

Choices begin with scarcity

Scarcity means that available time, resources and knowledge cannot satisfy every possible use. It does not mean that everything is rare or that everyone is poor. Economics studies choices under these limits. Throughout this lesson, every person, price and situation is illustrative. Start with this question: what must be given up?

A feasible choice is an available choice

A feasible set contains the options that a person can actually choose, given relevant constraints. A budget, opening hours, physical capacity and existing commitments can all matter. Preferences rank feasible alternatives; they do not make an unavailable alternative available. Separate “I would like it” from “I can choose it now”.

Worked example: draw a budget boundary

An illustrative weekly budget is £36. Books cost £9 each and lunches cost £6 each. Let B be books and L be lunches: $9B + 6L$ must be no more than 36. All books gives 4 books; all lunches gives 6 lunches. Two books and three lunches exactly exhaust the budget.

Worked example: calculate the trade-off

On that budget boundary, one additional book uses £9 that could buy 1.5 lunches. Its opportunity cost is therefore 1.5 lunches when lunch spending is the displaced alternative. With indivisible items, swapping two books for three lunches gives an exact feasible exchange. A price ratio describes the boundary's trade-off, not the learner's preferences.

Opportunity cost is the best forgone alternative

Opportunity cost is the value of the next-best feasible alternative sacrificed by a choice. Do not add together mutually exclusive alternatives. If the same hour could earn £18 tutoring or £12 gardening, choosing a third activity for that hour does not forgo £30. It forgoes whichever available alternative the person ranks highest.

Keep cash and economic cost separate

An explicit cost is a payment. An implicit cost is the value of an owned resource used instead of its next-best alternative. An afternoon project can use materials and unpaid time. Count each sacrifice once. Include an implicit time cost only when the comparison has not already accounted for the forgone activity.

Sunk costs belong to the past

A sunk cost has already been incurred and cannot be recovered through the current decision. It can explain how someone reached a situation, but it does not change the relative future consequences of available options. A refundable deposit is not fully sunk. Resale value, cancellation charges and future commitments need separate checks.

Worked example: continue or leave?

An illustrative concert ticket cost £18 and cannot be refunded or resold. Attending now brings enjoyment valued at £25 and requires £8 of travel. Staying home brings enjoyment valued at £14 with no extra cost. Compare future net values: attending gives £17; staying gives £14. Attending has a £3 advantage.

Think at the margin

Marginal means additional: the benefit or cost of one more unit, hour or step. For a divisible activity, expand while the next increment's benefit exceeds its opportunity cost. For discrete options, compare actual available bundles. A large total benefit does not imply that every additional unit is worth its cost.

Worked example: choose the next session

Four optional practice sessions have additional benefits valued at £31, £22, £12 and £5, in that order. Each session has a £15 opportunity cost. Net increments are £16, £7, minus £3 and minus £10. Taking the first two gives a total net benefit of £23. The third reduces that total.

Rules need their assumptions

A useful model states what is held fixed and what is omitted. The session example assumes diminishing additional benefits, constant additional cost and no hidden interaction. Real learning may have thresholds: a final session might unlock a qualification. When increments depend on one another, evaluate the relevant package before applying a marginal rule.

Uncertainty changes what we compare

Many outcomes are uncertain. Expected value weights each possible outcome by its probability, but people may also care about risk, timing and worst cases. Gathering information has a cost and can improve a decision. More information is worthwhile only when its expected usefulness exceeds its relevant cost, including delay.

Analysis and values answer different questions

A positive claim concerns what happens or could happen under specified conditions. A normative claim concerns what ought to happen or which values should guide action. Respect for individual choice is a normative commitment. Whether a particular rule expands feasible choices is an empirical or model-based question that still needs evidence.

A reusable decision checklist

Name the decision and the person making it. Identify feasible alternatives and relevant constraints. Compare future benefits and opportunity costs, counting each sacrifice once. Ignore only costs that are genuinely sunk. Examine the next increment or complete package. State uncertainty, affected people and the values behind your final recommendation.

Exchange can rearrange possibilities

People can gain from exchange because they value goods differently, face different opportunity costs, or both. Specialisation can also change what a group produces. These are related but distinct sources of gain. Every example in this lesson is illustrative. A voluntary agreement shows expected gains for participants under their information, not guaranteed gains for everyone.

Absolute advantage asks about productivity

Absolute advantage means producing more output with the same resources, or using fewer resources for the same output. It is measured good by good. Comparative advantage instead asks which producer sacrifices less of another good. A producer can be more productive in every activity yet still benefit from exchange with someone less productive.

Worked example A: set up production

Ada and Ben each have eight working hours. Ada makes four loaves or two metres of cloth per hour. Ben makes one loaf or one metre of cloth per hour. Within this illustrative model, each person can split time freely and has constant productivity. Ada has an absolute advantage in both goods.

Worked example A: compute opportunity costs

For Ada, one loaf costs half a metre of cloth: two divided by four. For Ben, one loaf costs one metre: one divided by one. Ada has comparative advantage in bread. Conversely, one metre costs Ada two loaves and Ben one loaf. Ben has comparative advantage in cloth despite lower absolute productivity.

Worked example A: establish a baseline

Initially, each person spends four hours on each good. Ada produces sixteen loaves and eight metres. Ben produces four loaves and four metres. Combined production is twenty loaves and twelve metres. With no trade, each consumes their own output. Record this baseline before claiming that a different arrangement benefits either person.

