, then the demand for goods/services will also change There is a direct relationship between the changes in population size and demand Demand will also change if there is a change to the age distribution in a country, as different ages demand different goods and services, e.g an ageing population will buy more hearing aids 	Population Increases	D Increases Shifts Right ($D \rightarrow D_1$)	Population Decreases	D Decreases Shifts Left ($D \rightarrow D_2$)



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Future price expectations	<ul style="list-style-type: none"> If consumers expects the price of a good/service to increase in the future, they will purchase it now, and demand will increase If consumers expects the price of a good/service to decrease in the future, they will wait to purchase it later, and demand will decrease 	Expectations price will rise	D Increases Shifts Right ($D \rightarrow D_1$)	Expectations price will fall	D Decreases Shifts Left ($D \rightarrow D_2$)
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Examiner Tips and Tricks

The difference between a **movement along the demand curve** and a **shift in demand** is essential to understand. You will be repeatedly examined on this, and it is important that you use the **correct language** to show that you understand the difference between a **change in quantity demanded** and a **change in demand**.

When **price changes** (ceteris paribus), there is a movement along the demand curve resulting in a change to **quantity demanded**. When a **condition of demand changes**, there is a shift of the entire demand curve resulting in a **change to demand**.



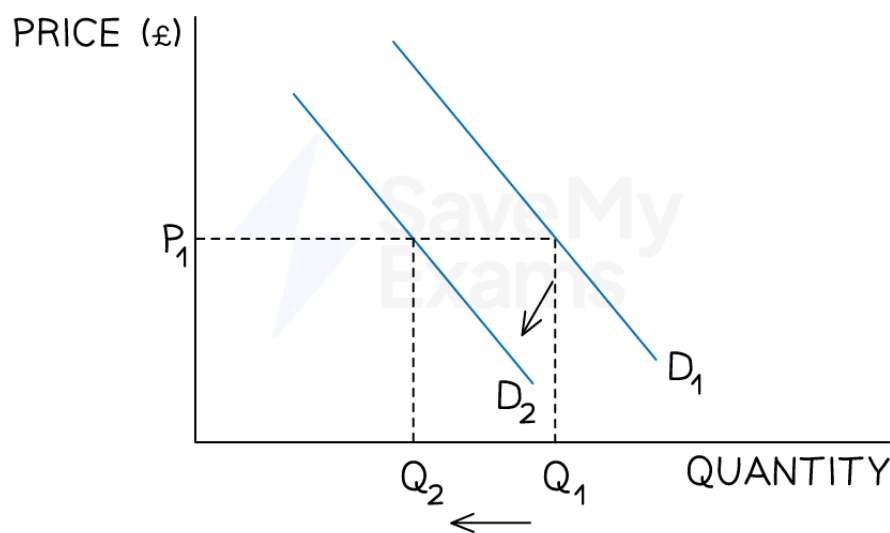
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Demand Curves: Real World Analysis

Real-World Example One: A Decrease in Demand

- During the COVID-19 pandemic, the demand for restaurant dining fell sharply due to changes in various **conditions of demand**
 - Reduced disposable **income** as unemployment increased
 - Changing preferences for safer dining options
 - Government restrictions on indoor dining

Diagram: Decrease in Demand for Restaurant Dining



Changes in these conditions of demand all shifted the entire demand curve left

(This image is placeholder – image under construction)

Diagram analysis

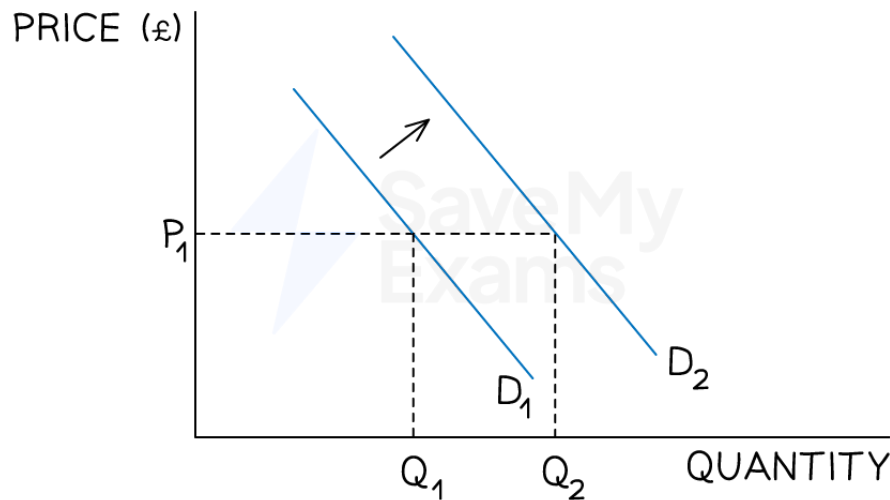
- During the pandemic, there was a downturn in the economy, causing unemployment levels to rise
 - As a result, there was a reduction in the **real income** of consumers
- Restaurant dining is considered a **normal good**, demand falls when consumer incomes fall
- The demand curve **shifts to left** from $D \rightarrow D_1$ as fewer consumers opt to eat out

- The price level remains the same (P_1), demand falls from $Q_1 \rightarrow Q_2$

Real-World Example Two: An Increase in Demand

- In 2023, global demand for **Taylor Swift concerts** surged as a result of her music becoming more popular
 - This is considered to be a change in **tastes and preferences**

Diagram: Increase in Demand for Concert Tickets



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Changes in the popularity of her concerts shifted the entire demand curve right, irrespective of the price level

(This image is a placeholder – image under construction)

Diagram analysis

- Positive reviews of Swift's concert and the popularity of her songs, along with changes in consumer **tastes and preferences**, have caused an **increase in demand** for concert tickets at each price level
- The demand curve **shifts right** $D \rightarrow D_1$ as more consumers buy concert tickets and the quantity demanded rises $Q_1 \rightarrow Q_2$



Your notes



Your notes

Supply Curves

An Introduction to Supply

- **Supply** is the amount of a good/service that a producer is willing and able to supply at a given price in a given time period
- A **supply curve** is a graphical representation of the **price** and **quantity supplied** by producers
 - If the data were plotted, it would be an actual curve. Economists, however, use straight lines so as to make analysis easier
- The supply curve is **sloping upward** as there is a **positive relationship** between the price and quantity supplied (QS)
 - Rational **profit maximising producers** would want to supply more as prices increase in order to **maximise** their profits
- **The law of supply** states that there is a positive (direct) relationship between quantity supplied and price, **ceteris paribus**
 - When the price rises, the QS rises
 - When the price falls, the QS falls

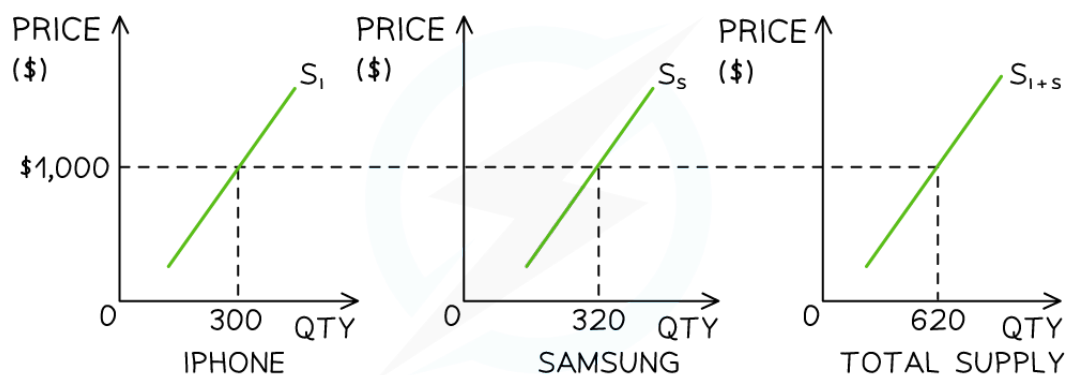
Individual and Market Supply

- **Market supply** is the combination of all the **individual supply** for a good/service
 - It is calculated by adding up the individual supply at each price level

The Monthly Market Supply of Bread from 4 Bakeries in a Small town

Bakery 1	Bakery 2	Bakery 3	Bakery 4	Market Supply
300	600	180	320	1400 loaves

Diagram: Individual & Market Supply Curves



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Market supply for smart phones in December is predominantly a combination of iPhone and Samsung supply

