

Demand, supply and policy (2.1-2.7)

International Baccalaureate · IB Diploma · Economics · HL

Demand, supply and policy

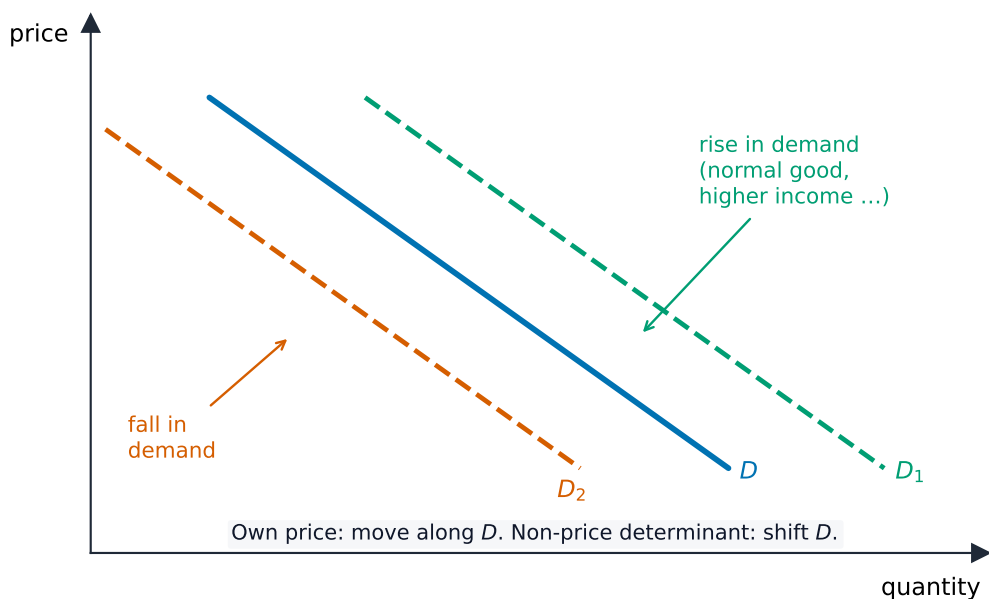
IB Diploma Programme Economics HL, Unit 2 *Microeconomics* (first assessment 2022). This topic covers syllabus sections 2.1–2.7 in full: demand, supply, competitive market equilibrium, the critique of maximizing behaviour, elasticity of demand and supply, and the role of government in microeconomics. One shared market model runs through the worked examples: demand $Q_d = 140 - 2P$ and supply $Q_s = 20 + 4P$, equilibrium $P = 20$, $Q = 100$ – the same numbers used across the Edexcel drives, so every calculation cross-checks.

Must-know for this topic:

Family	Relationship
demand	$Q_d = 140 - 2P$; movements vs shifts; the Law from diminishing marginal utility
supply	$Q_s = 20 + 4P$; shifts with costs, technology, taxes, subsidies
elasticity	$PED = \frac{\% \Delta Q_d}{\% \Delta P}$; $PES = \frac{\% \Delta Q_s}{\% \Delta P}$; YED/XED; TR test
welfare	consumer + producer surplus; allocative efficiency where $P = MC$
government	indirect taxes, subsidies, price controls; max/min quantity controls

Demand and supply

Demand is the quantity consumers are willing AND able to buy at each price over a period (2.1). The demand curve slopes downward – the LAW of demand – explained by DIMINISHING MARGINAL UTILITY: each extra unit gives less additional satisfaction, so a lower price is needed to justify it. A change in the good's own price MOVES ALONG the curve; shifts follow income (normal/inferior), the prices of substitutes and complements, tastes, expectations and the number of consumers. CONSUMER choice theory (2.4's critique): the rational, utility-maximising consumer is a simplification – bounded rationality, herd behaviour, framing and imperfect information bend real choices, and BEHAVIOURAL economics supplies the evidence.

