



CredGuild

STUDY NOTES

CFA® Program Level I

Economics

2027 curriculum · 8 readings · 35 practice questions

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Version v2027.1 · October 2026

ABOUT THIS EDITION

CredGuild · CFA® Program Level I · Economics

2027 curriculum · Version v2027.1 · Generated October 4, 2026

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USING THIS BOOK

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How to use this book

These are the CredGuild notes for the 2027 CFA® Program Level I curriculum, Economics: 8 readings. They are the same notes as on credguild.com, set out for reading on paper or offline.

What each reading contains

- **What you'll learn:** the learning outcome statements the reading covers.
- **The notes, module by module:** worked examples, key concepts, common exam traps, exam shortcuts and a bottom line.
- **A quick check after each module:** one question with its answer and the full explanation.
- **Practice questions at the end, with the answers.** The full explanation for each one is free on the reading's page at credguild.com; the link is under the answers.

The coloured boxes

KEY CONCEPT

Definitions and formulas to know.

Example. A worked problem, step by step. Try it before you read the working.

COMMON EXAM TRAPS

Mistakes that cost marks.

EXAM SHORTCUTS

Faster ways through a question.

BOTTOM LINE

What to remember from the module.

Using it with the website

Paper is good for reading. Practice works better on the site: it scores each answer as you go, explains every option, keeps a list of the questions you got wrong and spreads the readings across the weeks before your exam. If you are not sure where to start, the free diagnostic test (credguild.com/cfa/level-1/diagnostic/) gives you a score in each topic.

If this book helps you, pass it on to someone else who is studying.

CFA® PROGRAM LEVEL I · TOPIC

Economics

Exam weight 6–9% · 8 readings

How firms behave in different market structures, why economies move through business cycles, and what fiscal and monetary policy can do. The second half covers geopolitics, international trade, capital flows and exchange-rate arithmetic.

Reading 12 Oligopoly

Reading 13 Business Cycle

Reading 14 Fiscal Policy

Reading 15 Quantitative Easing

Reading 16 Introduction to Geopolitics

Reading 17 Comparative Advantage

Reading 18 Capital Flows and the FX Market

Reading 19 Exchange Rate Calculations

ECONOMICS · READING 12

Oligopoly

What you'll learn

LOS 12.a Determine and interpret breakeven and shutdown points (short and long run) and how economies and diseconomies of scale affect long-run average cost.

LOS 12.b Describe the characteristics of perfect competition, monopolistic competition, oligopoly and pure monopoly.

LOS 12.c Explain demand, optimal price and output, and pricing strategy for firms under monopolistic competition, in the short run and the long run.

LOS 12.d Explain demand, optimal price and output, and pricing strategy under oligopoly: kinked demand, Cournot, Stackelberg, Nash equilibrium, collusion and the dominant firm model.

LOS 12.e Identify the type of market structure a firm operates in and describe the use and limitations of concentration measures (N-firm concentration ratio and HHI).

MODULE 12.1

Breakeven, Shutdown, and Scale

This reading explains how a firm decides whether to operate, shut down or change its scale, and how price and output are set under perfect competition, monopolistic competition, oligopoly and monopoly. It ends with the concentration ratio and the Herfindahl-Hirschman Index, the measures used to identify a market structure.

LOS 12.a — Breakeven, shutdown and scale

Short run versus long run

The **short run** is the period over which at least one factor of production (usually capital: plant and equipment) is fixed, so the firm cannot change its scale. In the **long run** every input is variable: leases can lapse and equipment can be sold, so no cost is fixed.

Revenue and cost measures

The breakeven and shutdown rules compare revenue with cost, either in totals or per unit of output (Q):

Measure	Definition
Total revenue (TR)	$TR = P \times Q$
Average revenue (AR)	$AR = TR/Q$, equal to the price when every unit sells at one price
Marginal revenue (MR)	Extra revenue from selling one more unit, $\Delta TR/\Delta Q$
Total fixed cost (TFC)	Costs that do not change with output in the short run, such as rent under a lease
Total variable cost (TVC)	Costs that rise with output, such as materials or merchandise
Total cost (TC)	$TC = TFC + TVC$

Measure	Definition
Average variable cost (AVC)	$AVC = TVC/Q$
Average total cost (ATC)	$ATC = TC/Q$
Marginal cost (MC)	Extra cost of producing one more unit, $\Delta TC/\Delta Q$

Breakeven and shutdown for a price taker

A firm in perfect competition is a **price taker**: it can sell any quantity at the market price, so price = AR = MR.