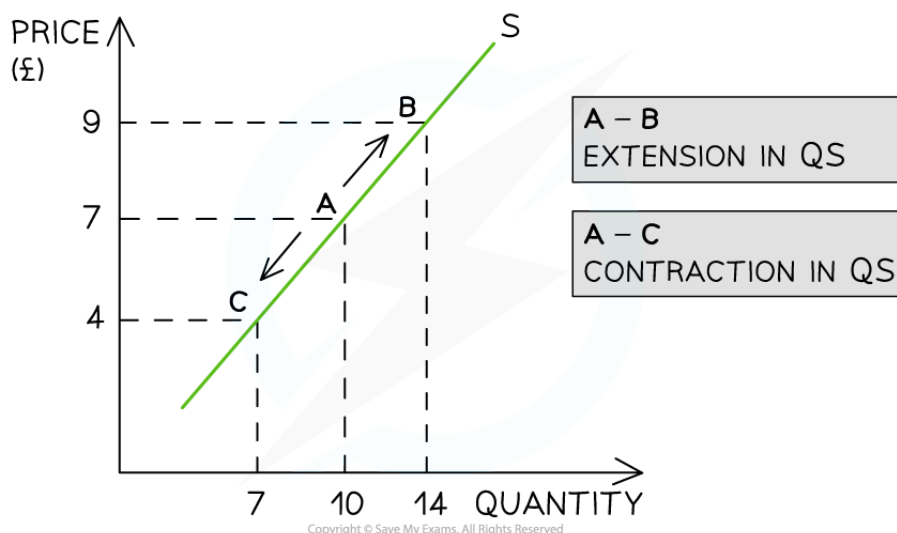
Diagram analysis

- In New York City, the market supply for smart phones in December is predominantly a combination of iPhone and Samsung supply
- **At a price of \$1000**, the supply of iPhones is 300 units and the supply of Samsung phones is 320 units
- At a price of \$1,000, the **market supply** of smart phones in New York City during December is 620 units

Movements Along a Supply Curve

- If **price** is the only factor that changes (**ceteris paribus**), there will be a change in the **quantity supplied (QS)**
 - This change is shown by a **movement along the supply curve**

Diagram: Movement Along a Supply Curve



There is an extension in quantity supplied (QS) as prices increase and a contraction in quantity supplied (QS) as prices decrease

Diagram analysis

- An **increase** in price from £7 to £9 leads to a **movement up** the supply curve from point A to B
 - Due to the **increase** in price, the quantity supplied has **increased** from 10 to 14 units
 - This movement is called an **extension in QS**
- A **decrease** in price from £7 to £4 leads to a **movement down** the supply curve from point A to C
 - Due to the **decrease** in price, the quantity supplied has **decreased** from 10 to 7 units
 - This movement is called a **contraction in QS**

The Conditions of Supply

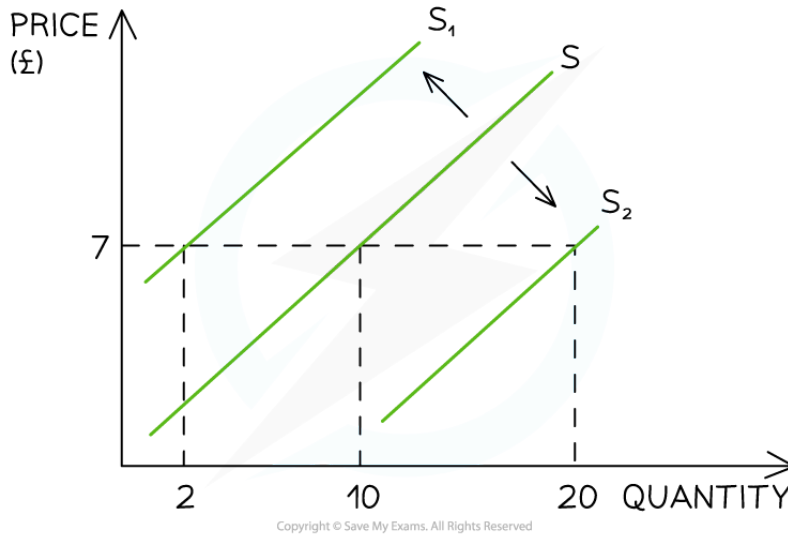
- There are several factors that will **change the supply** of a good/service, **irrespective of the price level**. Collectively, these factors are called the **conditions of supply and include**:
 - Changes to the costs of production
 - Changes to indirect taxes and subsidies
 - Changes to technology
 - Changes to the number of firms
 - Weather events

- Future price expectations
- Goods in joint and competitive supply
- Changes to any of the conditions of supply **shift the entire supply curve** (as opposed to a movement along the supply curve)



Your notes

Diagram: Shift of the Supply Curve



A graph that shows how changes to any of the conditions of supply shift the entire supply curve left or right, irrespective of the price level

- E.g. If a firm's cost of production increases due to the increase in price of a key resource, then there will be a **decrease in supply** as the firm can now only afford to produce fewer products
- This is a **shift in supply** from S to S₁. The price remains unchanged at £7 but the **supply has decreased** from 10 to 2 units

An Explanation of how each of the Conditions of Supply Shifts the Entire Supply Curve at Every Price Level

Condition of Supply	Explanation	Factor	Shift	Factor	Shift



Your notes

Changes to costs of production (COP)	<ul style="list-style-type: none"> If the price of raw materials or other costs of production change, firms respond by changing supply 	COP Increases	S decreases, shifting left (S→S1)	COP Decreases	S increases, shifting right (S→S2)
Indirect taxes	<ul style="list-style-type: none"> Any changes to indirect taxes change the costs of production for a firm and impact supply 	Taxes Increase	S decreases, shifting left (S→S1)	Taxes Decrease	S increases, shifting right (S→S2)
Subsidies	<ul style="list-style-type: none"> Changes to producer subsidies directly impact the costs of production for the firm 	Subsidy Increases	S increases, shifting right (S→S2)	Subsidy Decreases	S decreases, shifting left (S→S1)
New technology	<ul style="list-style-type: none"> New technology increases productivity and lowers production costs Ageing technology can have the opposite effect 	Technology Increases	S increases, shifting right (S→S2)	Technology Decreases	S decreases, shifting left (S→S1)
Change in the number of firms in the industry	<ul style="list-style-type: none"> The entry and exit of firms into the market have a direct impact on the supply 	No. of Firms Increases	S increases, shifting right (S→S2)	No. of Firms Decreases	S decreases, shifting left (S→S1)



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	<ul style="list-style-type: none"> E.g. If ten new firms start selling building materials in Hanoi, the supply of building material will increase 				
Weather events	<ul style="list-style-type: none"> Droughts or flooding can cause a supply shock in agricultural markets A drought will cause supply to decrease. Unexpectedly good growing conditions can cause supply to increase 	Drought	S decreases, shifting left (S→S1)	Good Weather	S increases, shifting right (S→S2)
Future price expectations	<ul style="list-style-type: none"> If firms expects the price of a good/service to increase in the future, they will start supplying more If firms expects the price of a good/service to decrease in the future, they will start supplying less 	Expectations price will rise	S Increases Shifts Right (S→S2)	Expectations price will fall	S Decreases Shifts Left (S→S1)
Goods in joint supply	<ul style="list-style-type: none"> When there is an increase of supply of one good in joint supply (e.g. beef), possibly due to higher prices, there will be an increase in supply of the other good too (e.g. leather) 	Supply of one good rises	S good A Increases Shifts Right (S→S2)	Supply of the other good rises	S good B Increases Shifts Right (S→S2)



Your notes

Goods in competitive supply	<ul style="list-style-type: none"> Farmers can produce many goods which are competitive in supply E.g. A farmer can grow wheat or potatoes. When they increase the supply of potatoes, the supply of wheat decreases 	Supply of one good rises	S good A Increases Shifts Right ($S \rightarrow S_2$)	Supply of the other good falls	S Decreases Shifts Left ($S \rightarrow S_1$)
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Examiner Tips and Tricks

Several of the **conditions of supply** change the costs of production. However, be sure to explain each condition as its own point before linking it to the **cost of production**, e.g. a change in indirect taxation.

A common error by students is to explain that a **subsidy** (for example, a £3,000 subsidy for each electric vehicle produced) shifts the demand curve for electric vehicles to the right. This is incorrect. The subsidy will shift the **supply curve** to the right. Then due to the lower price, there will be a **movement along the demand curve** (extension of quantity demanded) to create a new market equilibrium.