Worked example A: reorganise and exchange

Ada switches to six bread hours and two cloth hours, producing twenty-four loaves and four metres. Ben makes cloth for eight hours, producing eight metres. Ada then exchanges six loaves for four of Ben's metres. Final bundles: Ada has eighteen loaves and eight metres; Ben has six loaves and four metres.

Terms of trade divide the available gain

The exchange rate was four metres for six loaves, or two-thirds of a metre per loaf. That lies between Ada's bread opportunity cost of half a metre and Ben's cost of one metre. Rates strictly between these costs can benefit both at the margin, provided desired quantities, feasibility and exchange costs also permit agreement.

Worked example B: a different technology

Mira produces four app screens or two tests per hour. Sol produces one screen or three tests per hour. Each has six hours. One screen costs Mira half a test and Sol three tests. With three hours on each task initially, Mira produces twelve screens and six tests; Sol produces three screens and nine tests.

Worked example B: verify the gains

Full specialisation gives Mira twenty-four screens and Sol eighteen tests. Mira trades six screens for nine tests. Mira finishes with eighteen screens and nine tests; Sol finishes with six screens and nine tests. Each improves on the baseline. The exchange rate of 1.5 tests per screen lies between their opportunity costs.

Trading uses resources too

Finding partners, comparing quality, negotiating, transporting goods and enforcing agreements all have costs. In the bread example, each participant gained two loaves before exchange costs. If arranging the exchange costs each the equivalent of one loaf, each retains a one-loaf net gain. Larger costs can eliminate the advantage or prevent trade entirely.

Preferences and alternatives still matter

Lower opportunity cost creates a production opportunity; it does not force anyone to want the resulting goods. Potential partners may disagree on quality, quantity or timing. Their outside alternatives shape acceptable terms. A mutually beneficial reallocation exists only when the final bundles are feasible and preferred after all relevant costs are considered.

More total output need not mean everyone gains

An increase in aggregate output does not by itself show that each person benefits. Prices, ownership and adjustment costs affect distribution. A worker may lose a valued occupation even when consumers gain. Possible compensation is different from compensation actually received. Assess the relevant people and transition costs rather than treating a group total as everyone's experience.

Institutions support or obstruct cooperation

Clear ownership, reliable information and workable contracts can reduce uncertainty about what is exchanged and on what terms. Competition among alternatives can improve options. These are mechanisms to investigate, not guarantees of perfect outcomes. A rights-based judgement about permissible exchange differs from a positive claim about productivity, prices or measured welfare.

Audit a claim about gains from trade

Check resources, production rates, units and opportunity costs. Specify the baseline, the new production plan and the exchange. Verify that no goods appear from nowhere. Compare each person's final bundle after transaction costs. State which assumptions support the claimed gains, which people are included, and what the calculation does not establish.

A market model organises plans

Demand and supply describe quantities people plan to buy and sell at different prices over a specified period. They are schedules, not single quantities. An equilibrium price makes those planned quantities equal within the model. All markets and numbers in this lesson are illustrative; actual markets may have search, contracts, queues and bargaining.

Demand relates quantity to the good's own price

A demand schedule gives quantity demanded at each own price, holding relevant other conditions fixed. Our illustrative market has $Q_d = 60 - 2P$, where P is pounds per box and Q_d is boxes per week. At £10, quantity demanded is forty boxes; at £15, it is thirty boxes.

A movement is different from a shift

A change in the good's own price causes a movement along an unchanged demand curve. A change in income, preferences, buyer numbers, expectations or related-good prices can shift demand. A rightward shift means more is demanded at a given own price. Demand is a schedule; quantity demanded is one point on it.

Supply describes sellers' conditional plans

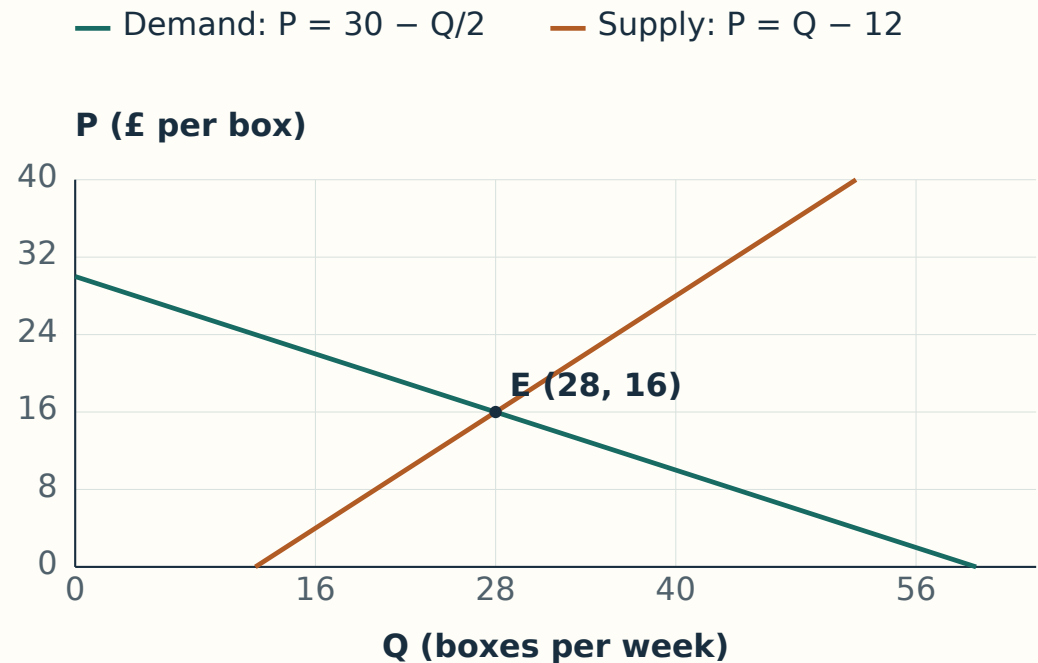
A supply schedule gives quantity supplied at each own price, holding technology, input prices and other relevant conditions fixed. Here $Q_s = 12 + P$. At £10, sellers plan twenty-two boxes per week; at £15, twenty-seven. The upward slope represents a larger planned quantity at a higher price within the illustrative range.