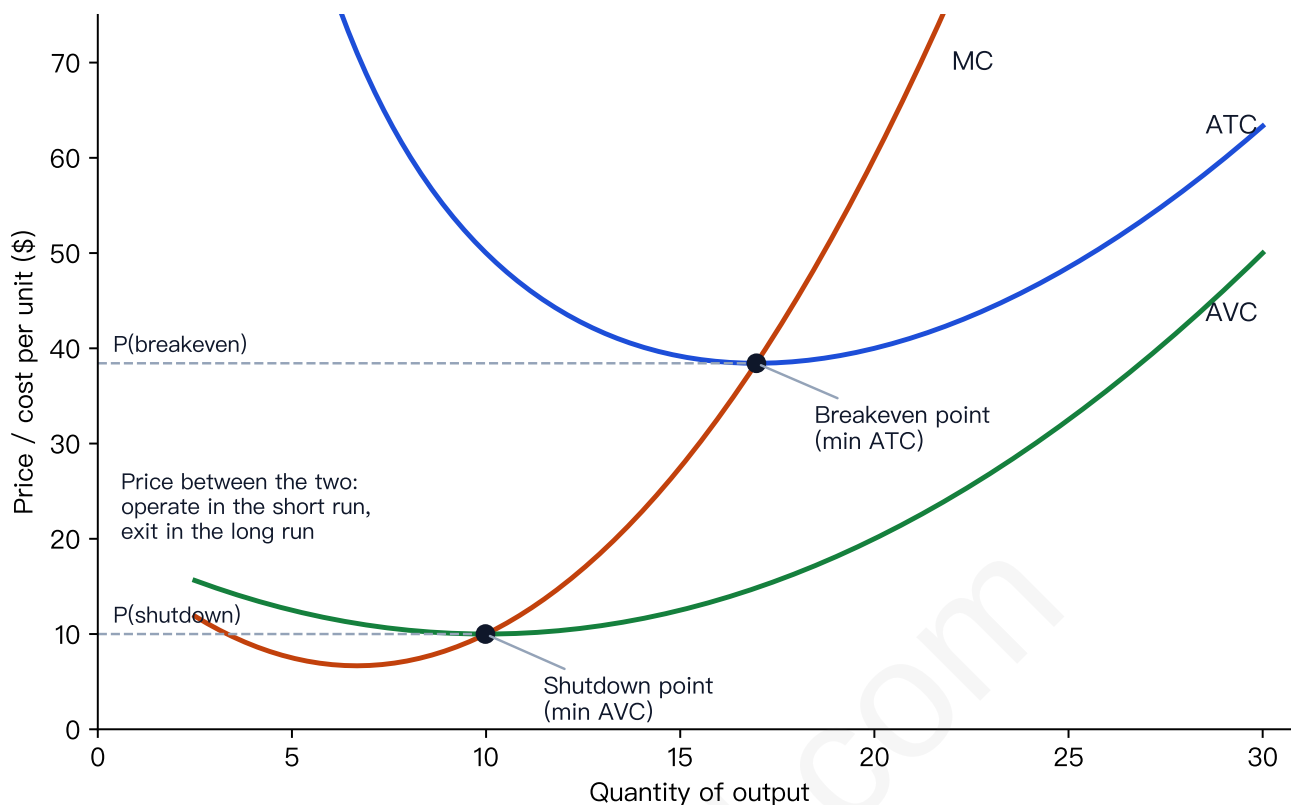
KEY CONCEPT

Condition	Short run	Long run
$AR \geq ATC$	Operate (zero or positive economic profit)	Stay in the market
$AVC \leq AR < ATC$	Operate: revenue covers variable cost, so the loss is no larger than fixed cost	Exit (shut down) unless price is expected to rise
$AR < AVC$	Shut down: operating losses more than fixed cost	Exit

- **Breakeven point:** $P = AR = ATC$ (minimum of ATC for a price taker), where $TR = TC$ and economic profit is zero.
- **Short-run shutdown point:** minimum of AVC; below it the firm shuts down.
- **Long-run shutdown point:** minimum of ATC, the same price as the breakeven point; a firm that expects price to stay below ATC leaves the market.