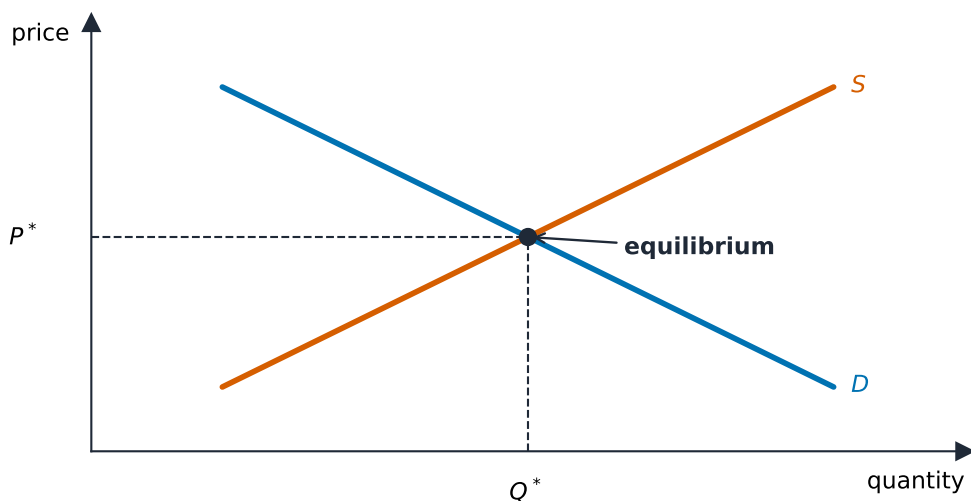


A price change moves along D ; a non-price determinant shifts the whole curve

Supply is the quantity producers are willing AND able to sell at each price (2.2); higher prices make production profitable, so the curve slopes upward. Own-price changes move ALONG; shifts follow costs of production, technology, indirect taxes and subsidies, and the number of sellers. The profit-maximising producer assumption (2.4 again) is also a simplification – satisficing, corporate social responsibility and stakeholder aims bend it.

Competitive market equilibrium

Equilibrium (2.3) sets $Q_d = Q_s$: $140 - 2P = 20 + 4P$ gives $P^* = 20$, $Q^* = 100$. At $P = 12$: excess demand = $116 - 68 = 48$ – the price is bid up; at $P = 25$: excess supply = $120 - 90 = 30$ – the price is pushed down. The market's self-correction is the “invisible hand” allocating resources by price signals, rationing and incentives.



equilibrium: $Q_d = Q_s$ at (P^*, Q^*) (market clears)

Equilibrium is where quantity demanded equals quantity supplied

Welfare: consumer surplus

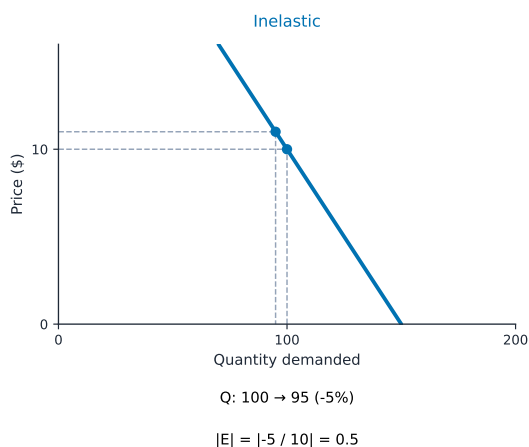
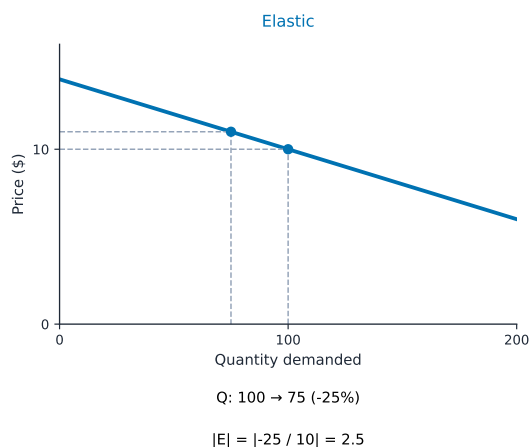
is the area below the demand curve above price; **producer surplus** the area above supply below price. At equilibrium here: $CS = \frac{1}{2} \times 100 \times (70 - 20) = 2500$ and $PS = 20 \times 20 + \frac{1}{2} \times (100 - 20) \times 20 = 400 + 800 = 1200$ (supply starts at 20 units when the price is 0, so the area is a rectangle plus a triangle). **Allocative efficiency** holds where $P = MC$ – the competitive equilibrium in the absence of externalities – and the SUM of the surpluses (social surplus) is then maximised. Any price away from equilibrium creates deadweight loss.