Supply shifts have different causes

Lower input costs or improved technology can increase supply: more is offered at each price. Higher costs or lost capacity can reduce it. A change in the product's own price is a movement along supply, not a supply shift. Time matters because firms can adjust some inputs quickly and others only slowly.

Worked example: solve the equilibrium

Set the planned quantities equal: $60 - 2P = 12 + P$. Subtract 12 and add $2P$ to get $48 = 3P$. Divide by three: $P = £16$. Substitute into either schedule: $Q = 28$ boxes per week. Check both: $60 - 32 = 28$ and $12 + 16 = 28$.



Worked example: diagnose a shortage

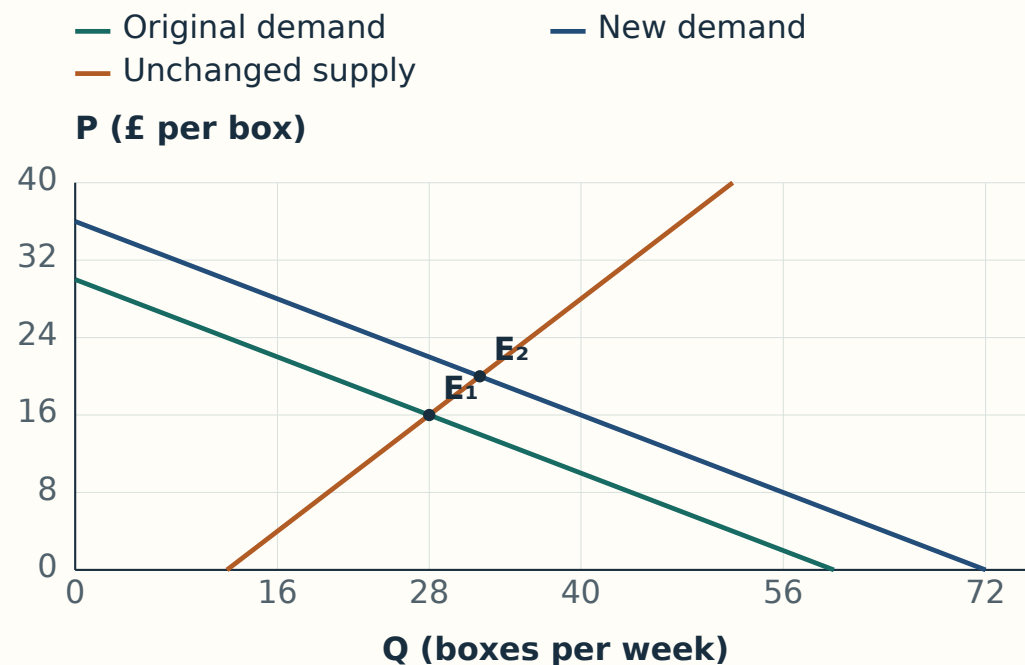
At a price of £12, $Q_d = 60 - 24 = 36$ boxes, while $Q_s = 12 + 12 = 24$ boxes. Excess demand is twelve boxes per week. This is a shortage at that price: planned purchases exceed planned sales. It is different from scarcity, which exists even when the market clears.

Worked example: diagnose a surplus

At £20, quantity demanded is twenty boxes and quantity supplied is thirty-two. Excess supply is twelve boxes per week. Sellers' plans exceed buyers' plans at that price. A surplus does not mean the goods have no possible use; it means the specified price and conditions do not reconcile those purchase and sale plans.

Worked example: a demand shift

Suppose demand becomes $Q_d = 72 - 2P$ while supply remains $Q_s = 12 + P$. At each price, buyers now want twelve additional boxes. Equilibrium satisfies $72 - 2P = 12 + P$, giving $P = £20$ and $Q = 32$. Demand shifted; the resulting price change causes movement along unchanged supply.



Worked example: a supply contraction

Return to original demand, $Q_d = 60 - 2P$. Now supply becomes $Q_s = 6 + P$, six fewer boxes at each price. Equating schedules gives $60 - 2P = 6 + P$, so $P = £18$ and $Q = 24$. A contraction of supply raises price and lowers equilibrium quantity in this model.

Several changes can occur together

If demand rises while supply falls, both changes tend to raise price in this model. Their quantity effects oppose one another, so quantity's direction cannot be inferred without relative magnitudes. With $Q_d = 72 - 2P$ and $Q_s = 6 + P$, equilibrium is £22 and twenty-eight boxes, the original quantity at a higher price.

Observations do not identify the cause automatically

A higher observed price and quantity are consistent with a demand increase under an unchanged upward-sloping supply curve. They do not prove that demand was the only thing that changed. Quality, income, costs, seasonality and market boundaries may also differ. A causal explanation needs a justified account of what moved and what stayed fixed.

Equilibrium is not a moral verdict

Market clearing means planned demand equals planned supply under specified conditions. It does not establish justice, adequate information, equal opportunity or absence of harm to outsiders. Efficiency claims need additional assumptions about competition, rights, information and external effects. Whether an outcome should be accepted also depends on values beyond this equality.