Both shutdown rules ask one question: does revenue cover the costs the firm could avoid by closing? In the short run only variable costs are avoidable, because fixed costs such as a lease must be paid anyway, so price is compared with AVC. In the long run every cost is avoidable, so price is compared with ATC.

MC cuts both AVC and ATC at their lowest points. When the next unit costs less than the current average, producing it pulls the average down; when it costs more, it pulls the average up. The averages therefore fall while MC lies below them and rise once MC is above them. Minimum AVC comes at a smaller output than minimum ATC. The shutdown point therefore sits below and to the left of the breakeven point, both on the MC curve.



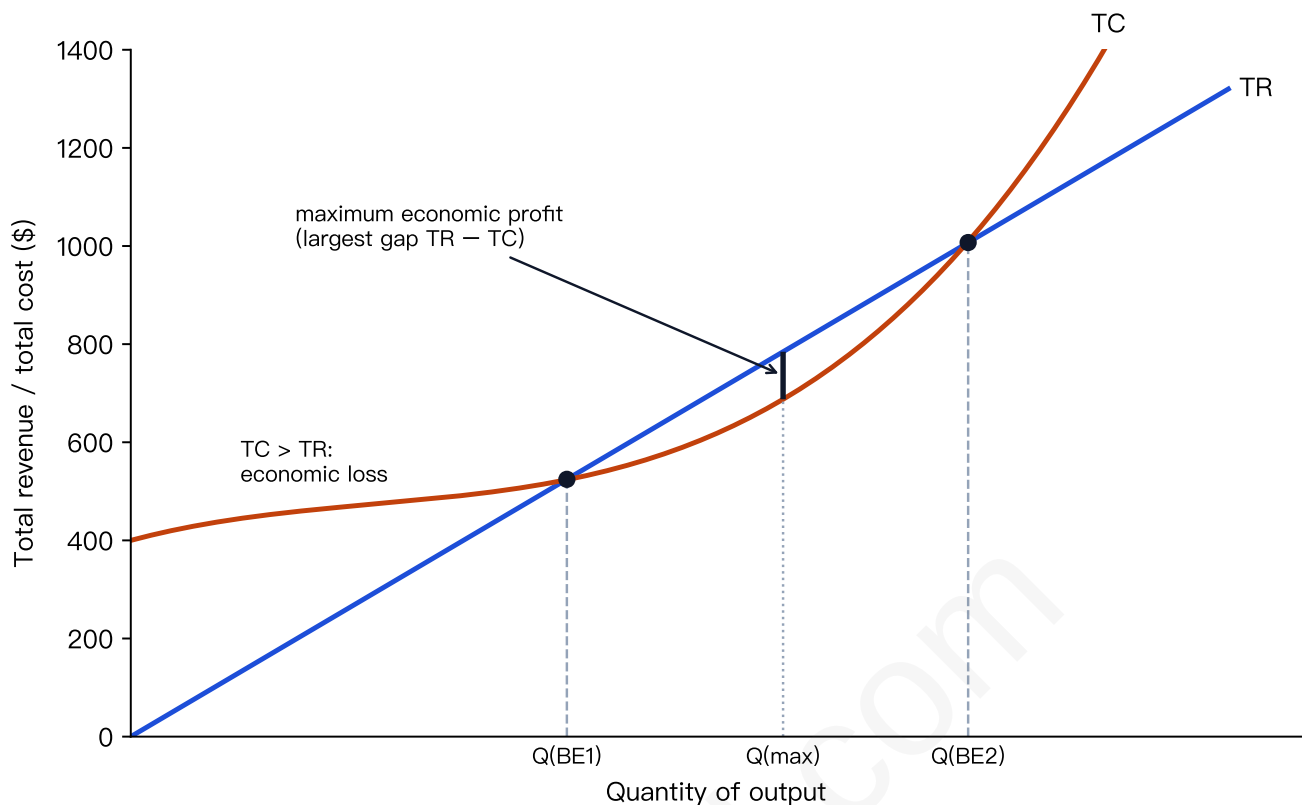
Short-run cost curves of a price taker: breakeven and shutdown points

A price taker is too small relative to the market to raise the market price by cutting its own output. Reducing output to push the price up is therefore never a remedy under perfect competition.

