Economics for Business Environment

Unit 4

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Lecture Outline

Learning Outcome

- Market Equilibrium
- What happens to demand when we change prices?
- Different types of elasticity.
- How to use elasticity in economic analysis.

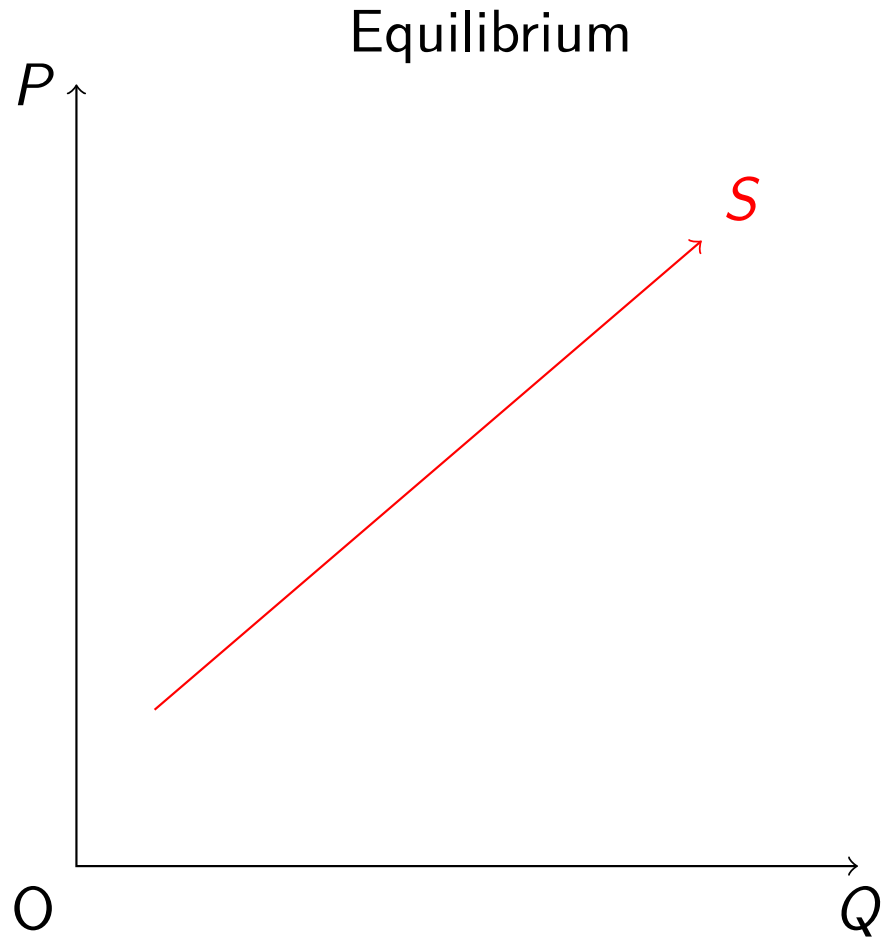
Equilibrium Point

- Equilibrium is the point where the demand and supply curves intersect.
- The quantity demanded is equal to the quantity the suppliers are willing to supply.
- If anything changes in the market, the price level will adjust to restore the equilibrium.

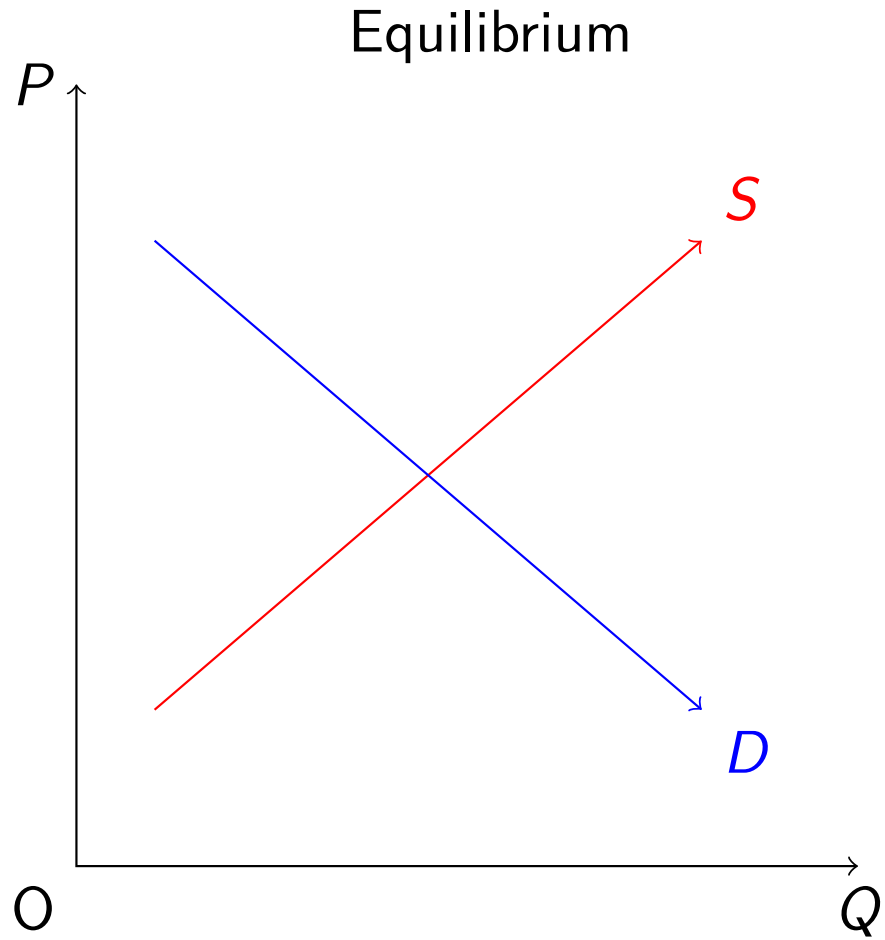
Price Mechanism

- Acts as signal: Price adjusts to demonstrate where resources are required, and where they are not.
- Transmits preference: By their response to price, consumers send a message about their preferences.
- Ration scarce resources: As resources are scarce, price serves as a method to ration who receives goods and services.