Elasticity

Price elasticity of demand

(2.5): $PED = \frac{\% \Delta Q_d}{\% \Delta P}$. On the shared model at $P = 20$: price rising to 22 moves Q_d from 100 to 96, so $PED = \frac{-4\%}{+10\%} = -0.4$ – inelastic. The TOTAL REVENUE test: $TR = P \times Q$ rises from 2000 to 2112 when price rises, confirming inelastic demand; TR peaks (unitary PED) at $P = 35$, $Q = 70$, $TR = 2450$. PED depends on substitutes, necessity, the share of income and time. HL adds: linear demand is elastic at high prices and inelastic at low prices; marginal revenue = $70 - Q$ here, and $MR = 0$ exactly where TR peaks.

Price: 10 → 11 (+10%); both quantities start at 100



The same 10% price rise: a small fall in quantity (inelastic) or a large one (elastic)

Price elasticity of supply (2.6): $PES = \frac{\% \Delta Q_s}{\% \Delta P}$; price 20 → 24 moves Q_s 100 → 116, so $PES = +0.8$. PES depends on spare capacity, stocks, factor mobility and time. IB applications: primary commodities tend to have INELASTIC supply (growing periods, perishability) and often inelastic demand (necessities) – so small demand shifts cause LARGE price swings, the volatility that commodity exporters suffer.

Other elasticities (HL within 2.5): income elasticity $YED = \frac{\% \Delta Q_d}{\% \Delta \text{income}}$ (positive for normal, negative for inferior; > 1 luxury) and cross elasticity XED between goods (positive substitutes, negative complements) – firms use YED to forecast over the business cycle and XED to price against rivals.

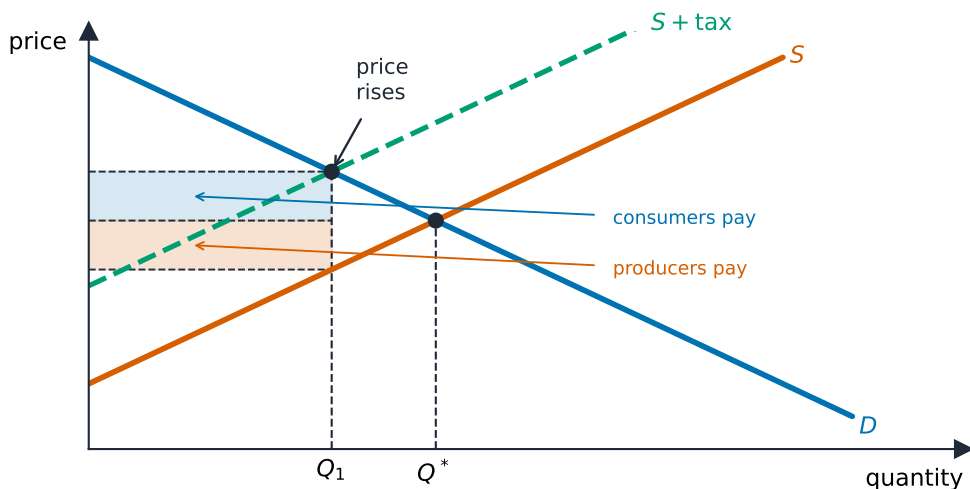
The role of government in microeconomics