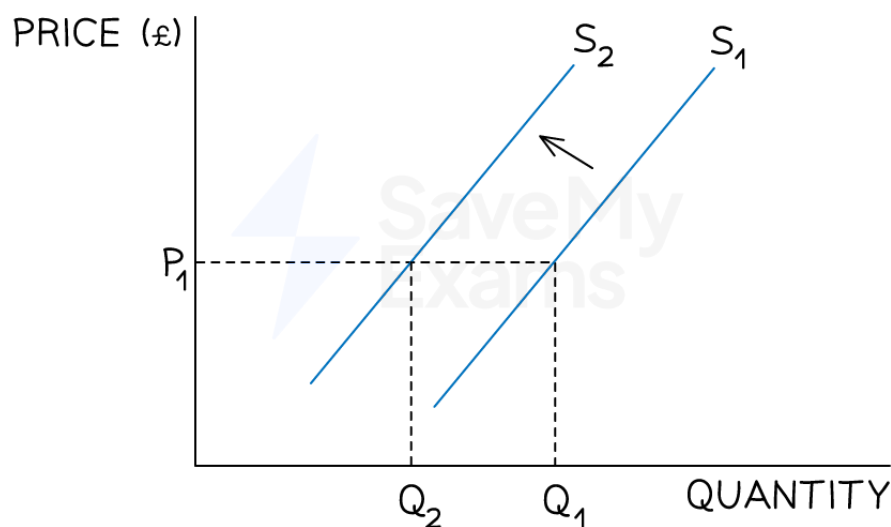
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Supply Curves: Real World Analysis

Real-World Example One: A Decrease in Supply

- In 2023, the supply of UK-grown **tomatoes** declined as a consequence of **rising energy costs**
 - Energy prices** increased due to supply chain issues, causing the cost of operating greenhouses to rise

Diagram: Supply of UK Tomatoes



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A fall in supply of tomatoes shifts supply curve to the left

Diagram analysis

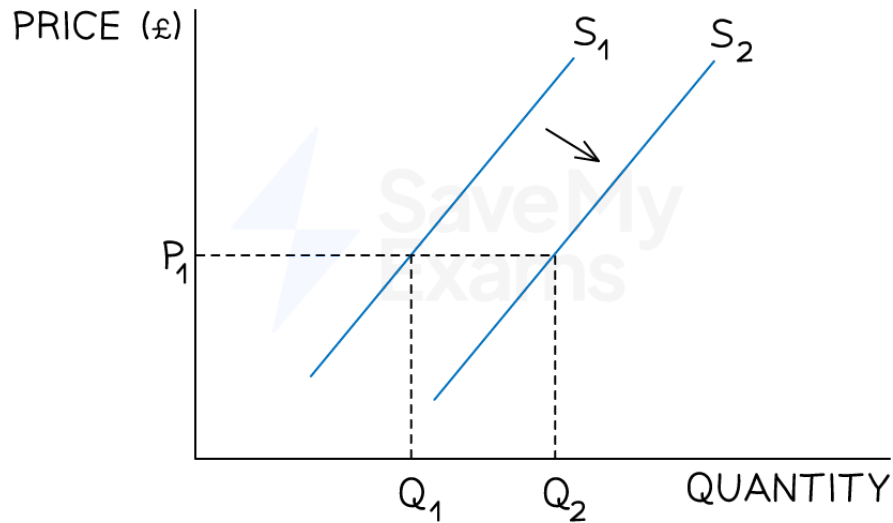
- An increase in the costs of production from imported energy results in a shift left of the entire supply curve from $S_1 \rightarrow S_2$
 - The price remains the same at P_1
 - The quantity supplied falls from $Q_1 \rightarrow Q_2$

Real-World Example Two: An Increase in Supply

- Advances in technology** have led to an **increase** in the supply of lettuce

- Greater mechanisation and innovations in genetically modified food increase productivity and output

Diagram: Supply of Food



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A rise in the supply of lettuce shifts supply curve to the right

Diagram analysis

- Improvements in farming technology cause a shift to the **right** of the entire supply curve from $S_1 \rightarrow S_2$
 - Price remains the same at P_1
 - The quantity supplied rises from Q_1 to Q_2



Your notes



Your notes

The Determination of Market Equilibrium

Price Determination in Markets

- 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-upon 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

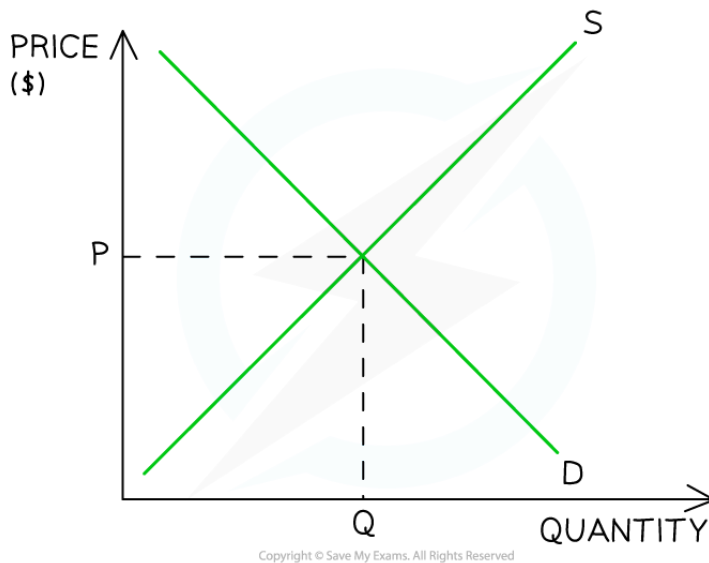
Market Equilibrium

- Equilibrium occurs in a market 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**

Diagram: Market Equilibrium



Your notes



Equilibrium is at PQ. The market clearing price of P & quantity at Q

Diagram analysis

- 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 occurs when demand is not equal to supply
 - If demand > supply, the market is facing excess demand
 - If demand < supply, the market is facing excess supply

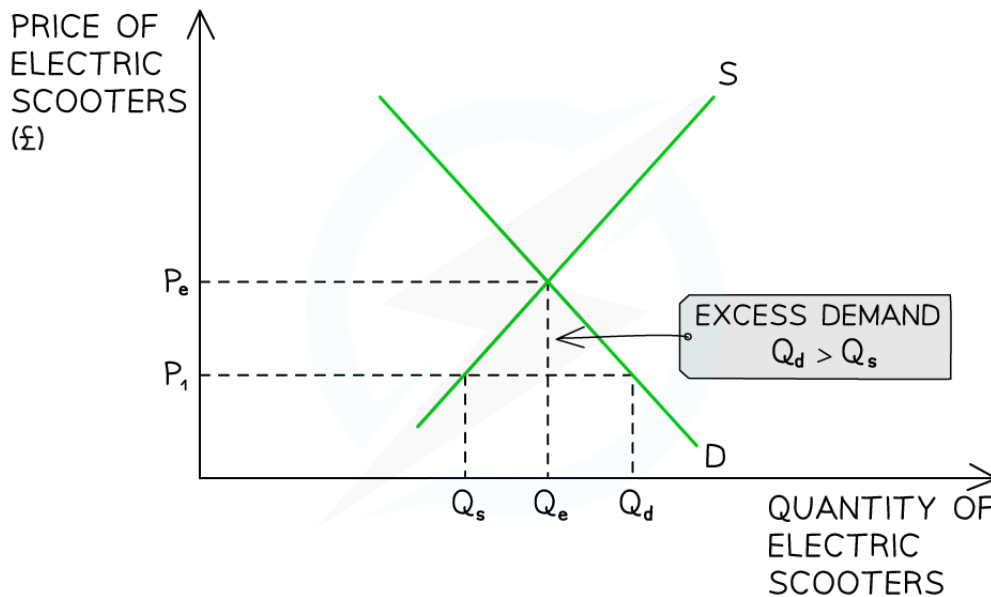
Disequilibrium: excess demand

- 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

Diagram: Excess Demand for Electric Scooters



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The quantity demanded is greater than quantity supplied

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 $Q_s Q_d$

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
- In time, the market will have **cleared the excess demand** and arrive at a position of **equilibrium**, $P_e Q_e$



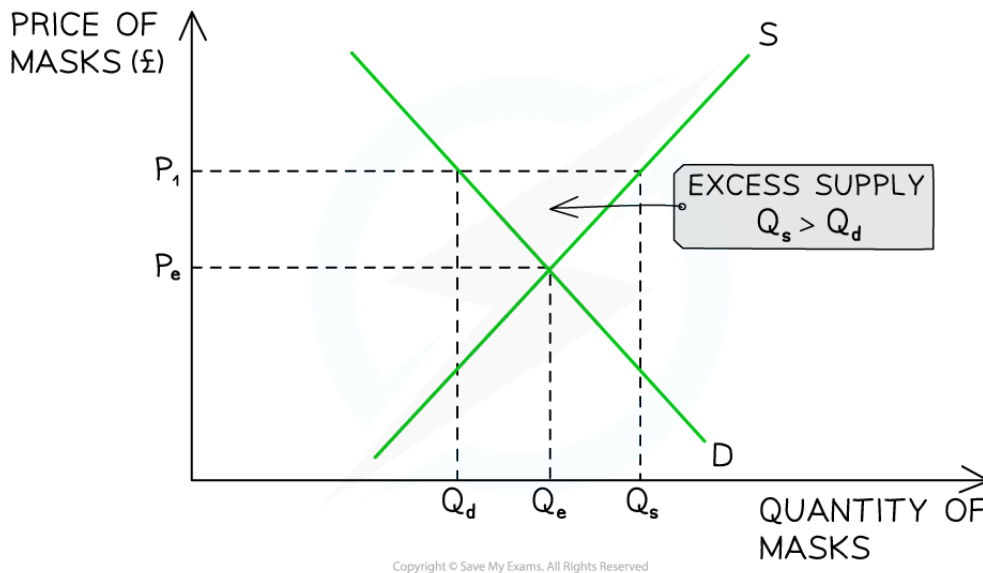
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- Different markets take different lengths of **time to resolve disequilibrium**
- E.g. Retail clothing can do so in a few days. Whereas the housing market may take several months or even years

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**

Diagram: Excess Supply Covid-19 Face Masks



The quantity supplied is greater than quantity demanded 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 $Q_s - Q_d$

Market response

- This market is in **disequilibrium**
 - Sellers are frustrated that the masks are **not selling** and that the **price** is obviously **too high**



Your notes

- 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, $P_e Q_e$**



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.