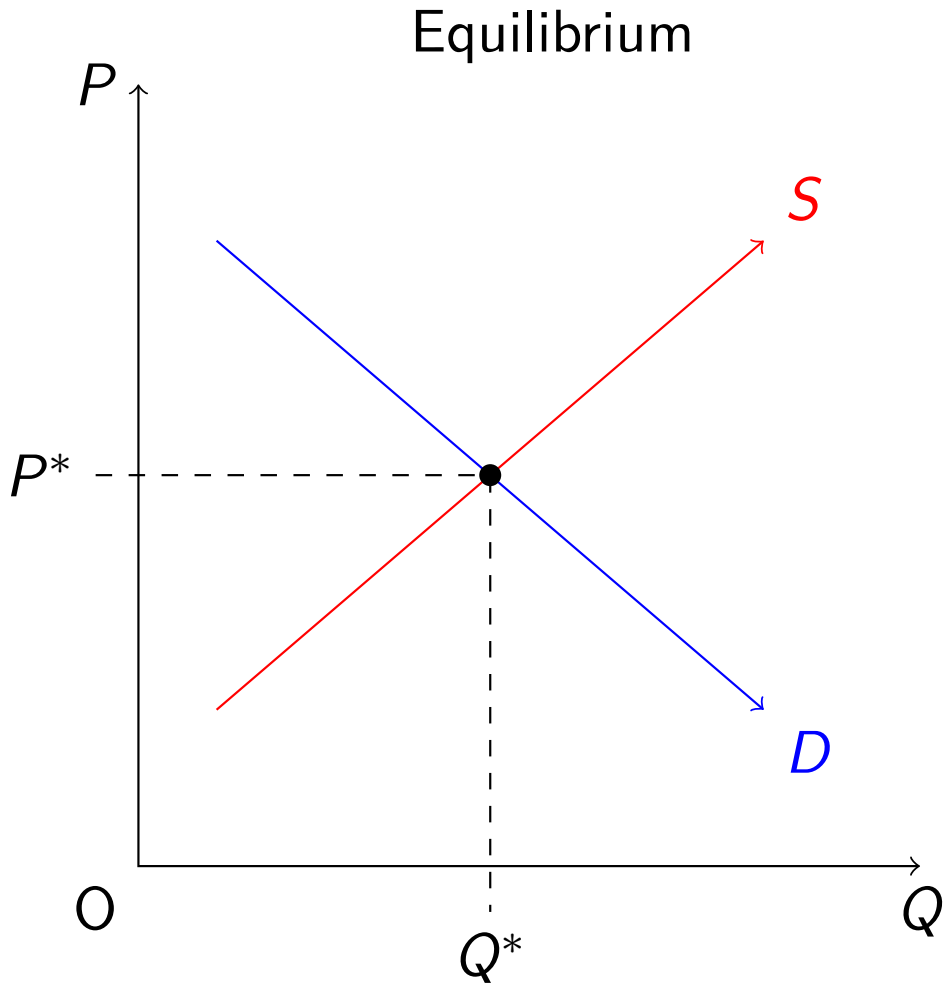
Equilibrium Analysis



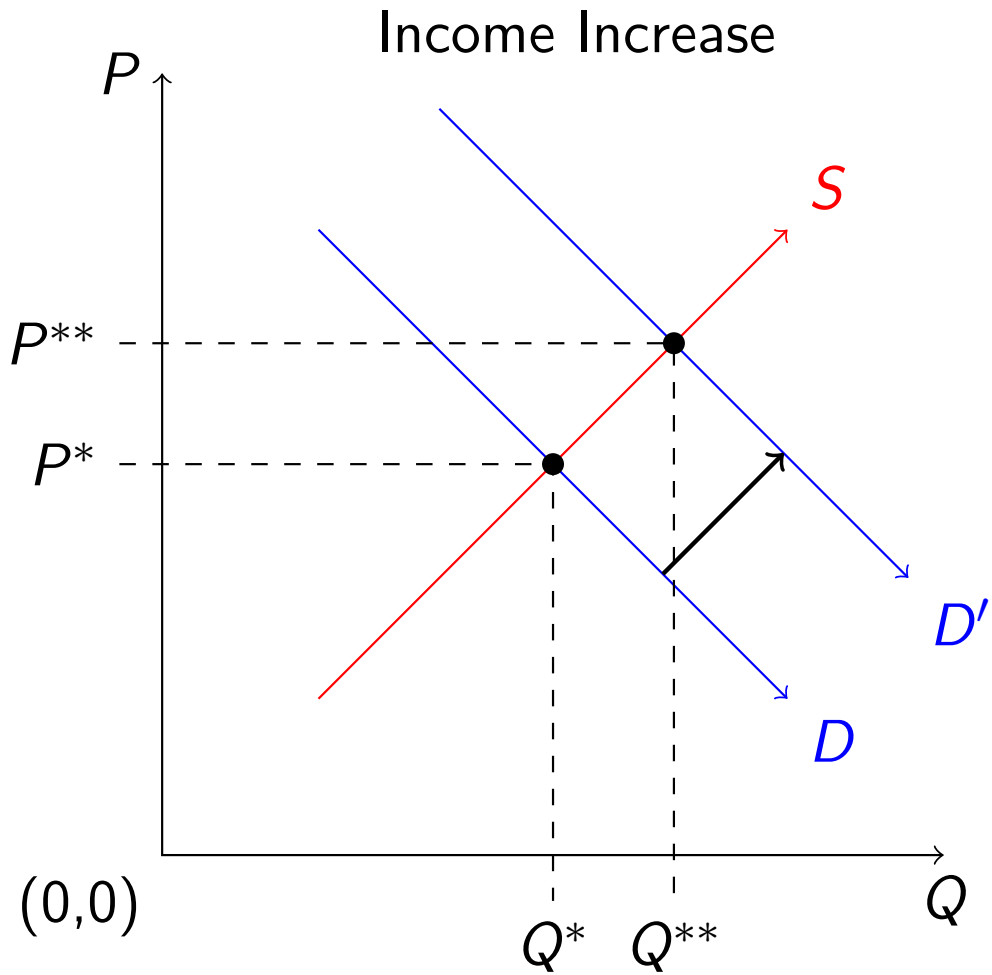
Equilibrium Analysis



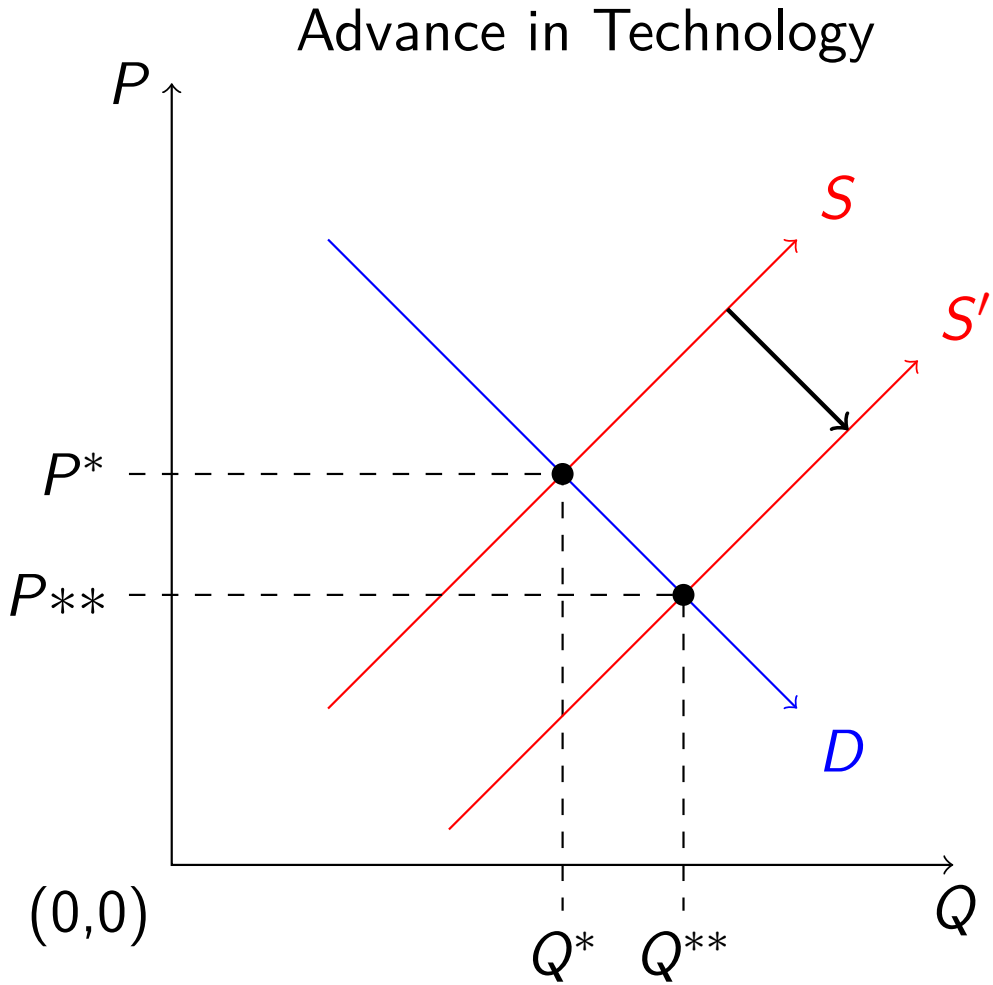
Equilibrium Analysis



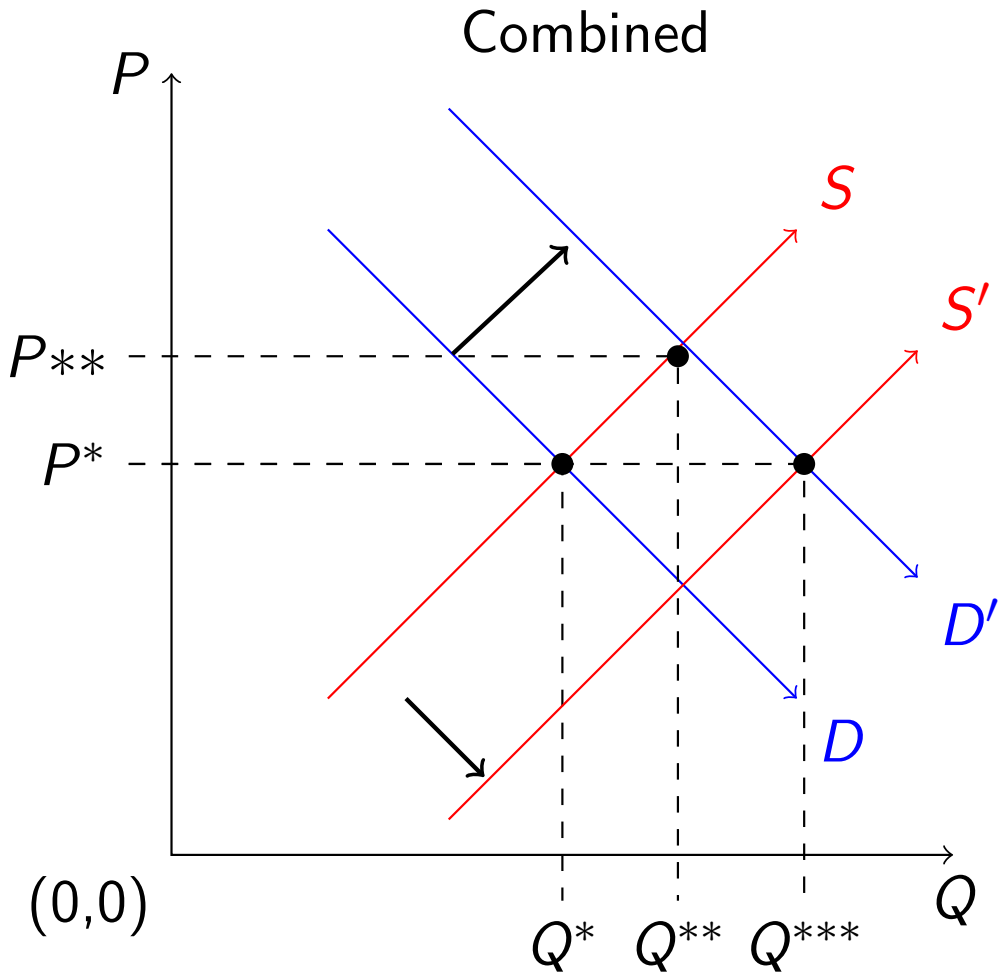
Change in Income



Change in Production Technology



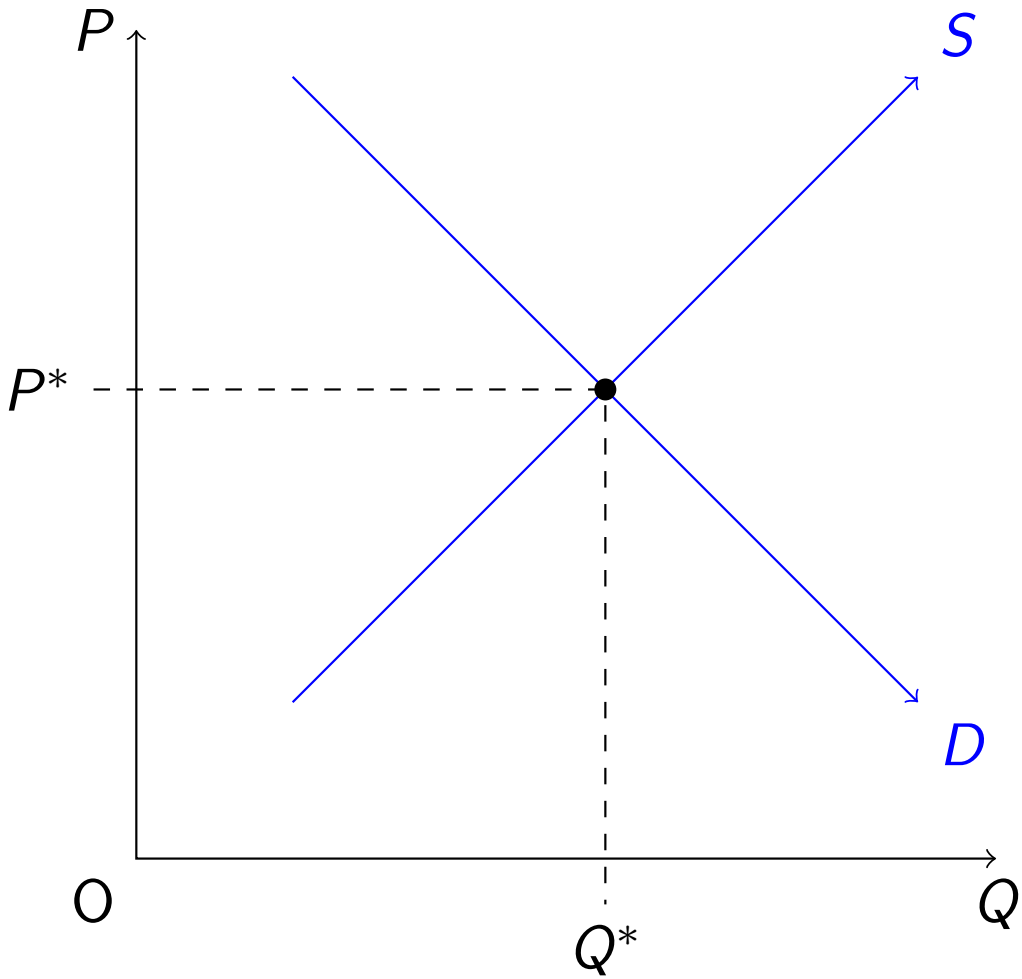
Equilibrium Analysis



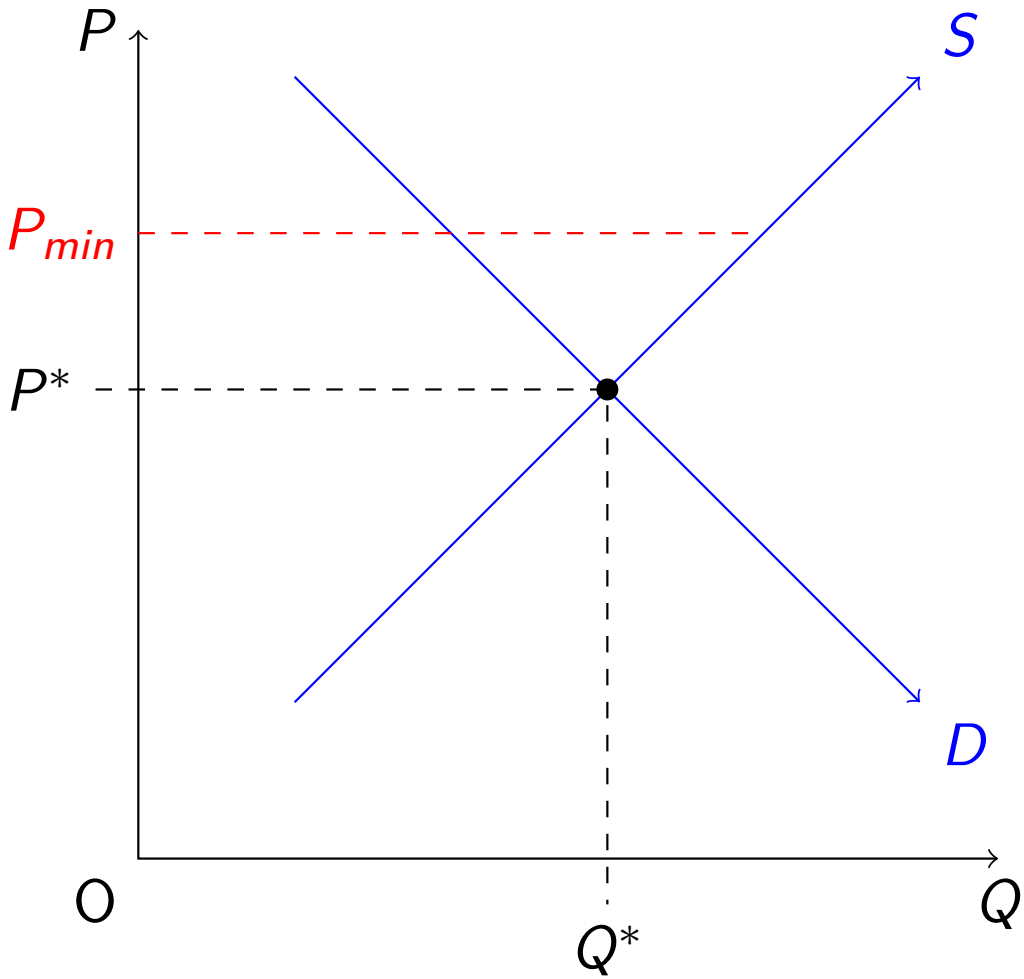
Equilibrium Analysis

- When a **factor** that affects demand changes then the **whole** Demand curve *shifts*. If the change is positive, i.e. increase in demand, then the curve will shift to the right and vice versa.
- When a **factor** that affects supply changes then the **whole** Supply curve *shifts*. If the change is positive, i.e. increase in supply, then the curve will shift to the right and vice versa.
- *Important*: If the price changes we move along the same curve.
- The position of the final equilibrium point will depend on the magnitude of the changes.