Government intervenes (2.7) when markets fail or on equity grounds. **Indirect taxes**

: a specific tax of 6 on the shared model shifts supply to $Q_s = 4P - 4$; equilibrium moves to $P_c = 24$, $Q = 92$ with producers keeping 18 – consumers pay 4 more, producers receive 2 less, revenue $6 \times 92 = 552$ per day, and incidence follows relative elasticity (demand at -0.4 is the inelastic side, so consumers bear more).

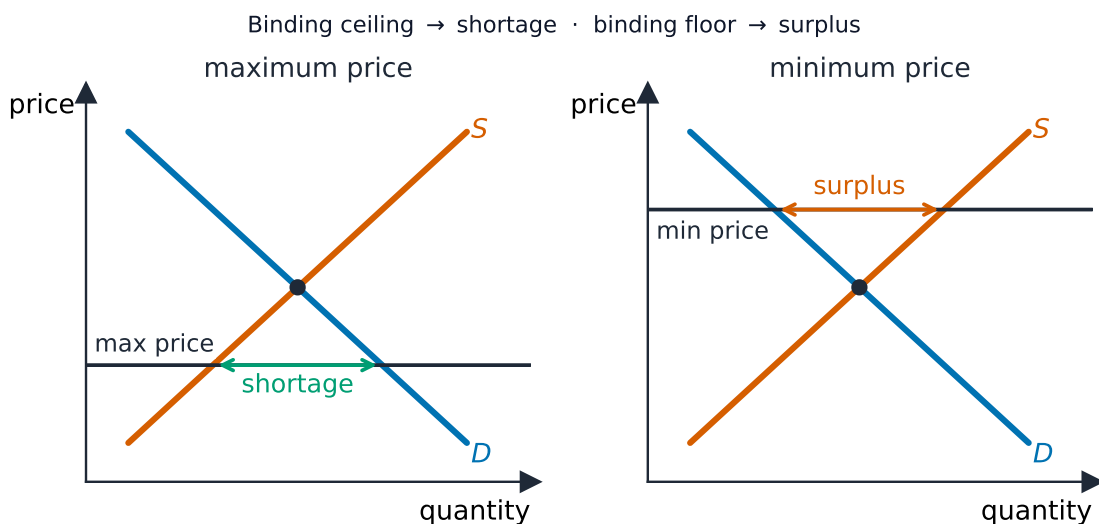
Subsidies (6 per unit) reverse the shift: $P_c = 16$, $Q = 108$, cost $6 \times 108 = 648$.

Price controls: a **maximum price** at 16 creates excess demand $108 - 84 = 24$ (rationing, queues, black markets); a **minimum price** at 24 creates excess supply $116 - 92 = 24$ (the government may have to buy the surplus). Quantity controls (quotas) restrict supply directly. Every intervention answer weighs the correction against unintended consequences – the Unit-1 key concepts (intervention, efficiency, equity) are the framing.



tax: S shifts left · incidence split consumers/producers

An indirect tax shifts supply up; consumers and producers share the burden



A binding maximum price causes a shortage; a binding minimum price causes a surplus

Worked example (original, on the shared model). The market sits at equilibrium ($P = 20$, $Q = 100$) and price rises to 25: quantity demanded falls to $140 - 50 = 90$. Percentage changes: $-10 \div 100 = -10\%$ against $+5 \div 20 = +25\%$, so $PED = 0.4$ – inelastic. Total revenue moves $20 \times 100 = 2\,000$ to $25 \times 90 = 2\,250$: with $|PED|$ below 1, the price rise RAISES revenue – the TR test in one motion.