Equilibrium in Demand & Supply Schedules

- A **demand and supply schedule** shows the quantity demanded and the quantity supplied of a product at **different price levels**
- Demand and supply schedules can be used to identify **equilibrium and disequilibrium**

Demand and Supply Schedule Per Week For YEEZY Boost 700 Wave Runner Trainers

Price (\$)	Quantity Demanded (QD)	Quantity Supplied (QS)	Excess Demand/Supply
300	1200	500	Excess demand = 700
400	1000	650	Excess demand = 350
500	800	800	Equilibrium
600	600	950	Excess supply = 350
700	400	1100	Excess supply = 700

- At a price of \$500, the market is in **equilibrium**
 - The $QD = QS$ (800 units)
- At a price of \$300 & \$400, there is **excess demand** as the product is more affordable for consumers

- Producers supply less at lower prices as they make **less profit per unit**
- Producers are **incentivised** to supply more when prices are higher
- At a price of \$600 & \$700, there is **excess supply** as the high price has eliminated some buyers from the market
- Producers would love to sell at this high price but in order to clear their stock, they have to lower the price & move towards **equilibrium**



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Analysing Changes to Market Equilibrium

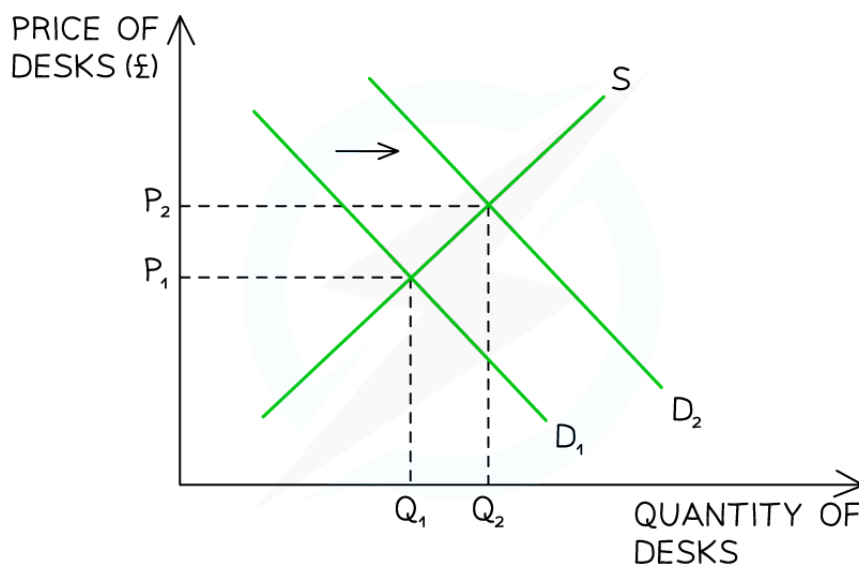
Causes & Consequences of Price Changes

- **Real world markets** are constantly changing and are referred to as **dynamic markets**
- **Market equilibrium** can change every few minutes in some markets (e.g. stocks and shares), or every few weeks or months in others (e.g. clothing)
- Any change to a **condition of demand or supply** will temporarily create **disequilibrium**, and market forces will then seek to clear the **excess demand or supply**

Real World Example One: Changes to Demand that Increase Price

- During lock downs associated with the Covid-19 pandemic, furniture retailers experienced **unexpectedly high demand** for their products (especially desks and sofas)

Diagram: Increase in Demand



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Demand increases for desks due to a temporary change in tastes/fashions

Diagram analysis



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- Due to the Covid mandated change of **working from home**, consumers experienced a temporary **change in taste** as they sought to **set up** comfortable **home offices**
 - This led to an **increase in demand** for desks from $D_1 \rightarrow D_2$
- At the **original** market clearing price of P_1 , a condition of **excess demand** now exists
 - The demand for desks is **greater** than the supply
- In response, suppliers **raise prices**
 - This causes a **contraction of demand** and an **expansion of supply**, leading to a **new market equilibrium** at P_2Q_2
 - Both the **equilibrium price** (P_2) and the **equilibrium quantity** (Q_2) are higher than before
 - The **excess demand** in the market has been cleared



Examiner Tips and Tricks

Be systematic in thinking through the order of changes in market conditions. E.g. An increase in demand (shift in demand) will cause a rise in price. The higher price will cause an expansion of supply (not a shift of supply)

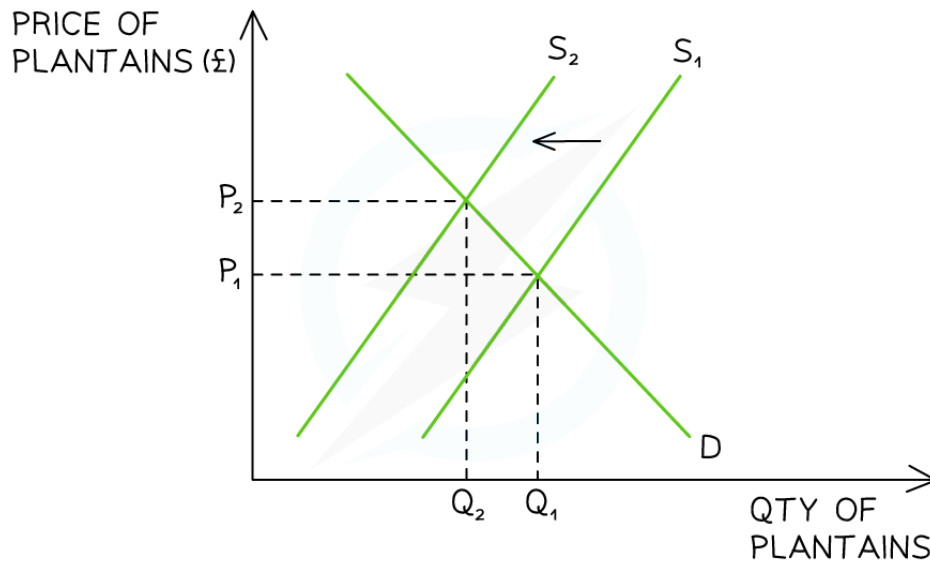
Real World Example Two: Changes to Supply that Increase Price

- In September 2022, **Hurricane Fiona** destroyed much of Puerto Rico's crop of plantains (a necessity in the diet of local people)

Diagram: Decrease in Supply



Your notes



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The supply of plantains in Puerto Rico falls due to a supply shock caused by Hurricane Fiona

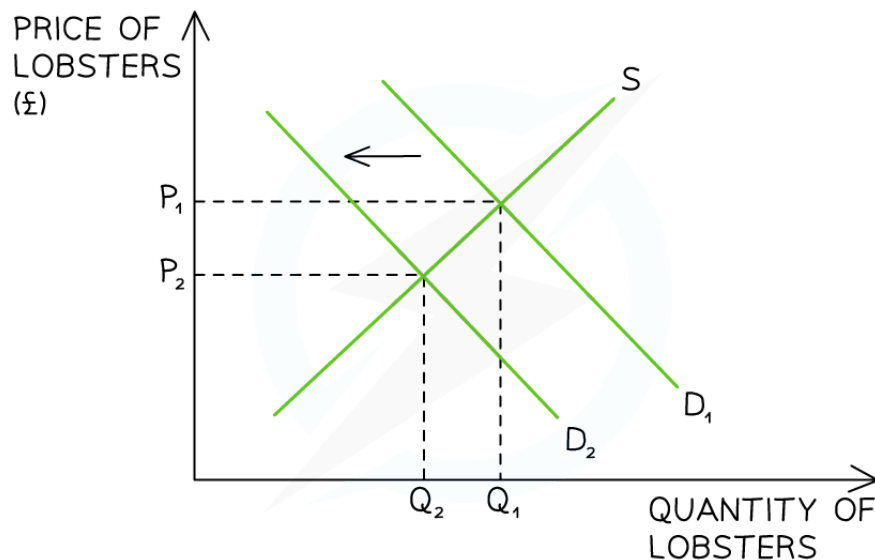
Diagram analysis

- Due to Hurricane Fiona, Puerto Rico is experiencing a **supply shock** in its plantain market
 - This causes a **decrease in supply** of $S_1 \rightarrow S_2$
- At the **original** market clearing price of P_1 , a condition of **excess demand** now exists (shortage)
 - The demand for plantain is **greater** than the supply
- In response, sellers in Puerto Rico **raised prices**
 - This causes a **contraction of demand** and an **expansion of supply** leading to a **new market equilibrium** at P_2Q_2
 - The **equilibrium price** (P_2) is higher, and the **equilibrium quantity** (Q_2) is lower than before
 - The **excess demand** in the market has been cleared