Use the model carefully

Define the good, period and units. Write the demand and supply schedules and their valid ranges. Solve for equality and check both sides. For any proposed price, distinguish shortage from surplus. When conditions change, identify the shifted schedule before calculating a new equilibrium. Finally, state assumptions, uncertainty and questions the model leaves unanswered.

Percentage changes make responses comparable

A change of ten units means different things in a market selling twenty units and one selling ten thousand. Percentages express a change relative to a base. Elasticity compares percentage changes in two variables. All data in this lesson are illustrative. Distinguish a percentage change in a rate from a percentage-point change.

Demand elasticity is a conditional response

Price elasticity of demand is the percentage change in quantity demanded divided by the percentage change in own price, along an unchanged demand relationship. Ordinary downward-sloping demand gives a negative signed elasticity. We usually classify its absolute magnitude: above one is elastic, below one is inelastic, and exactly one is unit elastic.

Worked example: use the midpoint method

Price rises from £10 to £12 and quantity falls from 100 to 80 units on one demand curve. Average price is £11; average quantity is 90. Midpoint changes are $2/11 = 18.18\%$ and $-20/90 = -22.22\%$. Signed elasticity is -1.222 approximately; its magnitude exceeds one, so this interval is elastic.

Revenue connects price and quantity

Total revenue equals price multiplied by quantity sold. In the preceding example, revenue changes from £1,000 to £960. The price rise is outweighed by the quantity response. Along unchanged demand, an elastic interval makes price and revenue move in opposite directions; an inelastic interval makes them move in the same direction.

Worked example: an inelastic price cut

Price falls from £20 to £18 while quantity rises from 50 to 54. Average price is £19 and average quantity is 52. The midpoint elasticity is $(4/52)$ divided by $(-2/19)$, approximately -0.731 . Revenue falls from £1,000 to £972: the percentage quantity gain is too small to offset the price reduction.

A straight line can have changing elasticity

Slope compares changes in units; elasticity compares proportional changes. For $Q = 200 - 10P$, the slope is always minus ten units per pound. Point elasticity is $-10P/Q$. At $P = £5$ and $Q = 150$ its magnitude is one-third; at $P = £15$ and $Q = 50$ it is three.

Substitution and time influence responsiveness

Demand often responds more when close substitutes are available, when spending represents a larger budget share, or when buyers have time to adjust. These are tendencies to investigate, not universal numerical laws. A narrowly defined product can face more substitutes than a broad category. Essential uses do not make every quantity completely unresponsive.

Supply has an elasticity too

Price elasticity of supply compares the percentage change in quantity supplied with the percentage change in the price received by sellers, other supply conditions unchanged. It is often positive. Capacity, inventories, input availability and time to expand matter. Demand responsiveness and supply responsiveness jointly determine how a market adjusts to a disturbance.

Other elasticities answer other questions

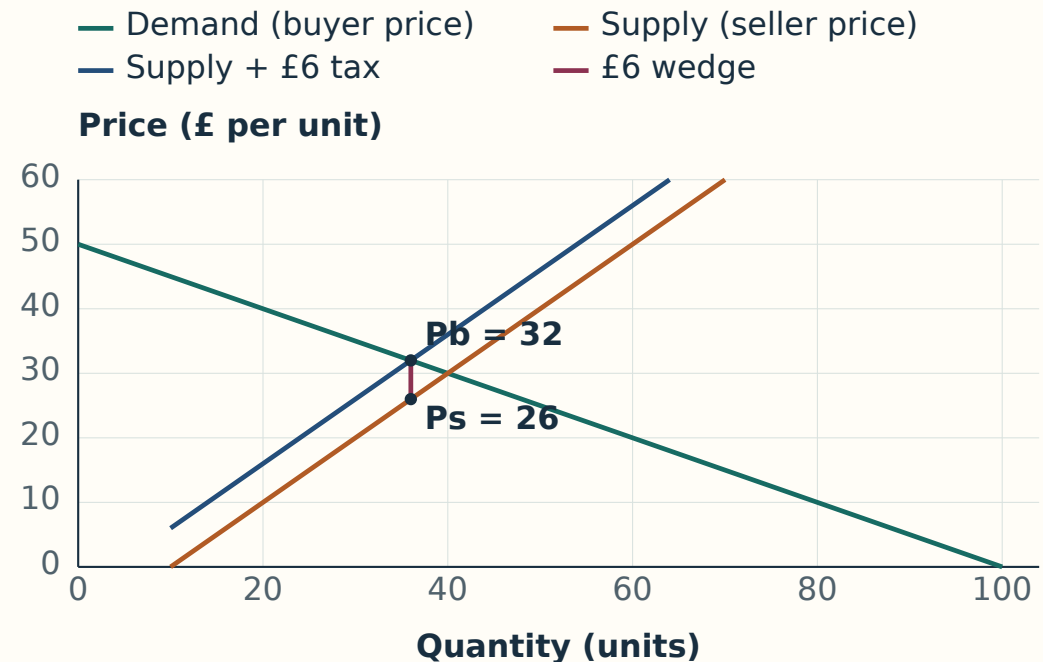
Income elasticity relates quantity demanded to income. A positive value describes a normal good; a negative value describes an inferior good over the relevant range. Cross-price elasticity relates demand for one good to another good's price. Positive responses can indicate substitutes; negative responses can indicate complements, with relevant conditions held fixed.