Breakeven and shutdown in total terms (all market structures)

For **price searchers** (downward-sloping demand), price no longer equals MR, so total revenue and total cost are the cleaner test. The same test works for price takers:

1. Compare TR with TC. If $TR \geq TC$, the firm stays in the market in both the short run and the long run; $TR = TC$ is the breakeven point.
2. If $TR < TC$, compare TR with TVC. If $TR \geq TVC$, keep operating in the short run and exit in the long run unless conditions are expected to improve.
3. If $TR < TVC$, shut down now and exit in the long run as well.



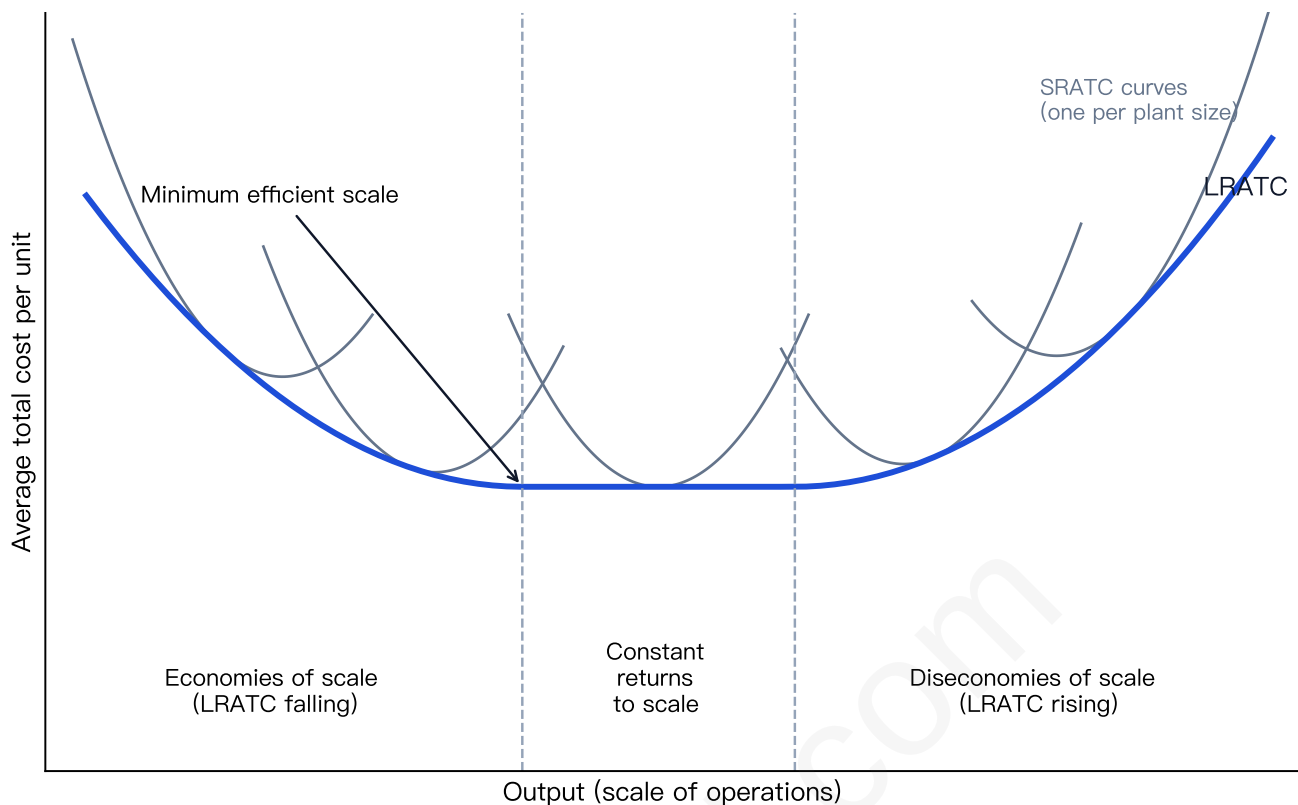
Total revenue and total cost of a price taker