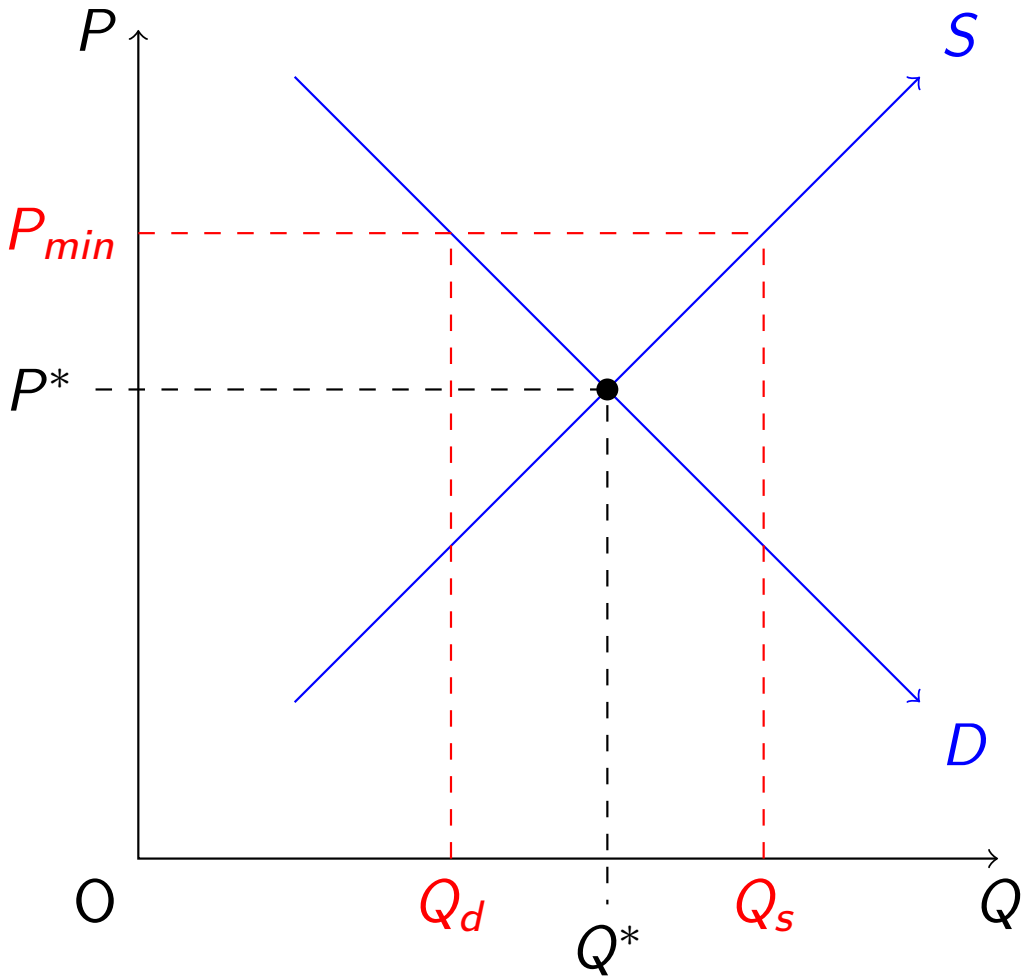
Excess Supply



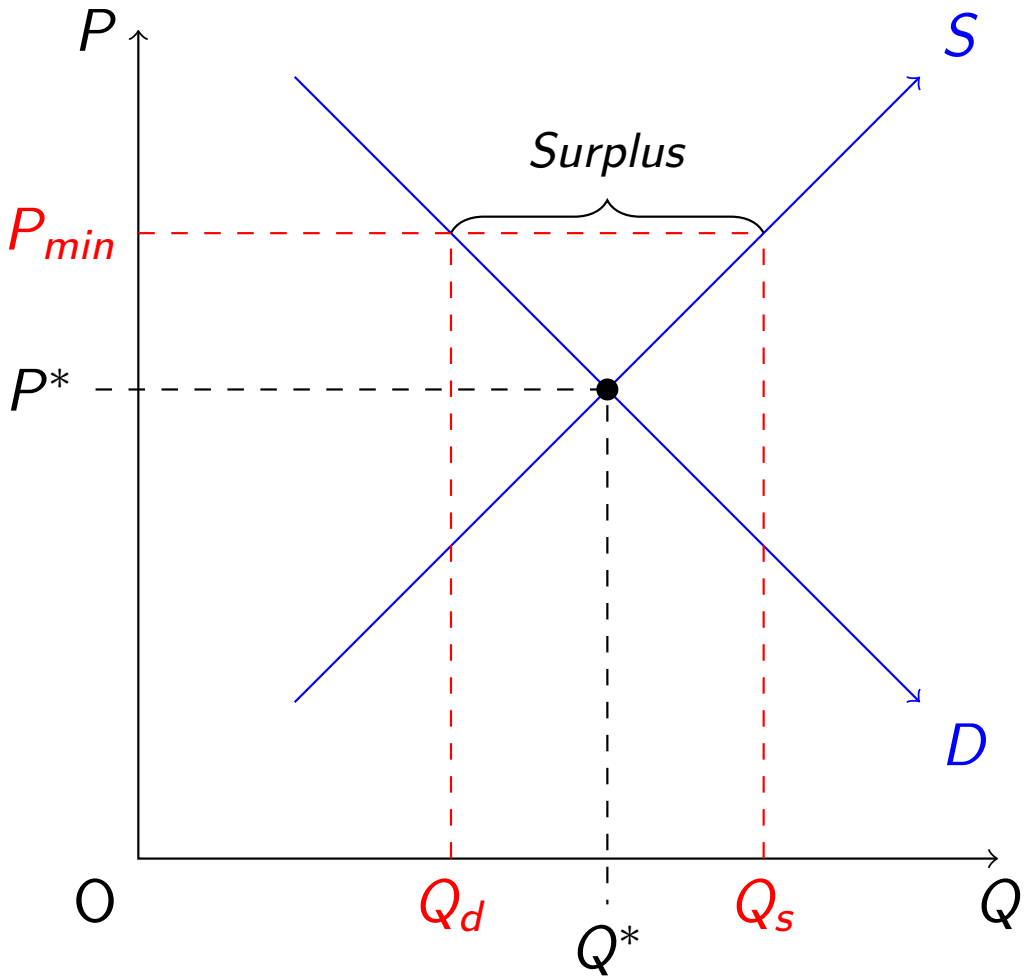
Excess Supply



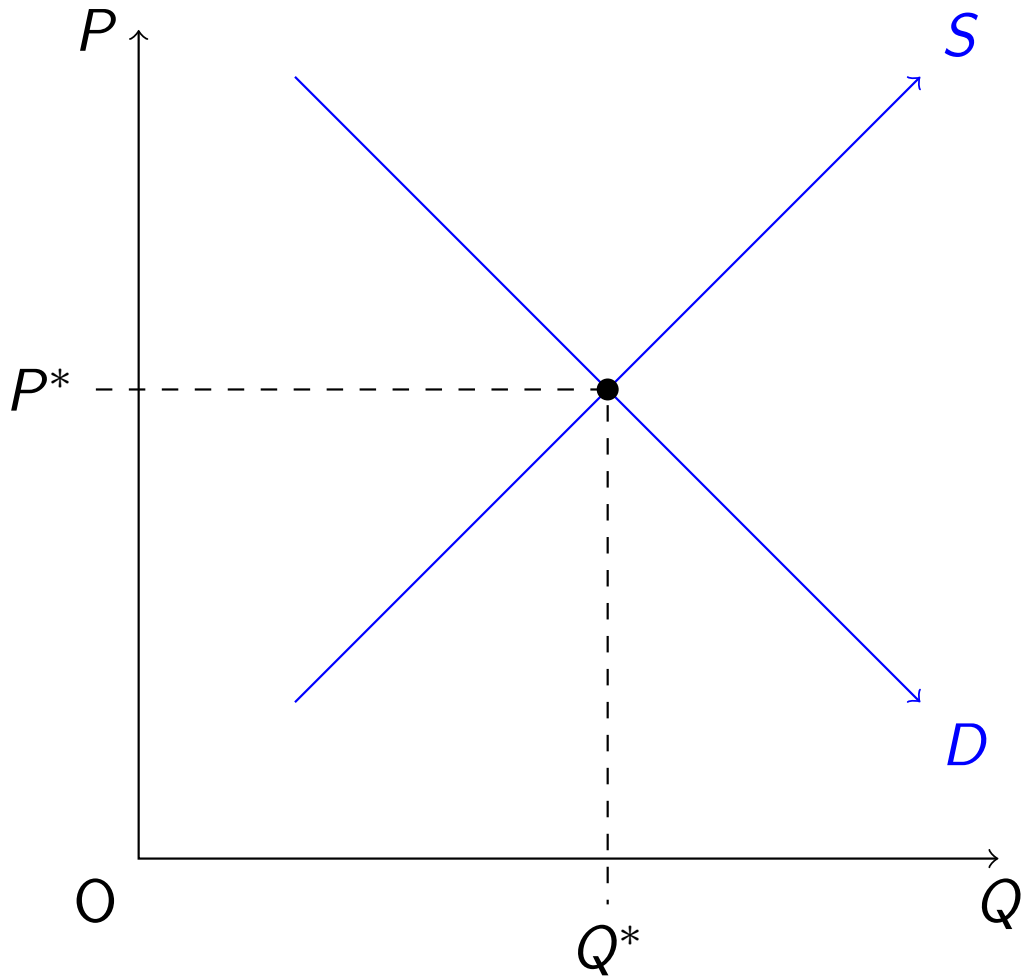
Excess Supply



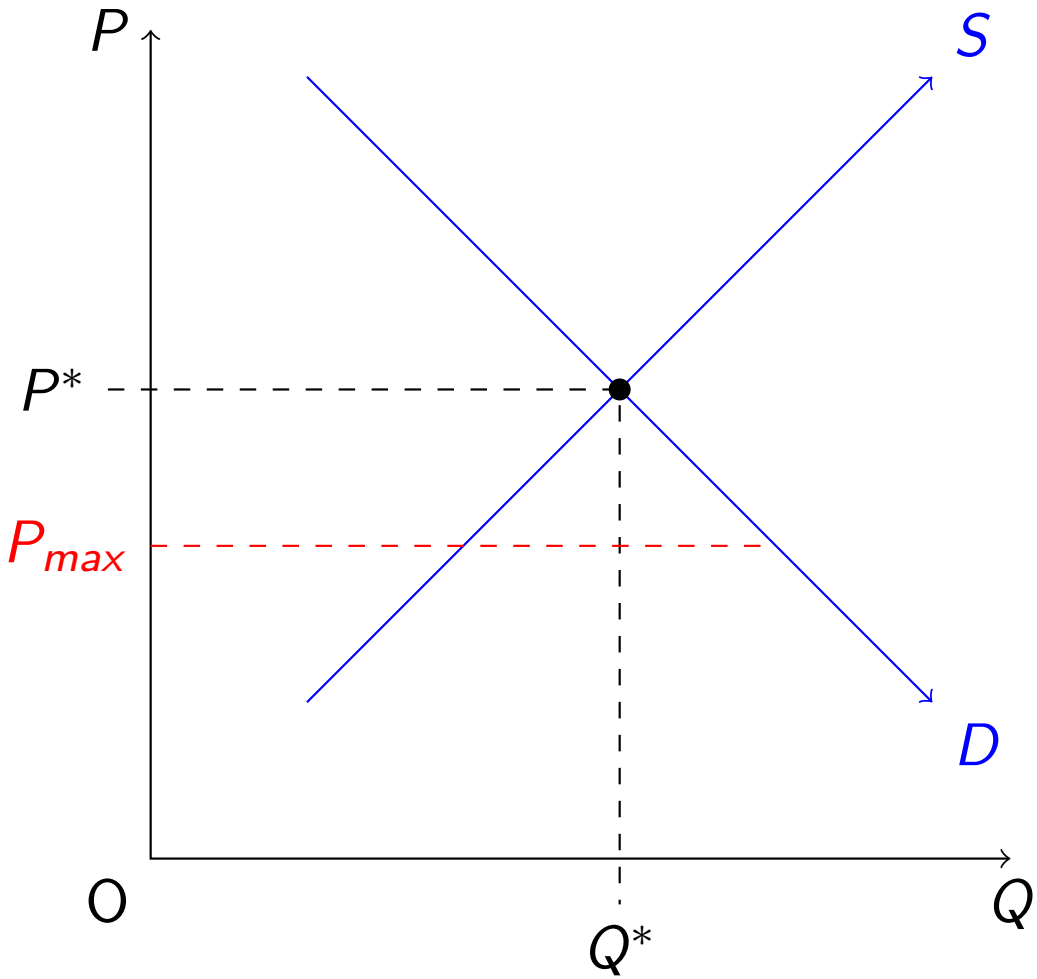
Excess Supply



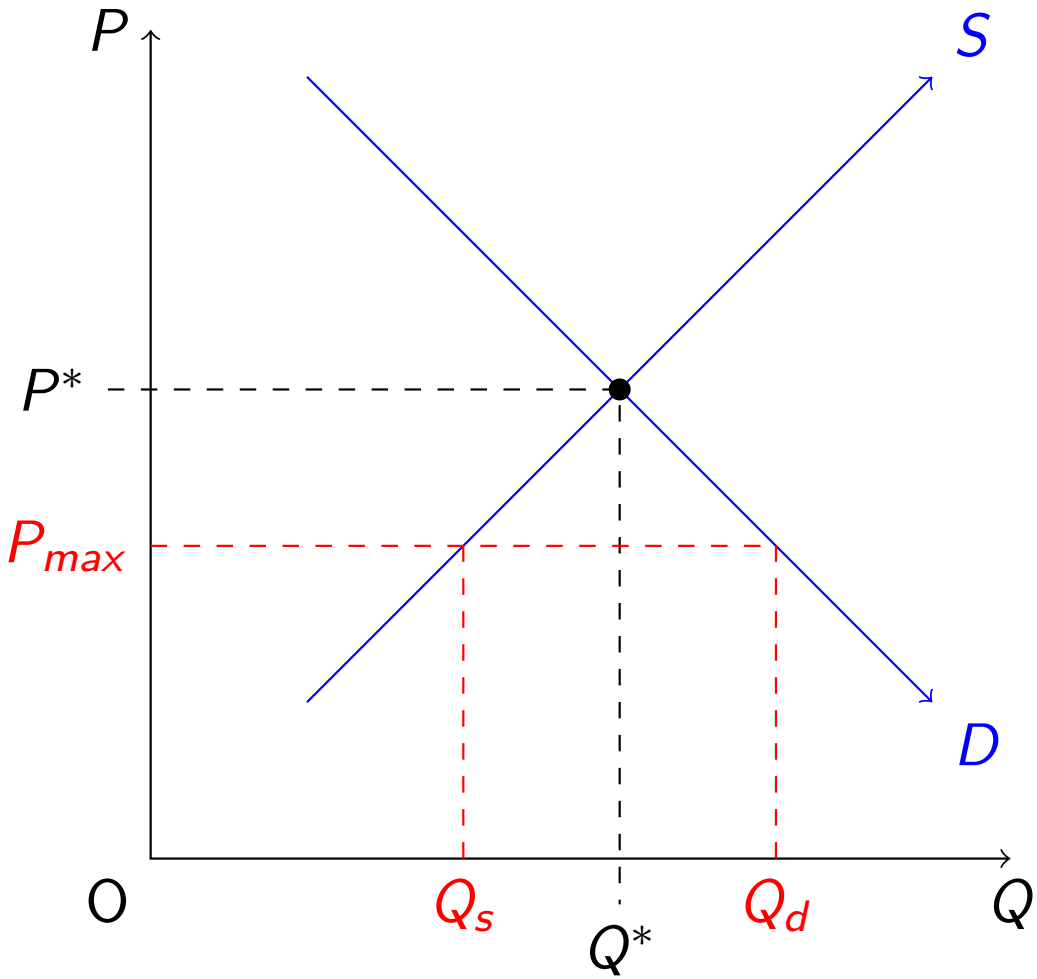
Excess Demand



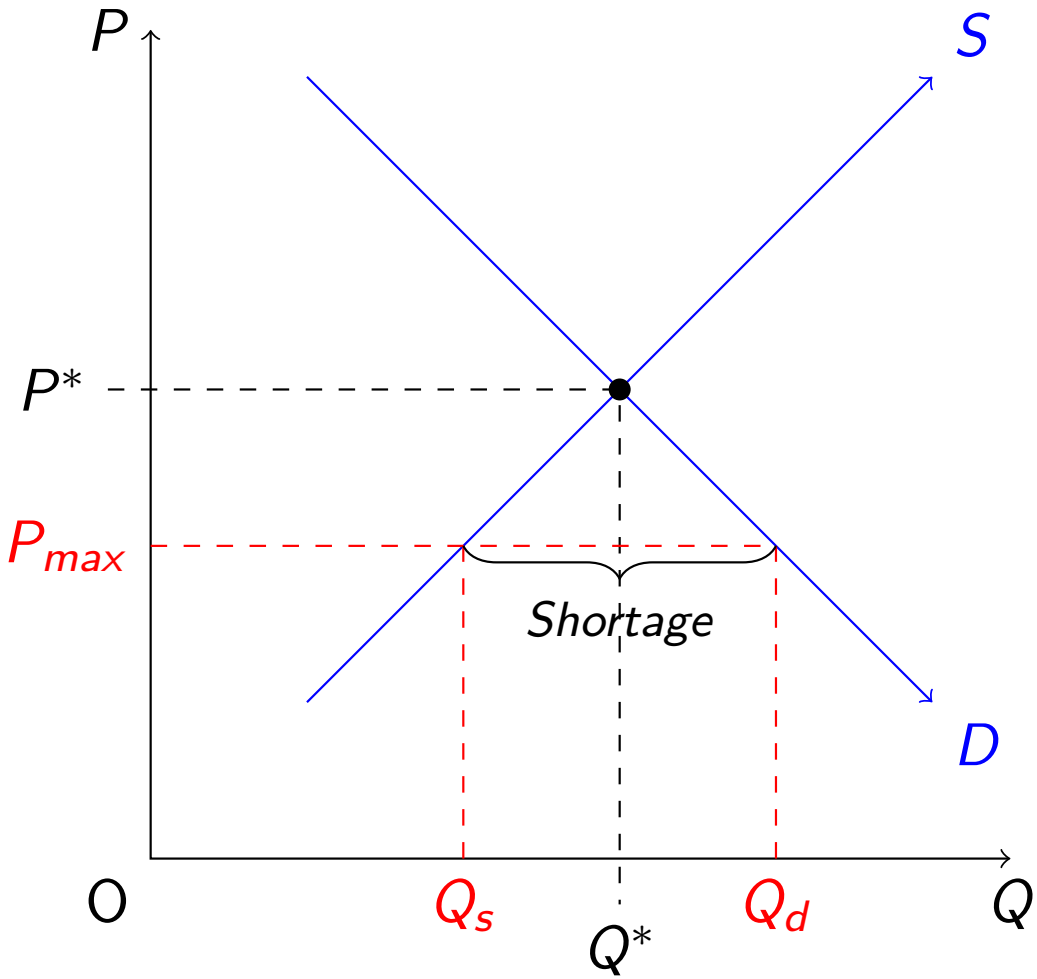
Excess Demand



Excess Demand



Excess Demand



Further Equilibrium Analysis

- A **shortage** *or excess demand* is a situation in which the quantity demanded for a product (Q_D) exceeds the quantity supplied in a market (Q_S), i.e. $(Q_D) > (Q_S)$.
- A *shortage* can only occur at a price level **below** the equilibrium.
- A **surplus** *or excess supply* is a situation in which the quantity supplied (Q_S) for a product exceeds the quantity demanded (Q_D) in a market, i.e. $(Q_D) < (Q_S)$.
- A *surplus* can only occur at a price level **above** the equilibrium.