Real World Example Three: Changes to Demand that Decrease Price

- Demand for lobsters in Maine, USA, has been **falling** steadily in recent months
- This has resulted in a **price fall** from \$12.35 per pound on the 1st April to \$9.35 per pound on the 1st May

Diagram: Decrease in Demand



Demand for lobsters falls due to a decrease in real income

Diagram analysis

- In recent months, the USA has been experiencing an **increasing rate of inflation**
 - Inflation lowers the **purchasing power** of money in a consumer's pocket and so effectively reduces their **real income**
 - With reduced real income, **fewer luxuries** are consumed
 - This led to a **decrease in demand** for lobsters from $D_1 \rightarrow D_2$
- At the **original** market clearing price of P_1 , a condition of **excess supply** now exists
 - The **demand** for lobsters is **less** than the **supply**
- In response, suppliers gradually **reduce prices**
 - This causes a **contraction of supply** and an **expansion of demand**, leading to a **new market equilibrium** at P_2Q_2
 - Both the **equilibrium price** (P_2) and the **equilibrium quantity** (Q_2) are lower than before
 - The **excess supply** in the market has been cleared



Your notes

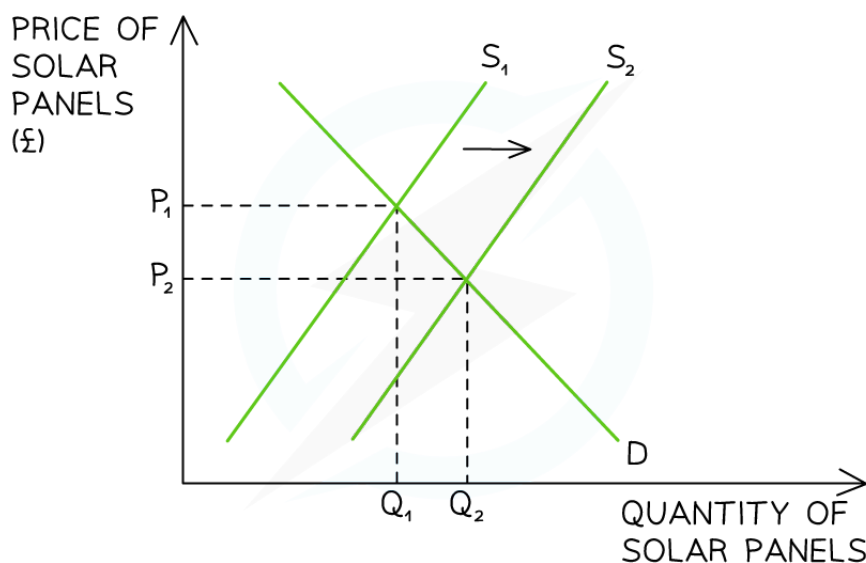


Your notes

Real World Example Four: Changes to Supply that Decrease Price

- In order to help meet their **climate targets** and to lower energy costs for households, the EU is providing **subsidies** for solar panels

Diagram: Increase in Supply



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The supply of solar panels increases in the EU due to a per unit subsidy

Diagram analysis

- To help meet its climate change targets and lower household energy bills, the EU has provided a **subsidy to solar panel retailers**
 - This causes an **increase in supply** of $S_1 \rightarrow S_2$
- At the **original** market clearing price of P_1 , a condition of **excess supply** now exists (surplus)
 - The supply of solar panels is **greater** than the demand
- In response, sellers in the EU **lower prices**
 - This causes an **expansion of demand** and a **contraction of supply**, leading to a **new market equilibrium** at P_2Q_2
 - The **equilibrium price** (P_2) is lower, and the **equilibrium quantity** (Q_2) is higher than before

- The **excess supply** in the market has been cleared



Examiner Tips and Tricks

MCQ may require you to identify the consequences of **dynamic changes** in markets, e.g. the new equilibrium point after a change in the market. **Memorise the conditions of demand and supply**; by doing so, you will save valuable thinking time in the exam.

In essay questions, explaining the steps in the dynamic change is often referred to as *analysis*, and students frequently leave out some steps in the explanation

Here is a systematic process to help build your explanation:

Step 1: From the scenario, identify if the change in condition is on the **demand side** or **supply side**

Step 2: State which way the demand or supply curve moves and use notation, e.g. $S_1 \rightarrow S_2$

Step 3: State the disequilibrium that now exists at the **original market price** (excess demand or excess supply)

Step 4: State if sellers raise or lower prices to clear the **disequilibrium**

Step 5: Explain the relevant **contraction** and **expansion** that occur on the demand and supply curves due to the change in price

Step 6: State the new market equilibrium points, e.g. P_2Q_2

Step 7: Explain the **market outcome** (is the new price/quantity higher/lower than the original?)



Your notes



Your notes

Price Elasticity of Demand (PED)

The Definition & Calculation of PED

- The **law of demand** states that when there is an increase in price, there will be a fall in the quantity demanded
 - Economists are interested **by how much** the **quantity demanded will fall**
- **Price elasticity of demand** reveals how **responsive** the change in **quantity demanded** is to a change in **price**
 - The responsiveness is different for different types of products

Calculation of PED

- **PED can be calculated** using the following formula

$$\text{PED} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{\% \Delta \text{ in QD}}{\% \Delta \text{ in P}}$$

- **To calculate a % change**, use the following formula

$$\% \text{ Change} = \frac{\text{new value} - \text{old value}}{\text{old value}} \times 100$$



Worked Example

A firm **raises** the price of its products from \$10 to \$15. Its **sales fall** from 100 to 40 units per day. Calculate the **PED** of its products

Step 1: Calculate the % change in QD

$$\% \Delta \text{ QD} = \frac{40 - 100}{100} \times 100$$

$$\% \Delta \text{ QD} = -60\%$$

Step 2: Calculate the % change in P



Your notes

$$\% \Delta P = \frac{15 - 10}{10} \times 100$$

$$\% \Delta P = 50\%$$

Step 3: Insert the above values in the PED formula

$$PED = \frac{\% \Delta \text{ in QD}}{\% \Delta \text{ in P}}$$

$$PED = \frac{-60}{50}$$

$$PED = -1.2$$

Step 4: Final answer = 1.2

The PED value will **always be negative** so economists **ignore the sign** and present the answer as 1.2



Examiner Tips and Tricks

In Paper 3 you are occasionally given the PED value and the %Δ in Price – you are then asked to find the %Δ in Qd. Follow the standard math procedure as follows:

1. Substitute the values provided into the equation
2. Substitute X for %Δ in Qd
3. Solve for X



Worked Example

The price elasticity of demand for smart phones is -2. It can be concluded that a 10% reduction in their price would be a percentage change in demand of:

- A. -7.4%
- B. -20.0%



Your notes

- C. +7.4%
- D. +20.0%

Step 1: Substitute the values provided into the equation

$$PED = \frac{\% \Delta \text{ in QD}}{\% \Delta \text{ in P}}$$

Step 2: Substitute X for %Δ in Qd

$$+2 = \frac{X}{-10\%}$$

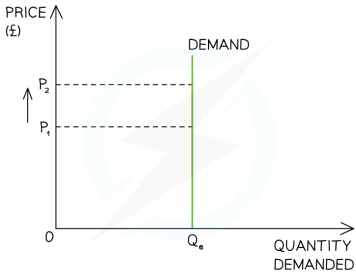
Step 3. Solve for X

$$X = 20\%$$

Quantity demanded increases by 20%

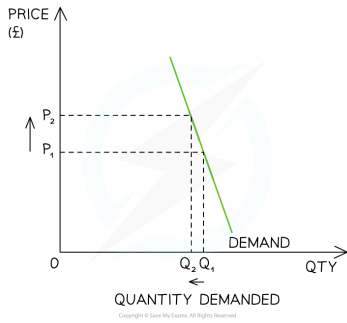
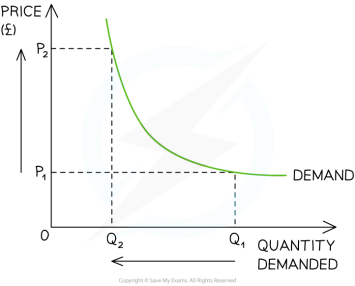
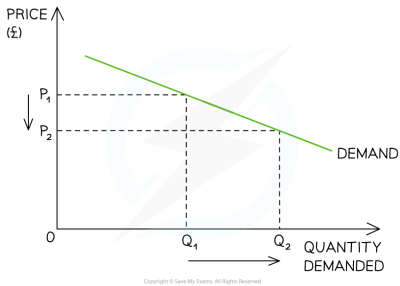
Interpreting PED Values