With a straight-line TR (price taker) and a cubic-shaped TC there can be two **breakeven quantities**. Economic profit is largest where the vertical gap $TR - TC$ is greatest, which is where the slope of TC (marginal cost) equals the slope of TR (marginal revenue, here the price). At the lower breakeven quantity MC is below MR, so producing more adds profit; at the upper breakeven quantity MC is above MR, so producing less adds profit. If TC lies above TR everywhere, the firm operates (if at all) where the loss $TC - TR$ is smallest, which is the same as where $TR - TC$ is largest (least negative).

Worked example. Fernhill Printing expects annual total revenue of \$1.8 million, total variable cost of \$1.5 million and total fixed cost of \$0.5 million, so total cost is \$2.0 million. Step 1: $TR < TC$, so the firm is not breaking even. Step 2: $TR > TVC$, so operating gives $1.8 - 2.0 = -\$0.2$ million, against $-\$0.5$ million (the whole fixed cost) if it closes. It should keep operating in the short run and, unless conditions improve, exit in the long run. If revenue instead fell to \$1.3 million, step 3 would apply: $TR < TVC$, and operating would give $1.3 - 2.0 = -\$0.7$ million, a loss larger than the fixed cost, so closing at once is the better choice.

Economies and diseconomies of scale

The **long-run average total cost (LRATC)** curve shows the lowest ATC achievable at each output level when plant size can be chosen freely; it is the envelope of the **short-run average total cost (SRATC)** curves for the different plant sizes.



Long-run average total cost as the envelope of short-run average total cost curves

LRATC segment	Name	Causes / meaning
Downward sloping	Economies of scale (increasing returns to scale)	Specialization of labor, mass production, better equipment and technology, volume discounts on inputs; output rises proportionally more than total input cost
Flat	Constant returns to scale	ATC roughly unchanged across a range of plant sizes
Upward sloping	Diseconomies of scale	Bureaucracy, harder-to-motivate workforce, barriers to innovation; unit cost rises as scale rises

The plant size at which LRATC first reaches its lowest level is the **minimum efficient scale**. Under perfect competition firms must operate there in long-run equilibrium, where price = minimum LRATC and economic profit is zero; a firm that has chosen a scale with higher ATC earns economic losses and must either move to the minimum efficient scale or leave the industry. A firm still in the economies-of-scale range can become more competitive by expanding output and lowering its unit cost. A firm experiencing diseconomies of scale should reduce its plant size (scale) toward the minimum efficient scale. This is a long-run decision, because plant size cannot change in the short run. The US auto industry is a commonly cited case of diseconomies of scale. Economies of scale are a long-run concept: they describe the LRATC curve. The cost curve of a single existing plant cannot show them.

COMMON EXAM TRAPS

- The minimum efficient scale is the plant size at the lowest point of LRATC. It is not the largest plant the firm could build.

- The output with the lowest ATC is the cheapest output per unit. It is not necessarily the profit-maximizing output, which is where $MR = MC$.
- Shutting down "temporarily until price exceeds ATC" is wrong when price is above AVC: it would turn a loss smaller than fixed cost into a loss equal to fixed cost.

EXAM SHORTCUTS

- Decide breakeven and shutdown with two comparisons in order: TR against TC, then TR against TVC.
- Short-run shutdown compares price with AVC; long-run exit compares price with ATC.