Data-response practice (Paper 2 style)

Extract. In July 2023 India, which supplied about 40% of world rice exports, put an **export ban** on non-basmati white rice to keep food prices at home low. The FAO All Rice Price Index rose by almost 10% in one month and in August 2023 reached its highest level since 2008. Rice prices jumped in many importing countries in Asia and Africa. India eased the ban in September 2024.

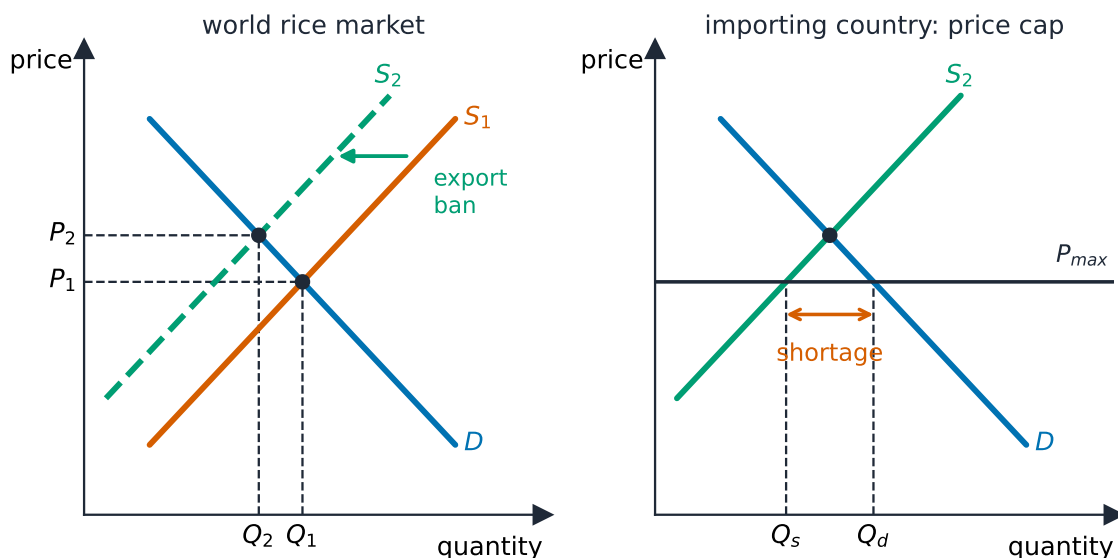
Country R imports most of its rice.

	Before the ban	After the ban
Price of rice (\$ per kg)	0.80	1.00
Rice bought (thousand tonnes per month)	50	48

Country R’s government is considering a maximum price of \$0.85 per kg. At that price sellers would supply 44 thousand tonnes a month, but consumers would want to buy 49.5 thousand tonnes.

Questions

- (a) Define *maximum price*. [2]
- (b) Using a demand and supply diagram, explain why India’s export ban raised the world price of rice. [4]
- (c) Calculate the price elasticity of demand for rice in Country R and comment on your answer. [2]
- (d) Using a diagram, explain the effect of the planned maximum price on the rice market in Country R. [4]
- (e) Using information from the text and your knowledge of economics, evaluate the use of a maximum price to protect consumers in Country R from higher rice prices. [15]



Left: the export ban shifts world supply left. Right: a maximum price below the new equilibrium creates a shortage.

Model answers

(a) A maximum price is a legal upper limit on the price of a good, set by the government below the equilibrium price. Sellers may not charge more than this price.

(b) The ban takes Indian rice off the world market, so world supply shifts left from S_1 to S_2 (left panel). At the old price P_1 there is now excess demand, so buyers bid the price up to P_2 and the quantity traded falls from Q_1 to Q_2 . The price rises a lot because demand for rice is price inelastic: it is a staple food with few close substitutes.