PED Classifications

Value	Name and Diagram	Explanation
0	<ul style="list-style-type: none"> Perfectly Inelastic 	<ul style="list-style-type: none"> The QD is completely unresponsive to a change in P (very theoretical value e.g. heart transplant is extremely inelastic but possibly not perfectly)
0 → 1	<ul style="list-style-type: none"> Relatively Inelastic 	

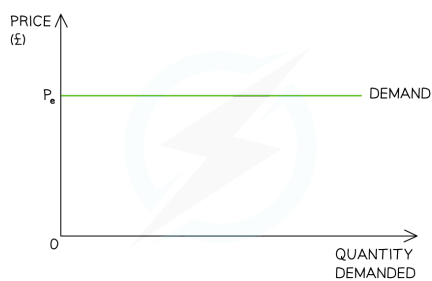


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	 <p>Copyright © Save My Exams. All Rights Reserved</p>	<ul style="list-style-type: none"> The $\% \Delta$ in QD is less than proportional to the $\% \Delta$ in P (e.g. addictive products)
1	<p>▪ Unitary Elasticity</p>  <p>Copyright © Save My Exams. All Rights Reserved</p>	<ul style="list-style-type: none"> The $\% \Delta$ in QD is exactly equal to the $\% \Delta$ in P
$1 \rightarrow \infty$	<p>▪ Relatively Elastic</p>  <p>Copyright © Save My Exams. All Rights Reserved</p>	<ul style="list-style-type: none"> The $\% \Delta$ in QD is more than proportional to the $\% \Delta$ in P (e.g. luxury products)
∞	<p>▪ Perfectly Elastic</p>	<ul style="list-style-type: none"> The $\% \Delta$ in QD will fall to zero with any $\% \Delta$ in P (highly theoretical elasticity)



Your notes



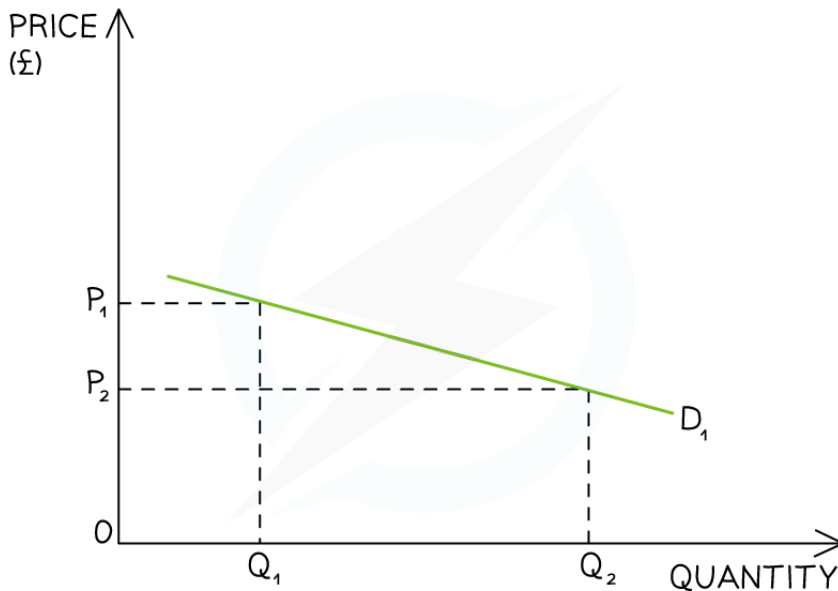
PED & Total Revenue

- **Knowledge of PED** is important **to firms** seeking to **maximise their revenue**
- Sales revenue will be maximised
 - If their product is **price inelastic in demand**, they should **raise their prices**
 - If their product is **price elastic** in demand, then they should **lower their prices**
- This rule is used when firms choose to use [popover id="F_vUGukEe4aWRck1" label="**price discrimination**"] to maximise their revenue
 - They lower their prices for elastic sections of their market e.g. off peak train travel
 - They increase prices for inelastic sections of their market e.g. peak hour train travel
- The benefits of this rule can be illustrated using a demand curve
 - A shallow curve represents a price-elastic product
 - A steep curve represents a price inelastic product

Diagram: Elastic Demand Curve



Your notes

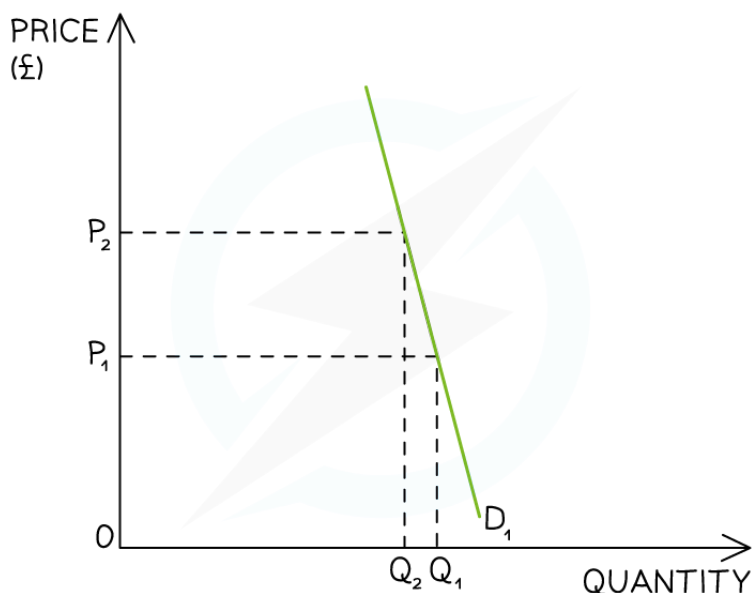


A small decrease in price from $P_1 \rightarrow P_2$ causes a large increase in quantity demanded from $Q_1 \rightarrow Q_2$

Diagram analysis

- When a good/service is **price elastic in demand**, there is a greater than proportional increase in the quantity demanded to a decrease in price
 - A small decrease in price leads to a larger increase in QD
- **TR is higher** once the price has been **decreased**
 - $(P_2 \times Q_2) > (P_1 \times Q_1)$

Diagram: Inelastic Demand Curve



A large increase in price from $P_1 \rightarrow P_2$ causes a small decrease in quantity demanded from $Q_1 \rightarrow Q_2$

Diagram analysis

- When a good/service is **price inelastic in demand**, there is a smaller than proportional decrease in the quantity demanded to an increase in price
 - A large increase in price leads to a smaller decrease in QD
- **TR is higher** once the price has been **increased**
 - $(P_2 \times Q_2) > (P_1 \times Q_1)$

The Factors that Influence PED

- Some products are more responsive to **changes in prices** than other products
- The factors that determine the responsiveness are called the **determinants of PED** and include:
 - **Availability of substitutes:** good availability of substitutes results in a **higher value of PED** (relatively elastic)
 - **Addictiveness of the product:** addictiveness turns products into necessities, resulting in a **low value of PED** (relatively inelastic)
 - **Price of product as a proportion of income:** the lower the proportion of income the price represents, the **lower the PED value will be**. Consumers are less responsive to price changes on

cheap products (relatively inelastic)

- **Time period:** In the short term, consumers are less responsive to price increases, resulting in a **low value of PED** (relatively inelastic). Over a longer period of time, consumers may feel the price increase more and will then look for substitutes, resulting in a **higher value of PED** (relatively elastic)



Your notes



Your notes

Income & Cross Elasticities of Demand

Defining & Calculating Income Elasticity of Demand (YED)

- **Changes in income** result in changes to the **demand** for goods/services
 - Economists are interested in **how much** the **quantity demanded will change** for different products
- **Income elasticity of demand (YED)** reveals how **responsive** the change in **quantity demanded** is to a change in **income**
- **YED can be calculated** using the following formula

$$\text{YED} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}} = \frac{\% \Delta \text{ in QD}}{\% \Delta \text{ in Y}}$$



Worked Example

A consumer's **income rises** from £100 to £125 a week. They originally consumed 12 bagels at the local bakery, but this **increased** to 15 bagels a week.