A tax introduces a price wedge

For a per-unit tax, distinguish the price buyers pay, P_b , from the net price sellers receive, P_s . With a £6 tax, $P_b = P_s + 6$. Our illustrative schedules are $Q_d = 100 - 2P_b$ and $Q_s = 10 + P_s$. Without the tax, one common price is £30 and quantity is forty.

Worked example: calculate tax incidence

Substitute $P_b = P_s + 6$ into demand:
 $100 - 2(P_s + 6) = 10 + P_s$. This
simplifies to $78 = 3P_s$, so $P_s = £26$
and $P_b = £32$. Quantity is thirty-six.
Compared with the untaxed price,
buyers pay £2 more and sellers
receive £4 less per unit.



Legal payment and economic burden can differ

Who sends a tax payment to the authority need not determine who bears its economic cost. In the simple competitive model, the less responsive side generally bears more of a small tax's price burden. At the untaxed equilibrium here, supply elasticity is 0.75 and demand's magnitude is 1.5, consistent with sellers bearing more.

A correlation is not a demand experiment

A hot weekend can increase both cold-drink prices and sales. That does not establish an upward-sloping demand curve; demand may have shifted. To estimate a causal price response, isolate a price change from other influences. Randomised prices or credible quasi-experimental variation can help, but each design needs assumptions, appropriate permissions and careful interpretation.

Calculate, interpret, then qualify

Name the response being measured. Use consistent percentage bases and report whether elasticity is signed or absolute. Check revenue directly when relevant, and separate revenue from profit. For incidence, distinguish buyer and seller prices. Finally, ask whether other conditions were genuinely controlled and whether the estimate applies to the decision at hand.

Production transforms scarce resources

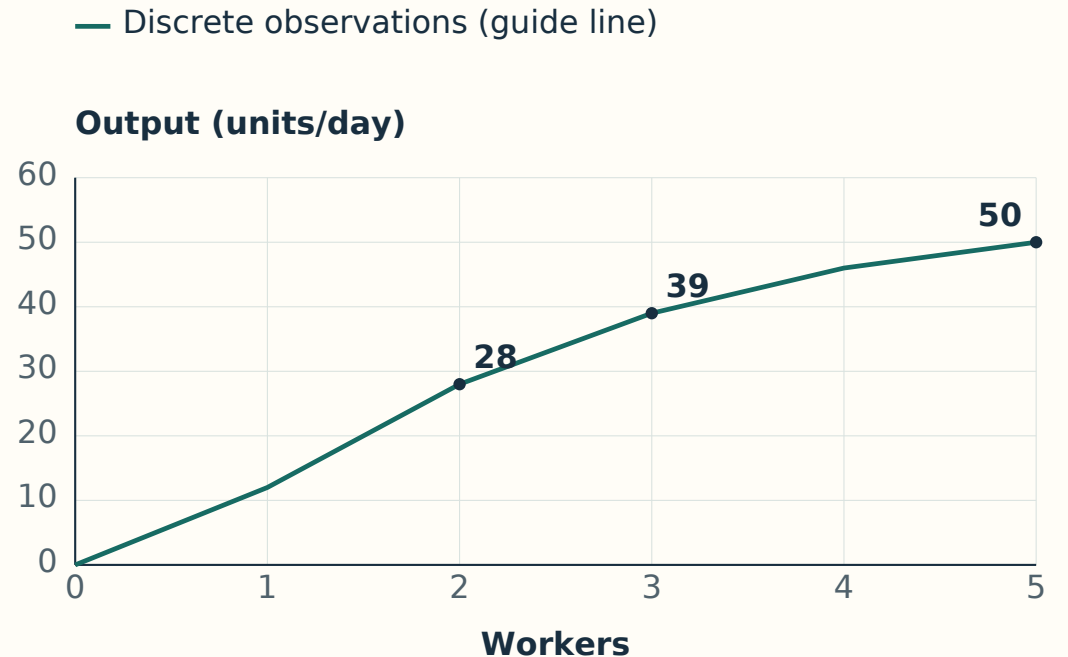
Production combines labour, equipment, materials, knowledge and time into goods or services. Output is a physical or service quantity; revenue is money received for selling it. More output is not automatically more profit or greater social value. Every business, price and production relationship in this lesson is an illustrative teaching assumption.

A production function holds some things fixed

A production function describes attainable output from specified inputs under a given technology. In a short-run example, equipment is fixed while labour can vary. “Short run” means at least one relevant input cannot adjust; it is not a universal number of months. Long-run comparisons allow all relevant inputs to change.

Worked example: marginal product

With zero through five workers, illustrative daily output is 0, 12, 28, 39, 46 and 50 units. Each additional worker therefore adds 12, 16, 11, 7 and 4 units. These increments are marginal products. Marginal product starts falling after the second worker, although total output continues rising throughout the table.



Average and marginal product differ

Average product is total output divided by the number of workers. In the same example, three workers produce thirty-nine units, so average product is thirteen units per worker. The third worker's marginal product is eleven. Adding an increment below the previous average pulls the average down; an increment above it raises the average.

Classify costs along separate dimensions

A fixed cost does not vary with output over the relevant range; a variable cost does. An avoidable cost changes if the activity is stopped; a sunk cost cannot now be recovered. These distinctions are independent. A future monthly subscription can be fixed with respect to sales yet avoidable if the business does not operate.

Cash surplus is not economic surplus

Cash surplus subtracts the stated cash outlays from receipts. Economic surplus also deducts the value of resources used instead of their best feasible alternatives. An owner's unpaid time can therefore matter. Define the measure and comparison before using "profit". Do not subtract an opportunity cost twice when comparing complete alternative plans.