BOTTOM LINE

- In the short run at least one input is fixed; in the long run every input is variable.
- A price taker breaks even at a price equal to minimum ATC and shuts down in the short run when price falls below minimum AVC.
- When price is between AVC and ATC the firm keeps operating in the short run, because its loss is smaller than its fixed cost, and exits in the long run unless price is expected to rise.
- In any market structure: $TR \geq TC$ means stay; $TVC \leq TR < TC$ means operate in the short run and exit in the long run if the shortfall is expected to persist; $TR < TVC$ means shut down.
- Marginal cost crosses AVC and ATC at their minimum points.
- The minimum efficient scale is the lowest point of LRATC; economies of scale make LRATC fall and diseconomies of scale make it rise.

QUICK CHECK

Question 1

Hartwell Joinery employs 35 carpenters and makes furniture in a factory it leases on a five-year contract, using machinery it owns. Over which inputs does the firm have a choice in the long run?

- A The carpenters only.
- B The factory and the machinery only.
- C The carpenters, the factory and the machinery.

Answer: C

The long run is the period over which every factor of production is variable. The firm can let the lease expire or sign a new one, sell or buy machinery and change its workforce, so all three inputs can be changed. In the short run the factory and machinery are fixed and only labor (and materials) can vary.

Why the other options are wrong

- **A.** Labor alone describes the short run, when the plant and equipment are fixed. In the long run the plant and equipment can be changed as well.
- **B.** This reverses the usual assumption: labor is variable even in the short run, so it is certainly variable in the long run.

Key takeaway In the long run all costs are variable; the short run is defined by at least one fixed input, usually capital.

MODULE 12.2

Characteristics of Market Structures

LOS 12.b — The four market structures

Every firm maximizes profit by producing the quantity at which **marginal revenue (MR) equals marginal cost (MC)**. What differs is the demand curve the firm faces. Demand is **elastic** when buyers react strongly to a price change (a small price rise loses many sales) and **inelastic** when they react little:

KEY CONCEPT

- Under **perfect competition** the firm is a **price taker**: its demand curve is horizontal (**perfectly elastic**) at the market price, so $P = AR = MR$.
- Under **monopolistic competition**, **oligopoly** and **monopoly** the firm is a **price searcher**: its demand curve slopes downward, so $MR < P$ and, at the profit-maximizing output, $P > MC$. As a rough rule, monopolistic competitors face relatively elastic demand, a monopolist the least elastic demand, and oligopolists something in between.

Why $MR < P$ for a price searcher: to sell one more unit the firm must cut its price, and the lower price applies to every unit it sells, not only to the extra one. MR is the price of the extra unit minus the revenue given up on the units that could have been sold at the higher price.

Revenue schedule of a price searcher (illustrative)

Quantity	Price (\$)	Total revenue (\$)	Marginal revenue (\$)
1	50	50	50
2	46	92	42
3	42	126	34
4	38	152	26
5	34	170	18
6	30	180	10

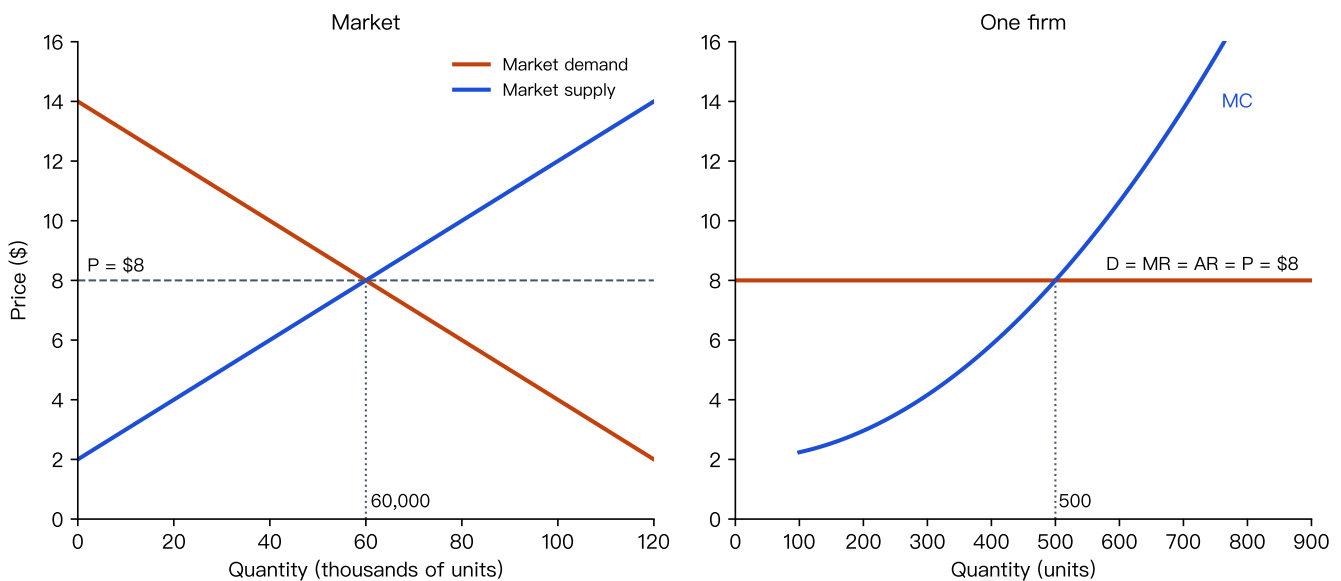
Example. In the schedule above, moving from 3 to 4 units lowers the price from \$42 to \$38. The fourth unit brings in \$38, but the first three units now sell for \$4 less each, a loss of \$12. So $MR = 38 - 12 = \$26$, the same as $\Delta TR / \Delta Q = (152 - 126) / 1$. A price taker faces no such loss: every extra unit sells at the market price, so $MR = P$, and selling 10% more units raises its total revenue by 10%.