The concept of elasticity

- If the price of a good rises by 10% - what will happen to demand?
- Based on what we have learned quantity demanded will (probably) decrease.
- By how much? More or less than 10%?
- Elasticity measures the response of the quantity demanded (or supplied) following changes in the market.

Price Elasticity of Demand

Price elasticity of Demand (P_{ε_d})

The price elasticity of demand measures the responsiveness of the quantity demanded of a good to a change in its price.

It is computed as the percentage change in quantity demanded divided by the percentage change in price.

Price Elasticity of Demand

We have two ways to calculate it:

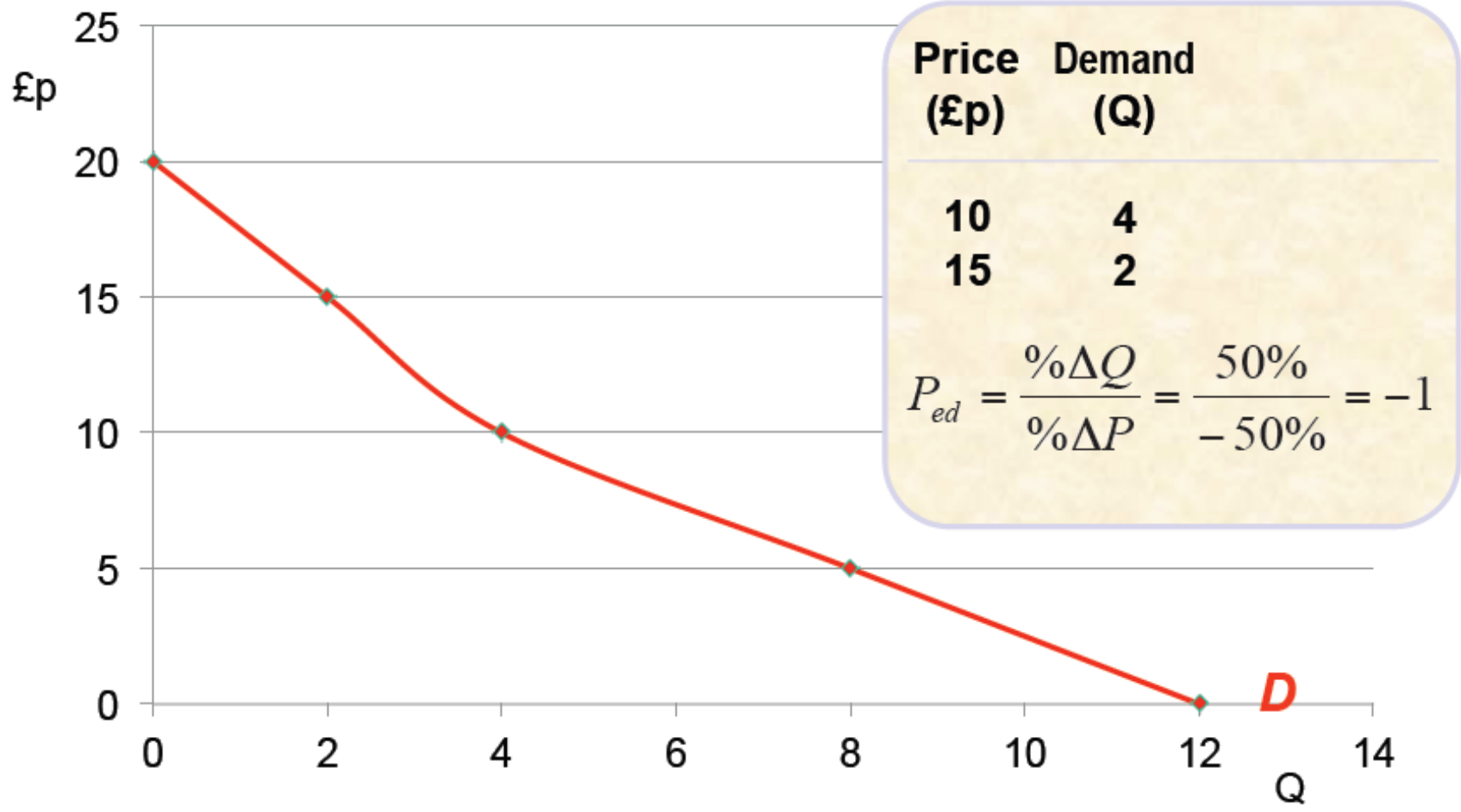
Point Elasticity of Demand

$$P_{\varepsilon_d} = \frac{\text{percentage change in quantity}}{\text{percentage change in price}} = \frac{\%\Delta Q}{\%\Delta P}$$