Worked example: contribution per unit

An illustrative product sells for £18. Each unit needs £7 of materials and delivery plus twelve minutes of the owner's time. Alternative work pays £15 per hour. Twelve minutes is 0.2 hours, worth £3. Economic contribution per unit is therefore $£18 - £7 - £3 = £8$ before monthly fixed costs.

Worked example: build the monthly result

The same business has £90 of avoidable monthly cash costs and four maintenance hours. At £15 per hour, fixed economic costs total £150. Thirty sales give thirty times £8 minus £150, or £90 economic surplus. Cash surplus is £240, but ten total working hours have an opportunity cost of £150.

Break-even depends on the decision

With £8 contribution per unit and £150 avoidable fixed economic costs, monthly economic break-even is $150/8 = 18.75$ units. Nineteen whole sales exceed that threshold under the assumptions. The minimum price for one additional sale after fixed commitments are unavoidable is a different question from the volume needed to justify operating.

Past expenditure does not force future production

Suppose the owner previously paid £300 for a design that cannot be refunded or sold. That payment is sunk for next month's operating decision. It may matter when evaluating the original investment, but it does not change next month's alternatives. Future avoidable costs and current resale opportunities still belong in the comparison.

Capacity makes algebra conditional

The owner has twenty hours available. Four maintenance hours leave sixteen production hours. At 0.2 hours per unit, capacity is eighty units. A formula predicting profitable sales beyond eighty is outside the stated feasible set. Expansion would need another assumption about hours, equipment, productivity or outsourcing, with its associated costs.

Worked example: choose a workforce

Return to outputs 0, 12, 28, 39, 46 and 50. Output sells for £12 per unit; each worker costs £100 per day. An already committed £60 daily cost is unavoidable now. Net results for zero through five workers are –£60, –£16, £76, £108, £92 and £40. Three workers is best.

Profit guides choices under specific conditions

Economic profit can signal that resources earn more here than in their stated alternatives. It can encourage entry and imitation where feasible. Losses can encourage adjustment or exit. These mechanisms depend on information, competition and institutions; profit is not a complete measure of social contribution or proof that every cost has been borne privately.

Audit the production decision

State output units, technology, relevant period and feasible inputs. Calculate marginal and average product separately. Classify costs by what the decision changes, including opportunity costs. Reconcile contribution and complete-plan calculations. Test break-even against capacity, and distinguish a marginal order from opening, continuing or expanding an entire operation.

Institutions shape the available choices

Institutions are formal and informal rules that structure interaction: ownership arrangements, contracts, customs, organisational rules and enforcement practices. Organisations are groups operating within or changing those rules. Institutions influence information, incentives and transaction costs. Every numerical situation here is illustrative, and the lesson explains economic concepts rather than rules of any particular legal jurisdiction.

Property rights specify permitted uses

Property rights describe claims about using, excluding others from, benefiting from and transferring resources. Different rights can be separated or conditional. Clear and secure rights can support planning and investment, but defining boundaries and addressing conflicts can be costly. Economic effects and the moral legitimacy of a particular allocation of rights are separate questions.

Contracts make plans conditional on agreement

A contract records agreed obligations, such as delivery, payment, quality and timing. Better specification can reduce misunderstanding, but writing and enforcing every possible contingency is costly. Incomplete contracts leave some future situations unspecified. Reputation, warranties, repeated dealings and dispute procedures can supplement formal terms, each with its own limitations.

Transaction costs change the gains from cooperation

Search, measurement, negotiation, monitoring and dispute resolution use resources. These transaction costs can prevent a trade whose gross benefits exceed production costs. Intermediaries, standards and organisations may reduce some costs while introducing others. Compare total relevant costs, including time and expected failures, rather than selecting the arrangement with the smallest visible fee.

Incentives depend on who receives consequences

A person who expects to keep benefits from improving a resource may have a stronger reason to invest in it. Someone who expects others to bear its costs may take too little care. These are conditional incentive mechanisms, not universal descriptions of human motivation. Norms, preferences, monitoring and the security of claims also matter.

External effects cross the transaction boundary

An externality is an effect on people outside the decision that is not fully reflected in the decision-maker's relevant costs or benefits. Pollution and uncompensated spillover learning are common examples. A price change that affects another seller is not automatically the same kind of externality. Specify the mechanism, affected people and missing incentive.

Worked example: a private output decision

An illustrative workshop can make up to five batches. Additional benefits after all private resource costs are £16, £12, £8, £4 and £1. With no other private consequence, all five add positive value to the owner. Total private net benefit is £41. Now suppose each batch also causes £6 of uncompensated harm to neighbours.

Worked example: include the external cost

Subtract £6 of harm from each batch's private increment. Combined net increments become £10, £6, £2, minus £2 and minus £5. Three batches maximise their summed net value at £18. Five batches give £41 of private benefit minus £30 of harm, or £11. The fourth and fifth reduce the combined total.

Bargaining may help, but conditions matter

If affected parties can identify one another, specify enforceable rights and negotiate cheaply, they may agree on changes that create mutual gains. Bargaining outcomes also depend on initial rights and available alternatives. Many parties, uncertain damage, holdouts, free riding or enforcement problems can block agreement. Potential compensation is different from consent and actual compensation.

Public goods have two technical properties

A public good is non-rival over the relevant range and difficult to exclude non-payers from using. One person's benefit does not substantially reduce another's, and selective access is costly. These properties create a possible free-rider problem. "Public good" does not simply mean beneficial, publicly owned or supplied by government.