Calculate the **YED** of the bagels

Step 1: Calculate the % change in QD

$$\% \Delta \text{ QD} = \frac{15 - 12}{12} \times 100$$

$$\% \Delta \text{ QD} = 25\%$$

Step 2: Calculate the % change in Y

$$\% \Delta \text{ Y} = \frac{125 - 100}{100} \times 100$$

$$\% \Delta \text{ Y} = 25\%$$



Your notes

Step 3: Insert the above values in the YED formula

$$PED = \frac{\% \Delta \text{ in QD}}{\% \Delta \text{ in Y}}$$

$$YED = \frac{25}{25}$$

$$YED = 1$$

Interpreting YED Values

- The YED value can be positive or negative and **the value is important in determining the type of good**
 - A good with a **positive YED** value is considered to be a **normal good**
 - Normal goods can be classified as **necessities or luxuries**
 - A good with a **negative YED** value is considered to be an **inferior good**

The Value Of YED Determines the Type of Good & Response to Changes in Income

Value	Type of Good	Explanation
0→1	Normal necessity	<ul style="list-style-type: none"> ▪ Demand increases when income increases ▪ Income inelastic, which means that it is relatively unresponsive to a change in income
YED > 1	Normal luxury	<ul style="list-style-type: none"> ▪ Demand increases when income increases ▪ Income elastic, which means that it is relatively responsive to a change in income
YED < 0	Inferior Good	<ul style="list-style-type: none"> ▪ Demand decreases when income increases



Your notes

Defining & Calculating Cross Elasticity of Demand (XED)

- Changes in the prices of **complementary goods** and **substitutes** affect the demand for related products
- Cross price elasticity of demand (XED)** reveals how **responsive** the change in **quantity demanded for good A** is to a change in **price of good B**
 - The responsiveness is different for different types of products
- XED can be calculated** using the following formula:

$$\text{XED} = \frac{\% \text{ change in quantity demanded of good A}}{\% \text{ change in price of good B}} = \frac{\% \Delta \text{ in } QD_A}{\% \Delta \text{ in } P_B}$$



Worked Example

Leading into the release of *FIFA 22 Ultimate*, EA Sports **discounted** the price of *FIFA 21* from £90 to £60. A game store in Winchester saw an **increase in sales** of their PlayStation 5 consoles. Prior to the discount, they were selling 50 units a week, and **after the discount** this increased to 80 units.

Calculate the XED and explain the relationship between the two products

Step 1: Calculate the % change in QD_A

$$\% \Delta QD_A = \frac{80 - 50}{50} \times 100$$

$$\% \Delta QD_A = 60\%$$

Step 2: Calculate the % change in P_B

$$\% \Delta P_B = \frac{60 - 90}{90} \times 100$$

$$\% \Delta P_B = -33.3\%$$

Step 3: Insert the above values in the XED formula



Your notes

$$XED = \frac{\% \Delta \text{ in } QD_A}{\% \Delta \text{ in } P_B}$$

$$XED = \frac{60\%}{-33.3\%}$$

$$XED = -1.8$$

Step 4: Explain the relationship between the two products

The **negative sign** indicates that these two products are **complements** and the high value suggests they are **strong complements**

**Worked Example**

The price of good Y, a substitute for X, rises from £50 to £60. As a result, the quantity demanded of good X rises from 2 units to 4 units per month.

What is the value of the cross elasticity of demand for good X with respect to Y?

A: +0.4

B: -0.4

C: +2.5

D: -2.5

Step 1: Calculate % change in QD_A using formula

$$\% \Delta QD_A = \frac{4 - 2}{2} \times 100$$

$$\% \Delta QD_A = 50\%$$

Step 2: Calculate % change in P_B using formula



Your notes

$$\% \Delta P_B = \frac{60 - 50}{50} \times 100$$

$$\% \Delta P_B = 20\%$$

Step 3: Insert the above values in the XED formula

$$XED = \frac{\% \Delta \text{ in } QD_A}{\% \Delta \text{ in } P_B}$$

$$XED = \frac{+50\%}{+20\%}$$

$$XED = +2.5$$

The positive **sign** indicates that these two products are **substitutes** and the high value suggests they are **strong substitutes**

Interpreting XED Values

- The XED value can be negative or positive, and the value is important in determining the type of good. The size of the number determines how closely related goods are
 - A good with a negative XED value is considered to be a **complementary good**
 - A good with a positive XED value is considered to be a **substitute good**

Using XED Values to Identify if Goods are Complements, Substitutes, or Unrelated

Value	Name	Explanation
XED < 0	Complementary goods	<ul style="list-style-type: none"> The negative value indicates the two goods are complements The higher the value the stronger the relationship
XED > 0	Substitutes	<ul style="list-style-type: none"> The positive value indicates the two goods are substitutes The higher the value, the stronger the relationship

XED = 0	Unrelated goods	<ul style="list-style-type: none">▪ A value of zero indicates that there is no relationship between the two goods.▪ The closer to zero, the weaker the relationship is
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Your notes



Your notes

Price Elasticity of Supply (PES)

The Definition & Calculation of PES

- The **law of supply** states that when there is an increase in price (**ceteris paribus**), producers will increase the quantity supplied and vice versa
 - Economists are interested **by how much** the **quantity supplied will increase**
- **Price elasticity of supply (PES)** reveals how **responsive** the change in **quantity supplied** is to a change in **price**
 - The responsiveness is different for different types of products
- **PES can be calculated** using the following formula"

$$\text{PES} = \frac{\% \text{ change in quantity supplied}}{\% \text{ change in price}} = \frac{\% \Delta \text{ in QS}}{\% \Delta \text{ in P}}$$

- **To calculate a % change**, use the following formula:

$$\% \text{ Change} = \frac{\text{new value} - \text{old value}}{\text{old value}} \times 100$$



Worked Example

In recent months, the **price of avocados** has increased from AU\$ 0.90 to AU\$ 1.45. *Bewdley Farm Shop* in Margaret River has sought to **maximise their profits** by increasing the **quantity supplied** to the market. They have been able to increase sales from 110 units a week to 120 units a week.

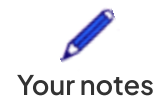
Calculate the **PES of avocados** and explain one reason for the value

Step 1: Calculate the % change in QS

$$\% \Delta QS = \frac{120 - 110}{110} \times 100$$

$$\% \Delta QS = 9.1\%$$

Step 2: Calculate the % change in P



$$\% \Delta P = \frac{1.45 - 0.90}{0.90} \times 100$$

$$\% \Delta P = 61\%$$

Step 3: Insert the above values in the PES formula

$$PES = \frac{\% \Delta \text{ in } QS}{\% \Delta \text{ in } P}$$

$$PES = \frac{9.1\%}{61\%}$$

$$PES = 0.15$$

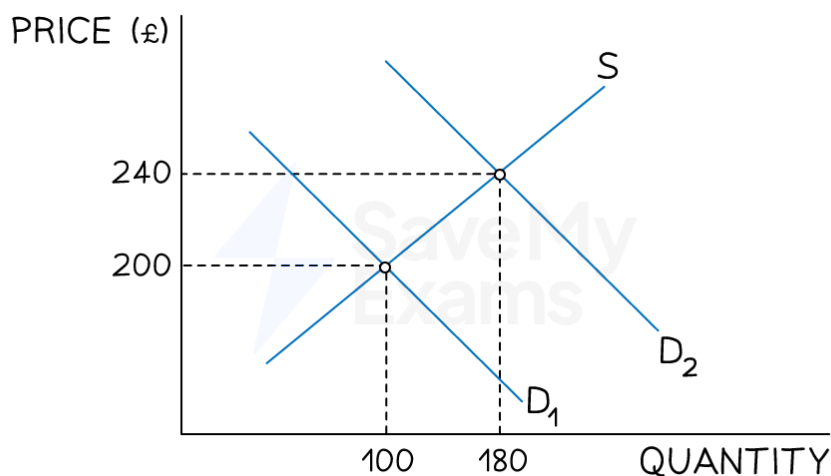
Step 4: Explain one reason for the value

The PES value of 0.15 indicates that **avocados are very price inelastic in supply**. Even with a significant increase in price, suppliers are **unable to supply more** due to the time it takes to grow additional avocados



Worked Example

The diagram below shows two market demand curves (D_1 and D_2) and the market supply curve (S) for Good X



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(This image is a placeholder - new image in production)

The price elasticity of supply of Good X when the demand curve shifts from D_1 to D_2 is:

A +0.25

B +2.0

C +4.0

D +7.5

Step 1: Calculate the % change in QS

$$\% \Delta QS = \frac{180 - 100}{100} \times 100$$

$$\% \Delta QS = 80\%$$

Step 2: Calculate the % change in P

$$\% \Delta P = \frac{240 - 200}{200} \times 100$$

$$\% \Delta P = 20\%$$

Step 3: Insert the above values into the PES formula

$$PES = \frac{\% \Delta \text{ in QS}}{\% \Delta \text{ in P}}$$

$$PES = \frac{80\%}{20\%}$$

$$PES = 4$$

The PES value of 4 indicates Good X is **elastic in supply**. Suppliers are very responsive to a change in price, they are able to increase output easily



Your notes



Examiner Tips and Tricks



Your notes

When doing **elasticity calculations**, make sure that your final answer for PES is **not** expressed as a **percentage**. This is a common error and loses marks.