(c) $\% \Delta Q_d = \frac{48-50}{50} \times 100 = -4\%$ and $\% \Delta P = \frac{1.00-0.80}{0.80} \times 100 = +25\%$, so $PED = \frac{-4}{25} = -0.16$. Demand is very price inelastic: rice is a necessity, so households keep buying it and spend more of their income on it.

(d) In the right panel the maximum price P_{max} is below the new equilibrium price P_2 . At P_{max} quantity supplied falls to Q_s (44 thousand tonnes) and quantity demanded rises to Q_d (49.5 thousand tonnes), so there is a shortage of 5.5 thousand tonnes a month. The price cannot rise to clear the market, so rice is shared out in other ways: queues, "first come, first served" or rationing. Some rice may be sold illegally above P_{max} on a black market.

(e) A strong answer explains the theory, uses the diagram and the data, then weighs the arguments.

- **The case for.** Demand is very inelastic ($PED = -0.16$), so the price rise from \$0.80 to \$1.00 mostly raises spending, not saving. Poor households spend a large share of their income on rice and are hit hardest. A cap at \$0.85 lowers the price for everyone who can still buy rice, and it costs the government almost nothing to announce.

- **Shortage and black markets.** The shortage of 5.5 thousand tonnes is about 11% of what consumers want. Rice goes to those who queue first or know the sellers, not to those in most need, and black-market prices may rise above \$1.00.
- **Supply falls further.** Country R imports most of its rice and importers pay the world price. If they must sell below what they pay, they import less, and the shortage grows. Local farmers also receive less, so in the long run, when supply is more elastic, they grow less rice.
- **Stakeholders.** Consumers who get rice gain; those who cannot get it lose. Importers and farmers lose income. The government must pay to enforce the cap and to fight the black market.
- **Alternatives.** The government could pay importers the gap between the world price and \$0.85 (about 0.15×48 million kg = \$7.2 million a month), release rice from a **buffer stock**, cut any import tariff, or give targeted **cash transfers** or food vouchers to poor households. Transfers protect the poor while the price still signals that rice is scarce.
- **Short run and long run.** The ban was temporary (India eased it in 2024). A short, time-limited cap combined with government imports could protect consumers through a temporary shock. A long-lasting cap would damage supply.

Judgement: a maximum price on its own is unlikely to protect the poorest consumers, because the shortage it creates falls hardest on them. Targeted transfers, with a buffer stock released during the shock, protect them at a known budget cost. If the government does cap the price, the cap should be temporary and the government should fund imports so that supply does not fall.

What examiners reward: precise definitions, a diagram that you refer to in the text, the extract's own numbers (the price rise, the PED, the shortage), more than one stakeholder, and a conclusion that answers the question.

Checklist

- Demand definition, the law from diminishing marginal utility, movements vs shifts (2.1).
- Supply definition, movements vs shifts (2.2).
- Equilibrium (20, 100); excess demand 48 at 12; excess supply 30 at 25; the invisible hand (2.3).
- The critique of maximizing behaviour: bounded rationality, herding, framing for consumers; satisficing and CSR for producers (2.4).
- PED with the -0.4 calculation and the TR test ($2000 \rightarrow 2112 \rightarrow 2450$); determinants; linear-demand elasticity ranges and MR (HL) (2.5).
- PES $+0.8$ with determinants; commodity volatility from double inelasticity (2.6); YED and XED classifications (HL).

- Consumer/producer surplus (2500/1200); allocative efficiency at $P = MC$; social surplus (2.3).
- Government (2.7): tax of 6 (price 24, quantity 92, revenue 552, incidence 4:2); subsidy of 6 (price 16, quantity 108, cost 648); maximum price 16 (shortage 24); minimum price 24 (surplus 24).

Boundary notes: HL Paper 3 quantifies exactly this arithmetic – elasticity from data, incidence, surplus areas. Paper 1's 25-mark essays want a diagram, definitions and evaluation of government failure against market failure. The nine key concepts (intervention, efficiency, equity) frame the policy questions. All worked numbers are original on the shared model.