Midpoint or Arc Elasticity of Demand

$$P_{\varepsilon_d} = \frac{(Q_2 - Q_1)/[(Q_2 + Q_1)/2]}{(P_2 - P_1)/[(P_2 + P_1)/2]}$$

Example: Chocolate bars



Price (£p)	Demand (Q)
10	4
15	2

$$P_{ed} = \frac{\%\Delta Q}{\%\Delta P} = \frac{50\%}{-50\%} = -1$$

P_{ε_d} for different products

- Different products respond differently in price changes.
- For some goods the response to a price change may be relatively large, for others quantity demanded may change by a very small amount.
- Class exercise: Think of some goods that fit in the two categories.

Elastic or Inelastic

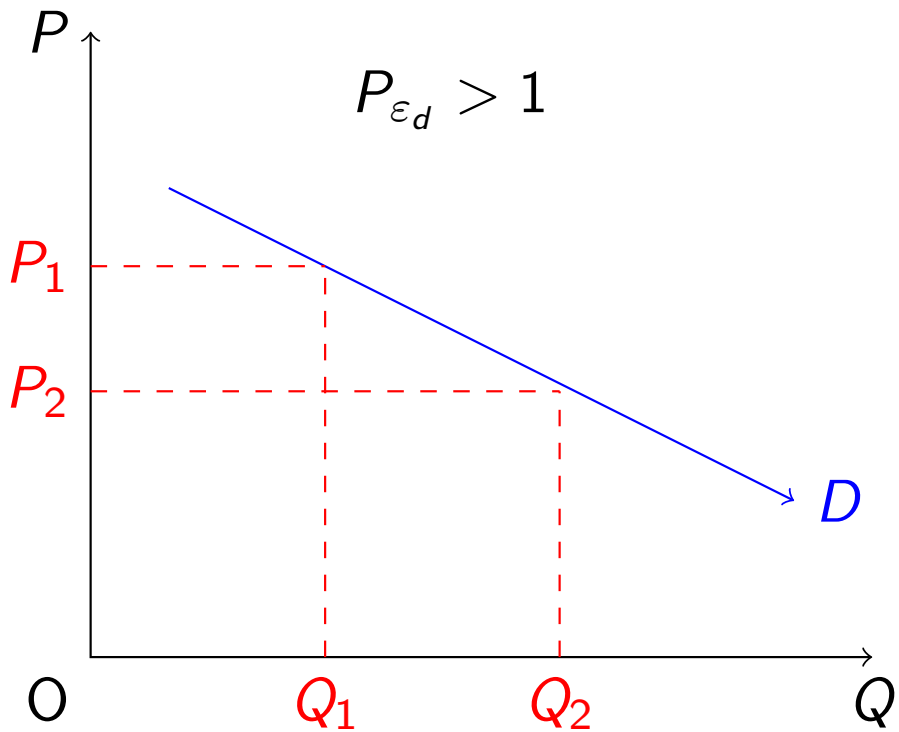
- It follows from the above that based on the value of the P_{ε_d} we can classify all goods in two broad categories.
- Elastic: When the percentage change in the quantity demanded is higher than the percentage change in the price and $P_{\varepsilon_d} > 1$
- Inelastic: When the percentage change in the quantity demanded is less than the percentage change in the price and $P_{\varepsilon_d} < 1$

Different degrees of price elasticity

- *elastic demand* ($P_{\varepsilon_d} > 1$): the response of quantity demanded is proportionately greater than the price change
- *inelastic demand* ($P_{\varepsilon_d} < 1$): the response of quantity demanded is proportionately smaller than the price change
- *unit elastic demand* ($P_{\varepsilon_d} = 1$): the response of quantity demanded is equal to the price change
- *perfectly inelastic demand* ($P_{\varepsilon_d} = 0$): quantity demanded does not respond to price changes
- *perfectly elastic demand* ($P_{\varepsilon_d} = \infty$): the response of quantity demanded to the price change is infinitely large

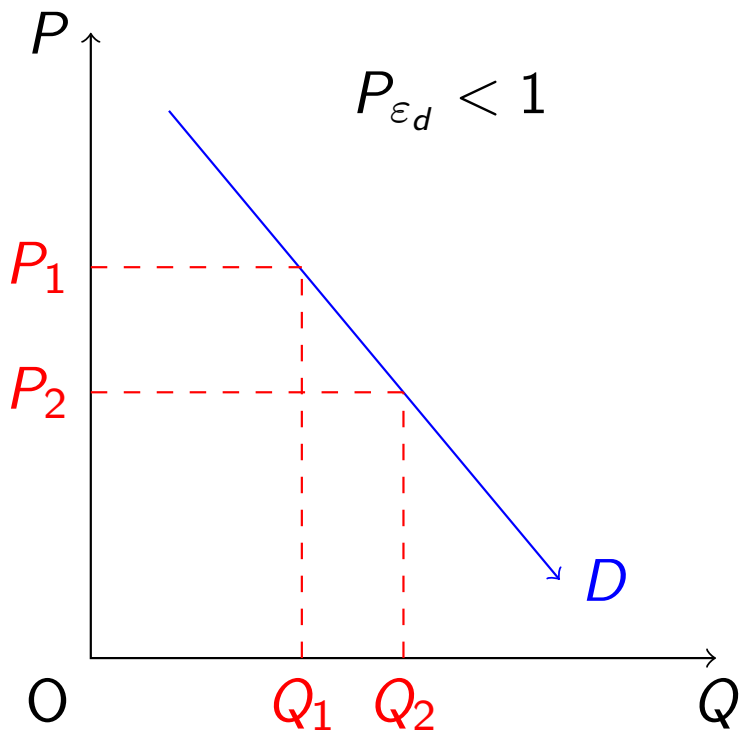
Elastic Demand Curve

- *elastic demand* ($P_{\varepsilon_d} > 1$): the response of quantity demanded is proportionately greater than the price change



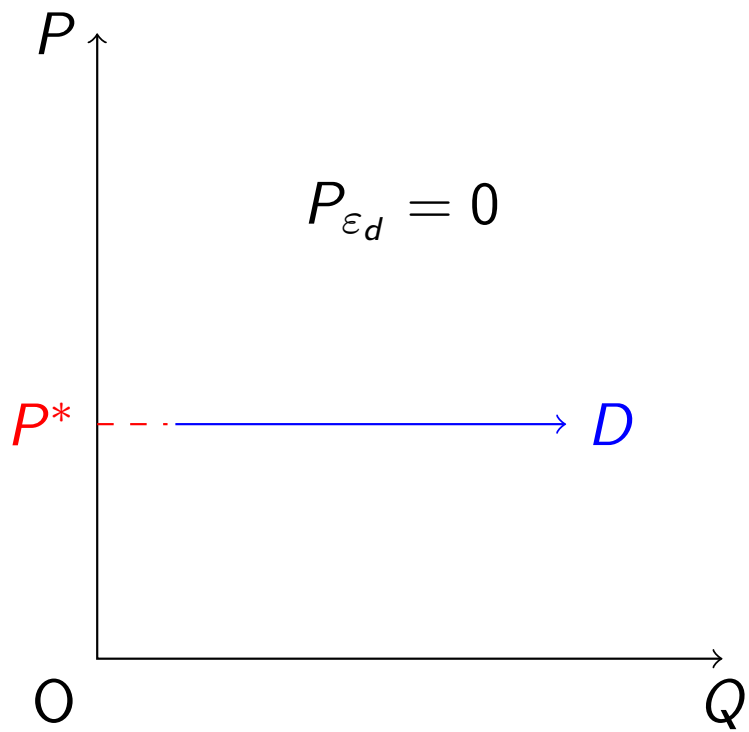
Inelastic Demand Curve

- *inelastic demand* ($P_{\varepsilon_d} < 1$): the response of quantity demanded is proportionately smaller than the price change