Worked example: funding a shared light

Three neighbours value an illustrative shared light at £18, £15 and £11. Provision costs £36. Total stated benefit is £44, leaving an £8 net gain. Equal £12 shares would exceed the third neighbour's benefit. Contributions of £14, £12 and £10 cover the cost and leave individual gains of £4, £3 and £1.

Compare realistic institutional alternatives

Possible responses include clearer rights, contracts, voluntary associations, reputation systems, pricing mechanisms, liability, rules and collective provision. Each requires information, administration and enforcement. Compare how alternatives perform on the actual problem, including errors and side effects. An imperfect existing arrangement should not be judged against an imagined alternative that has no costs or mistakes.

Knowledge and power need scrutiny everywhere

Markets, firms, associations and governments all operate with limited information and imperfect incentives. Competition, transparency, accountability and exit can improve some arrangements, but their availability varies. Private market power and public decision-making power both deserve examination. Institutional analysis should explain mechanisms and evidence rather than assume benevolence or competence from an organisation's label.

Keep efficiency and legitimacy distinct

An efficiency calculation asks what consequences follow under stated assumptions and an evaluative measure. A rights-based judgement asks which actions and claims are permissible. Neither is identical to fairness, consent or total money income. A defensible recommendation identifies affected people, relevant rights, feasible alternatives, enforcement costs, uncertainty and the values guiding the decision.

Money connects transactions across time

Money commonly serves as a medium of exchange, a unit of account and a store of purchasing power. These functions can be imperfect: purchasing power may change, and acceptance varies. Money is not identical to wealth or income. Every amount and rate in this lesson is illustrative, not a current quotation or personal financial recommendation.

Worked example: nominal versus real purchasing power

An illustrative income rises from £500 to £530 while a relevant price index rises from 100 to 108. Nominal income increases by 6%. Expressed in initial-period purchasing power, the new income is $£530/1.08$, approximately £490.74. Real purchasing power falls by about 1.85%, despite the higher number of pounds.

Inflation is a rate of price-level change

Inflation is an increase in a specified general price index over a period. Lower positive inflation means prices rise more slowly, not that the price level falls. Deflation is a decline in that index. Individual relative prices can move differently from the overall index, reflecting changes in demand, supply or quality.

Worked example: compound growth

A hypothetical £1,000 balance grows at 5% per year, with interest retained and no fees or taxes. After one year it is £1,050. After two, it is $£1,050 \times 1.05 = £1,102.50$. The general formula is $\text{future value} = \text{present value} \times (1 + \text{rate})^{\text{number of periods}}$.

Match the rate to the period

A one-per-cent monthly growth rate compounds by multiplying by 1.01 each month. Over twelve months, the factor is 1.01 raised to twelve, approximately 1.126825: effective annual growth of 12.6825%. Multiplying the monthly rate by twelve gives 12%, which omits growth on earlier months' additions. Always check the compounding convention.

Discounting translates future amounts into present equivalents

At a stated discount rate r , a payment received t periods later has present value equal to future payment divided by $(1 + r)$ raised to t . Discounting reverses compounding. At 5% annually, £1,102.50 received in two years has a present value of £1,000 under the same illustrative assumptions.

Worked example: compare a dated project

An illustrative project costs £400 today and returns £220 after one year and £230 after two. At a 10% annual discount rate, present values are £200 and approximately £190.08. Net present value is $£200 + £190.08 - £400 =$ minus £9.92. Under these assumptions, it falls short of the stated alternative return.

Nominal and real returns must be distinguished

If a hypothetical nominal balance grows by 8% while the relevant price level rises by 5%, the exact real growth is $1.08/1.05 - 1$, approximately 2.86%. Subtracting inflation from the nominal rate gives an approximation of 3%. The exact formula compares growth factors, and actual inflation may differ from what was expected.

Expected value is not a certain outcome

With stated probabilities, expected value is the sum of each outcome multiplied by its probability. An illustrative choice yielding £80 with probability 0.6 and minus £40 with probability 0.4 has expected value £32. Neither possible outcome is £32. Risk attitudes, affordability of losses and confidence in the probabilities still matter.

Several exposures can share the same risk

Spreading resources across different activities can reduce exposure to some independent or imperfectly related risks. It does not remove all risk. If outcomes respond to the same underlying shock, apparent variety may offer little protection. Liquidity needs and the consequences of a bad outcome can matter as much as the average expected return.

Bank lending changes balance sheets

In a simplified bank loan, lending £1,000 creates a £1,000 loan asset for the bank and a £1,000 deposit liability when the borrower's account is credited. The borrower receives a deposit asset and a matching debt. This does not create £1,000 of net wealth for the borrower or give banks unlimited lending capacity.

Liquidity differs from solvency

Liquidity concerns meeting payments when due. Solvency concerns whether assets cover liabilities under the relevant valuation. An illustrative bank has assets of £100 and liabilities of £95, leaving equity of £5. An £8 asset loss reduces assets to £92 and equity to minus £3. A solvent institution can nevertheless face a short-term liquidity problem.

Credit reallocates purchasing power and obligations

Credit allows spending before the borrower has earned or saved the full amount, while creating future repayment obligations. It can fund productive activity or unsustainable commitments. Effects on output and prices depend on demand, capacity, expectations, institutions and how credit is used. A balance-sheet mechanism alone does not determine a complete macroeconomic outcome.