In Paper 3 multiple choice questions, you are occasionally given the PES value and the $\% \Delta$ in QD. You have to find $\% \Delta$ in price. Follow the standard math procedure as follows:

1. Substitute the values provided into the equation
2. Substitute X for $\% \Delta$ in price
3. Solve for X

Interpreting PES Values

The Values of PES vary from 0 to Infinity (∞) & they are Classified as Follows

Value	Name	Explanation
0	Perfectly Inelastic	The QS is completely unresponsive to a change in P (e.g. fixed number of seats in a theatre)
0 \rightarrow 1	Relatively Inelastic	The $\% \Delta$ in QS is less than proportional to the $\% \Delta$ in P (e.g agricultural products)
1 \rightarrow ∞	Relatively Elastic	The $\% \Delta$ in QS is more than proportional to the $\% \Delta$ in P (e.g t-shirts)
∞	Perfectly Elastic	The $\% \Delta$ in QS will fall to zero with any $\% \Delta$ in P. However, supply is unlimited at a particular price. This is a very theoretical scenario

The Factors that Influence Price Elasticity of Supply

- Some products are more responsive to **changes in prices** than other products
- The **factors** that determine the responsiveness of **PES** include:

1. Mobility of the factors of production

If producers can quickly switch their resources **between products**, then the PES will be more elastic.
E.g. If prices of hiking boots increase and shoe manufacturers can switch resources from producing trainers to boots, then boots will be **price elastic in supply**

2. The rate at which costs of production increase

It costs more to produce each additional unit of output (**marginal cost**). If the rate of the marginal cost

increase is low, the quantity supplied will be more elastic. However, if marginal costs rise quickly, then the quantity supplied will be more inelastic

3. **Ability to store goods**

If products can be easily stored then **PES will be higher** (elastic) as producers can quickly increase supply (e.g. tinned food products). An inability to store products results in **lower PES** (inelastic)

4. **Spare capacity**

if prices increase for a product and there is a capacity to produce more in the factories that make those products, then supply will be **elastic**. If there is **no spare capacity** to increase production, then supply will be **inelastic**

5. **Time period**

In the **short run**, producers may find it harder to respond to an increase in prices as it **takes time to produce** the product (e.g. avocados). However, in the **long run** they can change any of their factors of production so as to **produce more**



Examiner Tips and Tricks

Many students **confuse PES with PED** and inadvertently answer questions using **knowledge from PED**. When faced with **PES questions**, tell yourself to **think like a producer** (not a consumer!) and it will help you to stay focused on providing the correct answer.



Your notes



Your notes

Interrelationships Between Markets

Different Types of Interrelationships Between Markets

- Markets do not operate in isolation. Interrelationships can exist between markets in several ways

The Interrelationships Between Markets

Relationship	Explanation	Example
Joint demand	<ul style="list-style-type: none"> When consumers use two products together, also known as complementary goods The change in price of one good impacts the demand for the other good 	<ul style="list-style-type: none"> Coffee and sugar Cereal and milk Smart phones and mobile apps
Competitive demand	<ul style="list-style-type: none"> Two goods are used for the same purpose, also known as substitute goods The change in price of one good impacts the demand for the other good 	<ul style="list-style-type: none"> Cinema tickets and online streaming services Tea and coffee E-books and printed books
Composite demand	<ul style="list-style-type: none"> Two or more goods require the same input to make them An increase in production of one good could lead to a decrease in supply of another good, as less of the input is available 	<ul style="list-style-type: none"> Cheese and yogurt require the same input (milk) Growing crops or raising livestock requires the same input (land)
Derived demand	<ul style="list-style-type: none"> Demand for a good or service arises from the demand for another good or service <ul style="list-style-type: none"> The demand for inputs is derived from the demand for the final product 	<ul style="list-style-type: none"> Aluminium and cars Labour and goods & services
Joint supply	<ul style="list-style-type: none"> The supply of two different goods stems from the same source 	<ul style="list-style-type: none"> Beef and cow leather Poultry meat and feathers



Your notes

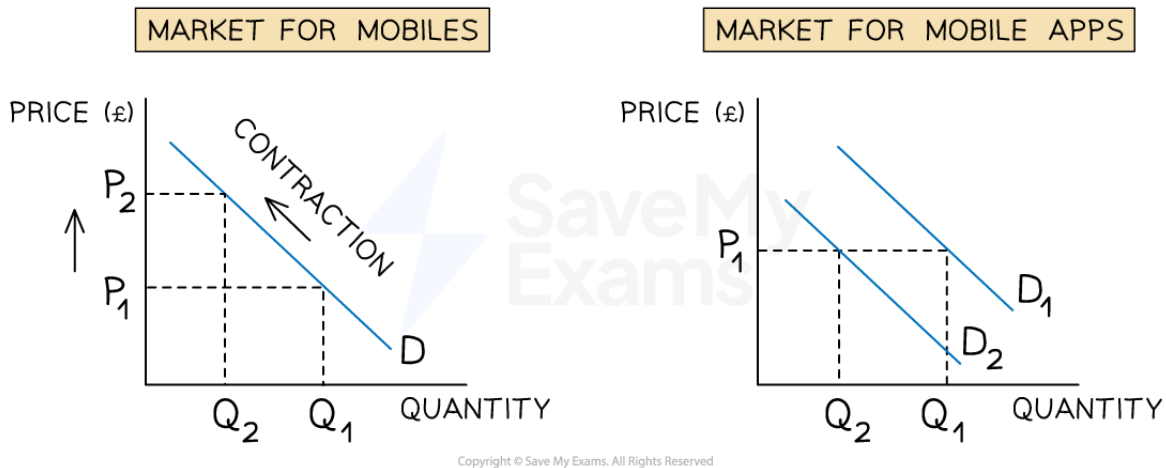
- The increase in production of one good will increase the production of another good.
 - The second good may be a **by-product** of the first good
- Honey and beeswax

Analysing Interrelated Markets

1. Analysing markets in joint demand

- Changes to the price of one good **shift the entire demand curve** of a complementary good

Diagram: Markets for Mobiles & Mobile Apps



Increases in price of mobile phones, shift the entire demand curve of mobile apps to the left

Diagram analysis

Market for mobiles

- An **increase** in price for mobiles from $P_1 \rightarrow P_2$ leads to a movement **up** the demand curve
 - Due to the **increase** in price, there is a contraction in QD from $Q_1 \rightarrow Q_2$

Market for mobile apps

- As a result of price increase for mobile phones, there will be an **decrease in demand** for mobile apps (the complementary good) as more consumers become buy less
 - This causes a **shift in demand** from D_1 to D_2 . The price remains unchanged at P_1 but the **demand has decreased** from $Q_1 \rightarrow Q_2$

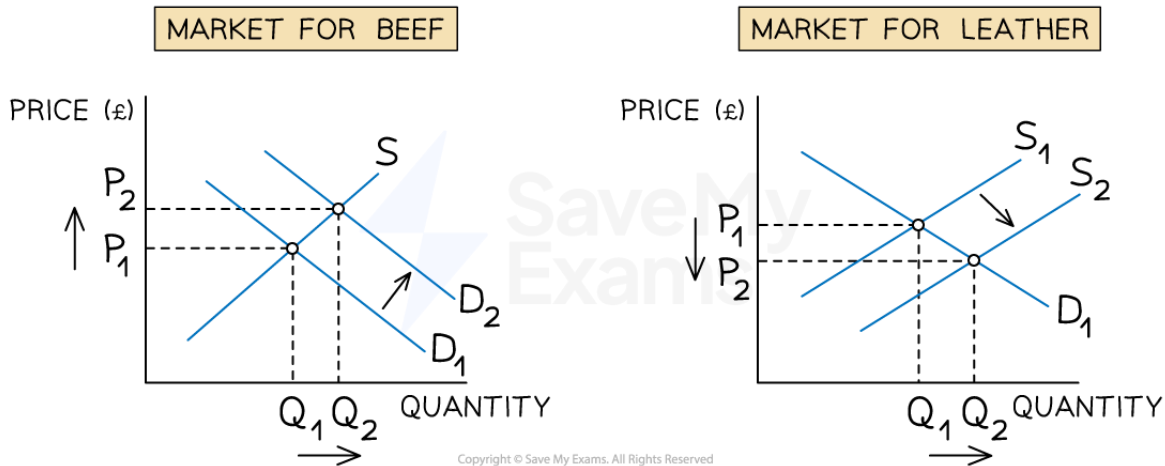


Your notes

2. Analysing markets in joint supply

- As the production of beef increases, the supply of leather will increase (as it is a by-product of beef)

Diagram: Market for Beef & Leather



An increase in demand for beef increases the supply of leather

Diagram analysis

Market for beef

- If the real income of individuals of a country increase, there may be an increase in demand for beef (considered a **normal good**)
 - This causes a **shift in demand** from $D_1 \rightarrow D_2$. The price has increased from $P_1 \rightarrow P_2$ and the quantity **has increased** from $Q_1 \rightarrow Q_2$

Market for leather

- When there is an increase of quantity of beef, there will be an increase in the supply of leather
 - This is a **shift in supply** from S_1 to S_2 . The price increased from $P_1 \rightarrow P_2$ and the **supply has decreased** from $Q_1 \rightarrow Q_2$