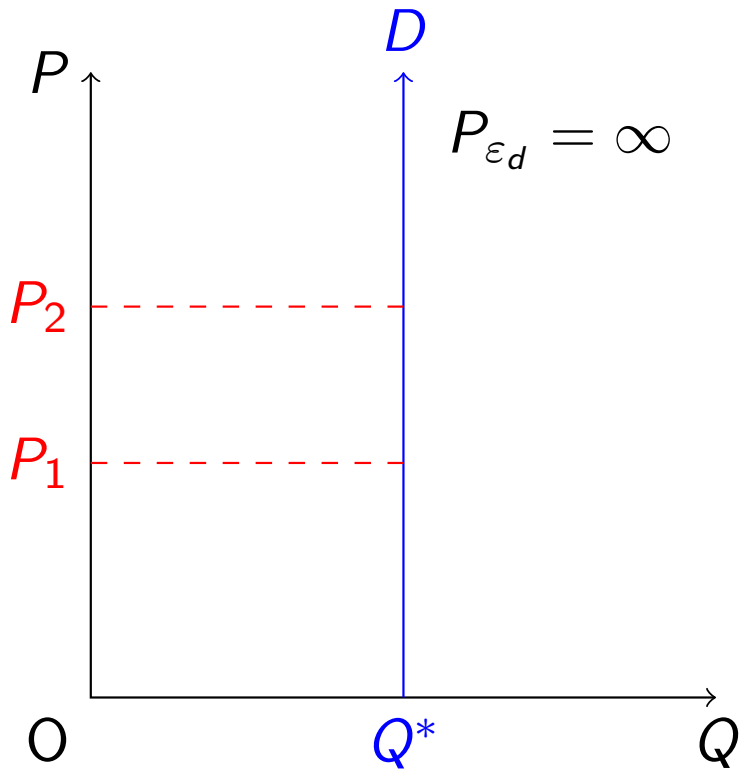
Perfectly Elastic

- *perfectly elastic demand* ($P_{\varepsilon_d} = \infty$): the response of quantity demanded to the price change is infinitely large



Perfectly Inelastic

- *perfectly inelastic demand* ($P_{\varepsilon_d} = 0$): quantity demanded does not respond to price changes



Elasticity vs Slope

- In general, Elasticity and Slope are two DIFFERENT things, even if the demand curve is a straight line.
- The value of Elasticity depends on the point at which you calculate it, while the slope of a straight demand curve is constant.
- On the other hand, for a constant elasticity the demand curve HAS to be convex.
- Note: We can use the slope as an indication of elasticity and vice versa.

Determinants of Elasticity

- *Price of related goods*: A good with more close substitutes will likely have a higher elasticity, as it will be easier for consumers to shift to other goods.
- *The proportion of income used to pay for the product*: The relative high cost of some goods will cause consumers to pay attention to the purchase and seek substitutes, as a result they tend to have high elasticity.
- *Degree of necessity*: Consumers will buy necessary products (e.g. critical medications like insulin) regardless of the price or addictive (tobacco and alcohol).

Determinants of Elasticity

- *Market definition*: How we define the market? For example, the market of smart phones in general we have a very high elasticity because there are many brands, you could buy an iPhone, an Android phone or a Windows phone.
- *Brand loyalty*: An attachment to a certain brand (either out of tradition or because of proprietary barriers) can override sensitivity to price changes, resulting in more inelastic demand.
- *Time Horizon*: The shorter the period of time we are looking at, the lower the elasticity.

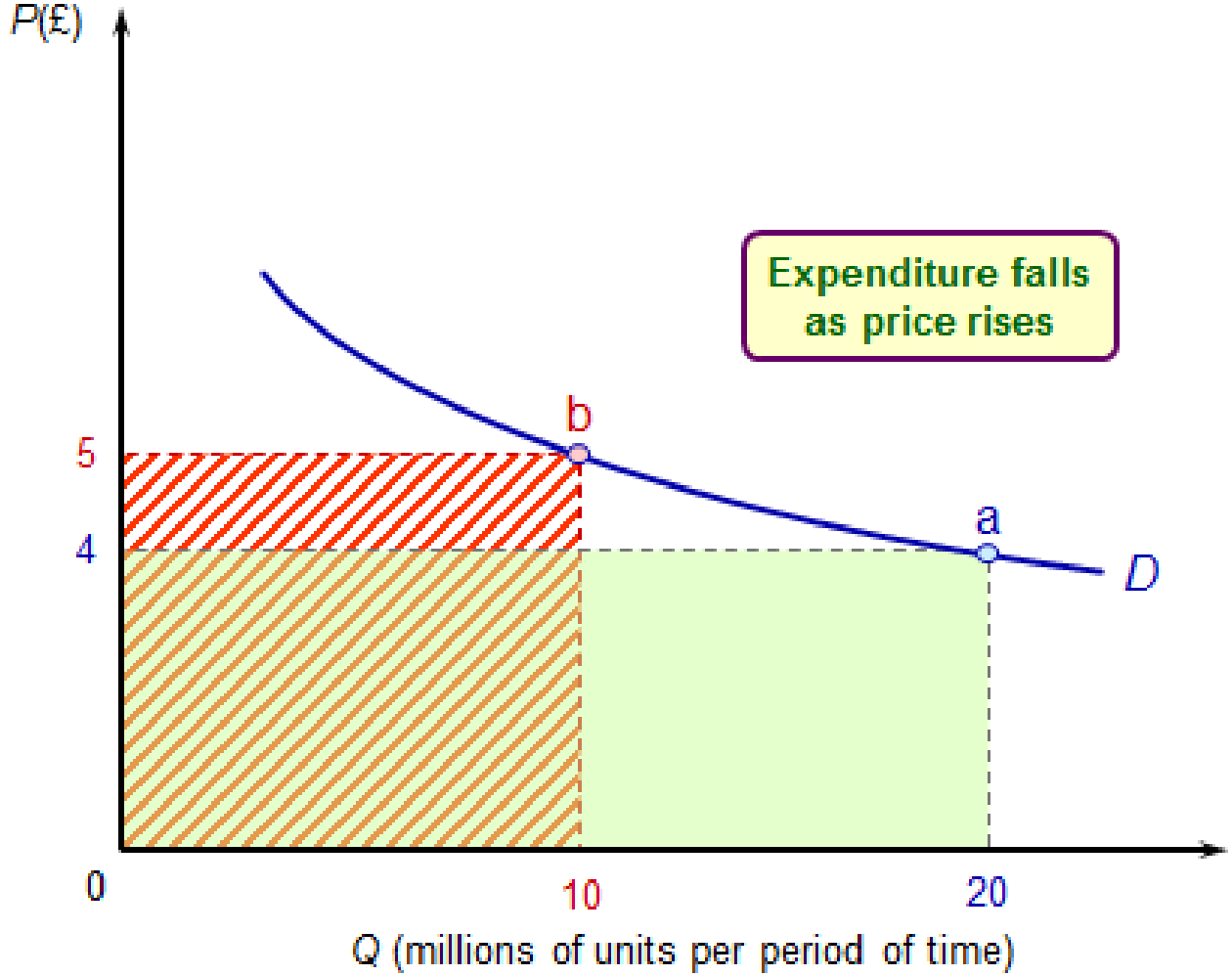
Elasticity and Total Revenue

- Total Revenue (TR) or a firm is the value of goods they sold.
- It is calculated by multiplying the price of the good with the quantity of the goods sold.
- $TR = P * Q$

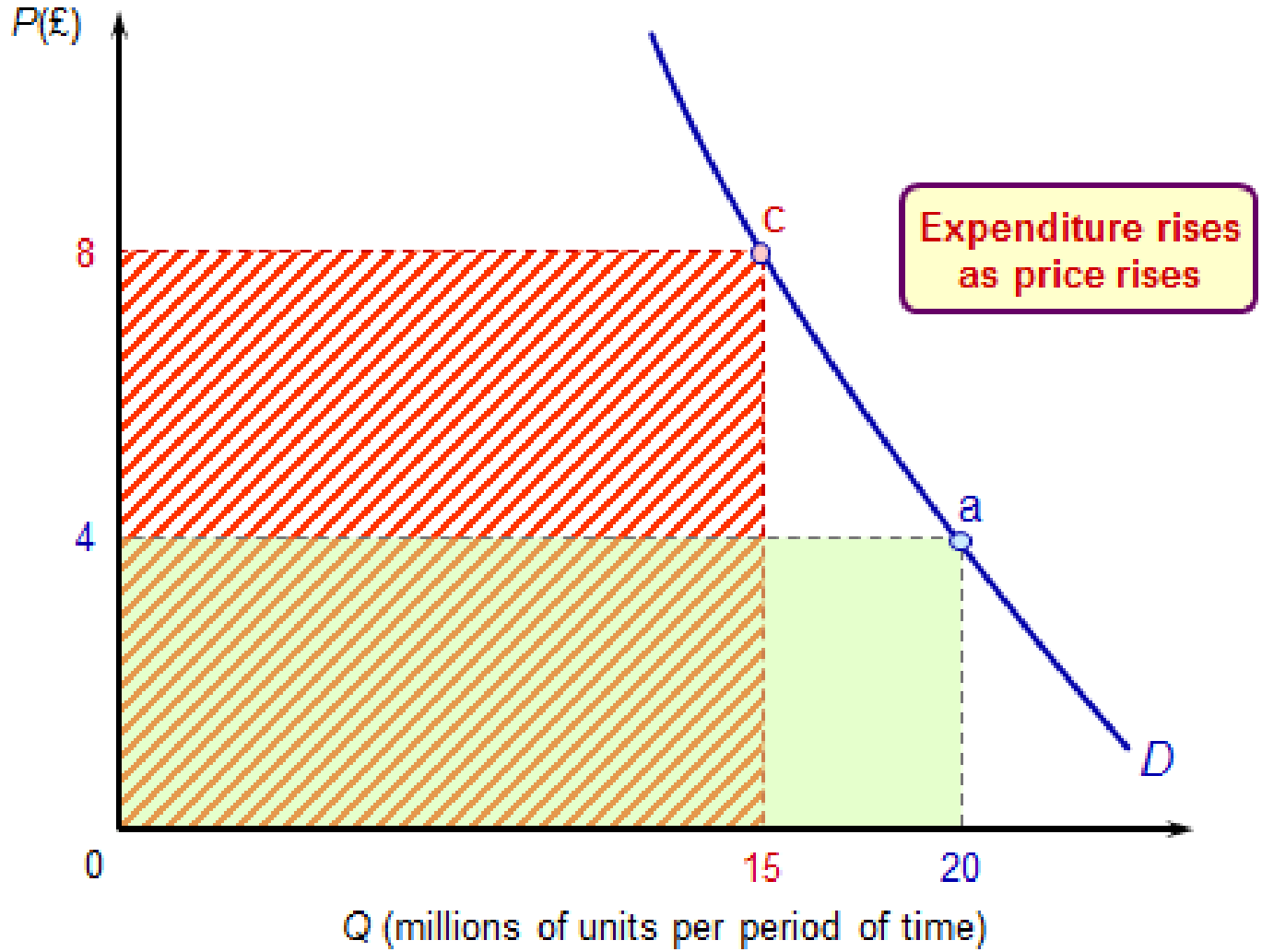
Elasticity and Total Revenue

- A change in price (ΔP) is followed by a change in quantity (ΔQ)
- The elasticity gives us the information we need in order to analyse how much the revenue of the firm will change if the price of the good changes.
- For example: $?TR = \uparrow P * \downarrow Q$