Put time, purchasing power and uncertainty together

Label each amount as a stock or flow, nominal or real, and present or future. Match rates to periods and compounding conventions. Discount dated amounts consistently, identify the alternative being used, and test uncertain assumptions. For credit, record assets and liabilities separately. An attractive receipt today can carry a substantial obligation tomorrow.

Leila's map shop: identify the decisions

Leila makes downloadable walking maps. A single map costs £2 and a three-map bundle £5. Each purchase is one order and one payment. Her forecast is 120 orders: 75% singles and 25% bundles. You will evaluate operating, an additional order, a price change and a service switch. All people, services and figures are fictional.

State Leila's time alternative and past commitments

Leila has twenty hours for maps and editing together next month. Editing is available for any of those hours at £18 per hour after its incremental expenses. She values the activities equally apart from financial return. Last month's £240 illustrations and six design hours are unrecoverable. A £12 laptop allocation changes neither spending nor alternative use.

Service A: record the complete operating terms

Service A is already configured. It charges £0.20 plus 3% of each order's price and an avoidable £40 monthly operating charge. Delivery and storage cost £0.10 per order. Each order needs three minutes of service time, and monthly maintenance takes four hours. Leila can stop next month without a cancellation charge.

Service B: separate recurring and one-off differences

Service B charges £0.05 plus 5% per order and £55 per operating month. Delivery expense, three-minute service time and four-hour maintenance are unchanged. Switching from A requires £36 cash and two additional hours once. Both services have identical reliability, customer experience and demand in the model. These are assumptions, not claims about actual providers.

Define measures and rounding before calculating

Calculate fees exactly and aggregate before rounding. There are no taxes, refunds, advertising costs, failed payments or other expenses in this model. Cash surplus subtracts stated cash outlays from revenue. Economic surplus relative to editing also subtracts the value of displaced editing time. Expected fractional orders describe averages, while realised orders are whole counts.

Worked example: another seller's weighted order

Noor sells illustrative templates for £4 or £9, with a 60:40 order mix.

Weighted price is $0.6 \times £4 + 0.4 \times £9 = £6$. A fee of £0.10 plus 2% averages £0.22. Delivery costs £0.18; two minutes valued at £24 per hour cost £0.80. Contribution is therefore £4.80 per order.

Worked example: reconcile two monthly calculations

Noor expects fifty orders, pays £65 monthly and spends 1.5 maintenance hours. Fixed economic costs are $£65 + £36 = £101$. Economic surplus is $50 \times £4.80 - £101 = £139$. Alternatively, £300 revenue less £11 fees, £9 delivery and £65 monthly charges gives £215 cash surplus; total time costs £76.

Worked example: compare complete time allocations

Suppose Noor has ten hours available for templates and alternative work paying £24 per hour. Alternative work alone gives £240. Operating uses nineteen-sixths of an hour, leaving forty-one-sixths for other work, worth £164. Adding £215 business cash surplus gives £379. The advantage over £240 is £139, matching the incremental method.

Worked example: an additional order has a different threshold

For Noor, an extra order priced at p contributes $0.98p - £1.08$ before any new fixed costs. Setting this equal to zero gives $p = 1.08/0.98$, approximately £1.10204. With penny prices, £1.11 is the lowest positive-contribution price. This assumes spare capacity, unchanged other sales and no additional setup requirement.

Worked example: derive a demand boundary

If Noor raises both prices by 20% with mix unchanged, weighted price becomes £7.20 and the fee £0.244. Contribution becomes £5.976. To match the previous £139 surplus, solve $N \times £5.976 - £101 = £139$. The boundary is approximately 40.1606 expected orders, a 19.6787% decline from fifty. This is a condition, not a demand forecast.

Apply the method to Leila's proposed prices

Leila considers a 10% increase to £2.20 and £5.50 on Service A. Keep the same expected mix and other costs. Compare scenarios of 102 and 96 expected orders, and derive the volume that matches her original economic surplus. No demand curve is supplied. Changes in mix, support time or customer exposure could change the comparison.

Worked example: compare recurring service costs

A separate seller, Rowan, has £10 orders. Provider X charges £0.30 plus 2%; provider Y charges £0.10 plus 3%. Their fees are £0.50 and £0.40 per order. Y saves £0.10 per order but costs £8 more monthly. Its recurring advantage is therefore $£0.10N - £8$, positive above eighty orders.

Worked example: add switching costs and time

Rowan's switch costs £20 cash and 1.5 hours worth £20 per hour, totalling £50. At 180 monthly orders, recurring advantage is £10. Cumulative advantage after m months is $£10m - £50$: minus £20 after three months, zero after five and plus £10 after six. This undiscounted calculation assumes stable monthly conditions.

Evaluate Leila's services over stated horizons

Return Leila to the original £2 and £5 prices. Compare B with A at 120 orders, first on recurring costs and then including switching. Derive recurring and first-month volume thresholds. Separately examine 240 orders per month for ten months, with no discounting, and compare the cumulative results after three and ten months.

A threshold must fit the resource budget

Check Leila's twenty-hour limit before recommending any order threshold. Maintenance uses time even at low volume, and switching consumes additional first-month time. For comparison, Noor's ten-hour budget, 1.5 maintenance hours and two minutes per order permit 255 orders. An extra one-hour setup would reduce that illustrative first-month capacity to 225.

Write a conditional, auditable recommendation

Your brief should cover operating, pricing and switching under their separate scenarios. Support it with checked calculations, units and stated assumptions. Identify two material uncertainties and practical ways to investigate them. Distinguish Leila's private economic return from effects on walkers or neighbourhoods. The written brief is ungraded reflection; numerical checks do not certify the quality of the whole recommendation.