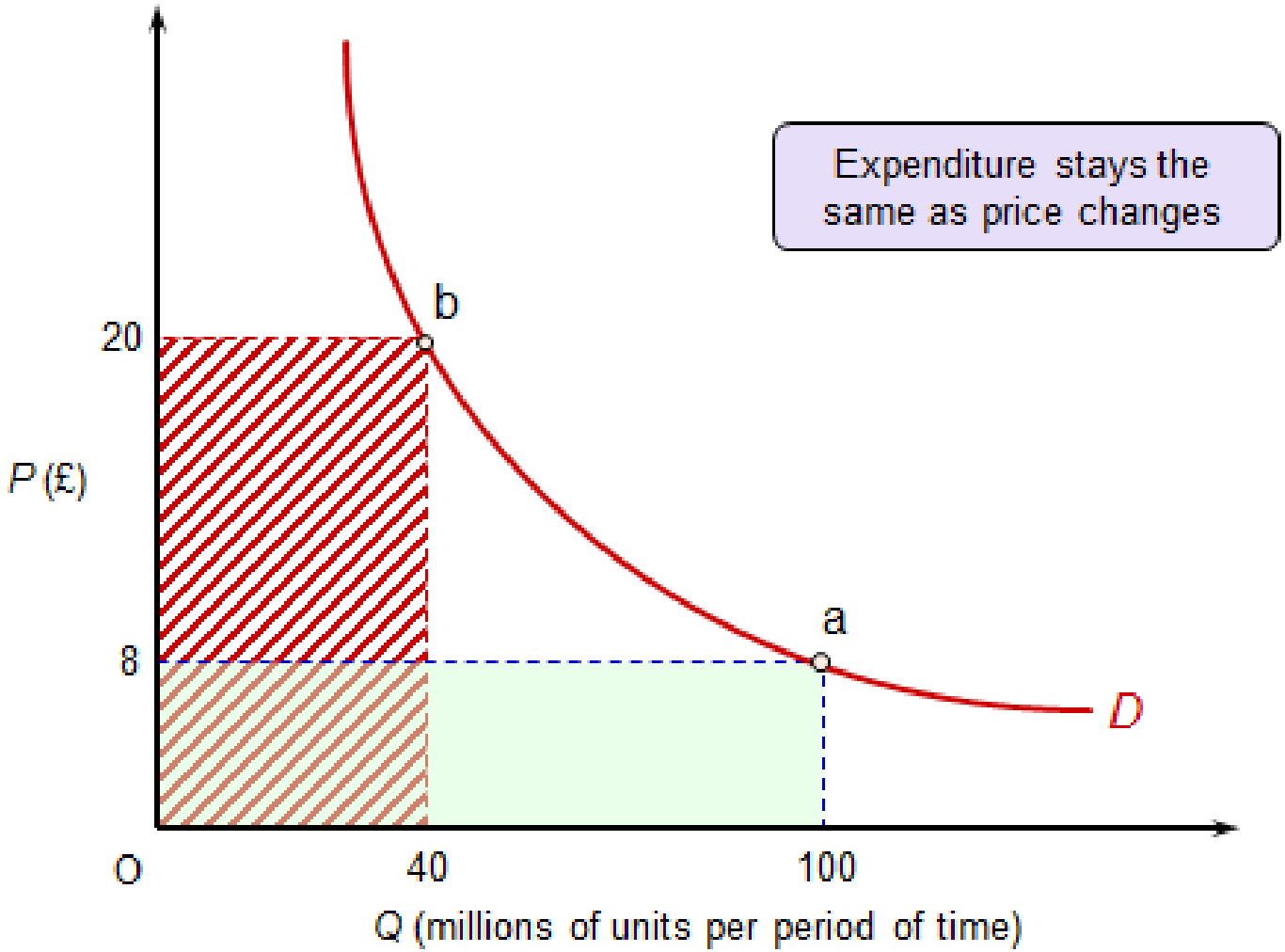
Graph: TR and Elastic Demand



Graph: TR and Inelastic Demand



Graph: TR and Unit Elastic Demand



Demand Elasticity and TR

Elasticity of Demand	$P\&Q$ Changes	ΔTR if $P \uparrow$	ΔTR if $P \downarrow$
Elastic: $P_{\varepsilon_d} > 1$	$\Delta Q > \Delta P$	$\Delta TR \Downarrow$	$\Delta TR \Uparrow$
Inelastic: $P_{\varepsilon_d} < 1$	$\Delta Q < \Delta P$	$\Delta TR \Uparrow$	$\Delta TR \Downarrow$
Unit Elastic: $P_{\varepsilon_d} = 1$	$\Delta Q = \Delta P$	0	0

Cross-Price Elasticity

Cross-Price elasticity of Demand ($Cross - P_{\varepsilon_d}$)

Measures the responsiveness of the quantity demanded for a good to a change in the price of another good, ceteris paribus.

Formula

$$Cross - P_{\varepsilon_d} = \frac{\%\text{ change in quantity of good A}}{\%\text{ change in price of good B}} = \frac{\%\Delta Q_A}{\%\Delta P_B}$$

Cross-Price Elasticity

- If cross price elasticity > 0, then the two goods are *substitutes*
- If cross price elasticity < 0, then the two goods are *complementary*
- If cross price elasticity $= 0$, then the two goods are *independent*

Income Elasticity

Income elasticity of demand (Y_{ε_d})

Measures the responsiveness of the quantity demanded for a good or service to a change in the income of the people demanding the good.

Formula

$$Y_{\varepsilon_d} = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in income}} = \frac{\%\Delta Q_D}{\%\Delta Y}$$

Income Elasticity

- Normal goods have a positive income elasticity, when income increases the quantity increases as well.
- Necessities have income elasticity between 0 and 1
- Luxury goods have an income elasticity > 1, quantity increases by more than income.
- Inferior goods have a negative income elasticity, quantity decreases when income increases.

Price elasticity of supply

Price elasticity of supply (P_{ε_s})

Measures the responsiveness of the quantity supplied of a good or service to a change in its price.

Formula

$$P_{\varepsilon_s} = \frac{\%\text{ change in quantity supplied}}{\%\text{ change in price}} = \frac{\%\Delta Q_s}{\%\Delta P}$$

Price elasticity of supply

- When $P_{\varepsilon_s} > 1$, then supply is price elastic
- When $P_{\varepsilon_s} < 1$, then supply is price inelastic
- When $P_{\varepsilon_s} = 0$, supply is perfectly inelastic
- When $P_{\varepsilon_s} = \infty$, supply is perfectly elastic

Determinants of Elasticity of Supply

- In general, price elasticity of supply depends on the flexibility of sellers to change the quantity. The easier it is to respond to a change in price, the higher the elasticity would be.
- *Time period*. The shortest the time period the lower the flexibility.
- *Productive Capacity*: Limits in production How much can the firm produce?

Determinants of Elasticity of Supply

- *Size of firm/industry*: The larger the firm the easier it is to respond to a change in price. For example if the price increases, it is easier for a factory that produces furniture to increase production than it is for a carpenter.
- *Mobility of Factors of Production*: How easy it is to transfer production.
- *Ease of Storing Stock*: The easier it is for a firm to maintain stock product the more flexibility they have to changes in prices. For example, storing fresh fruit is not easy.

Supply Elasticity and TR

We can do the same with the elasticity of supply.

Elasticity of Supply	$P\&Q$ Changes	ΔTR if $P\uparrow$	ΔTR if $P\downarrow$
Elastic: $P_{\varepsilon_s} > 1$	$\Delta Q > \Delta P$	$\Delta TR \Uparrow$	$\Delta TR \Downarrow$
Inelastic: $P_{\varepsilon_s} < 1$	$\Delta Q < \Delta P$	$\Delta TR \Uparrow$	$\Delta TR \Downarrow$
Unit Elastic: $P_{\varepsilon_s} = 1$	$\Delta Q = \Delta P$	$\Delta TR \Uparrow$	$\Delta TR \Downarrow$

What We Learned Today

- Equilibrium *Demand* = *Supply*
- Price Mechanism: Prices will change to restore Equilibrium
- Equilibrium Analysis, how the market reallocates resources to move to a new equilibrium point

What We Learned Today

- Elasticity of demand measures the responsiveness of the quantity demanded to a change in price.
- Types of elasticity
- The factors that determine the elasticity of a good
- Elasticity and Total Revenue
- Other types of elasticity

Conclusion

- Review today's lesson.
- Read the relevant chapters in the book (Ch.3 pg. 42-51 and Ch.4, including all boxes and case studies)
- Search online for more sources.
- Ask questions in seminar if anything is unclear.
- Do self-test questions at the end of the chapter and online.