Where a market sits on the spectrum depends on five factors: the number and relative size of firms, the degree of product differentiation, the firms' pricing power, **barriers to entry** and exit, and how much firms compete on things other than price.

Characteristics of the four market structures

Feature	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
Number of sellers	Many	Many	Few	One
Barriers to entry	Very low	Low	High	Very high
Substitute products	Very good substitutes (identical)	Good substitutes, but differentiated	Good substitutes or differentiated	No good substitutes
Nature of competition	Price only	Price, marketing, features	Price, marketing, features	Advertising
Pricing power	None	Some	Some to significant	Significant
Firm demand curve	Horizontal (perfectly elastic)	Downward sloping, relatively elastic	Downward sloping	Downward sloping (market demand)
Long-run economic profit	Zero	Zero	May be positive	May be positive

Perfect competition. Many small firms sell identical (homogeneous) products, barriers to entry and exit are very low, and firms compete only on price. No firm can affect the market price; each can sell all it wants at that price, so charging less than the market price simply lowers its revenue. Example: a regional market for a standard grade of grain. The market price comes from market supply and demand, and the market demand curve slopes downward as usual. Each firm takes that price as given, so the demand curve facing the individual firm is horizontal at it.



Perfect competition: the market sets the price and each firm takes it as given (illustrative)

Monopolistic competition. Many independent sellers, each a price searcher, with **differentiated products** (quality, features, branding, marketing) and low barriers to entry. Example: toothpaste or restaurants. Heavy advertising is typical.

Oligopoly. A few sellers, each with a large market share; products may be similar or differentiated; high barriers to entry, often due to large **economies of scale**. The defining feature is **interdependence**: each firm's best price and output depend on how its rivals will react. Firm demand slopes downward and can be more or less elastic than under monopolistic competition. Examples: automobiles, commercial aircraft, oil.

Monopoly. One firm is the only seller, buyers have no good substitutes for its product, and very high barriers to entry keep rivals out. The barriers can be patents and copyrights, control of a key resource, or government licensing and regulation (e.g., a local utility). The firm faces the market demand curve and has significant pricing power.

COMMON EXAM TRAPS

- "Maximizes profit" and "produces where $MR = MC$ " apply to all structures, so they never distinguish one structure from another.
- A vertical demand curve is perfectly inelastic, the opposite of the perfectly competitive firm's horizontal curve.
- Barriers to entry under monopolistic competition are low: neither absent altogether nor high.
- Advertising and product differentiation separate monopolistic competition from perfect competition; low barriers and zero long-run economic profit are common to both.

LOS 12.c — Monopolistic competition: price, output and strategy

Features that drive behavior:

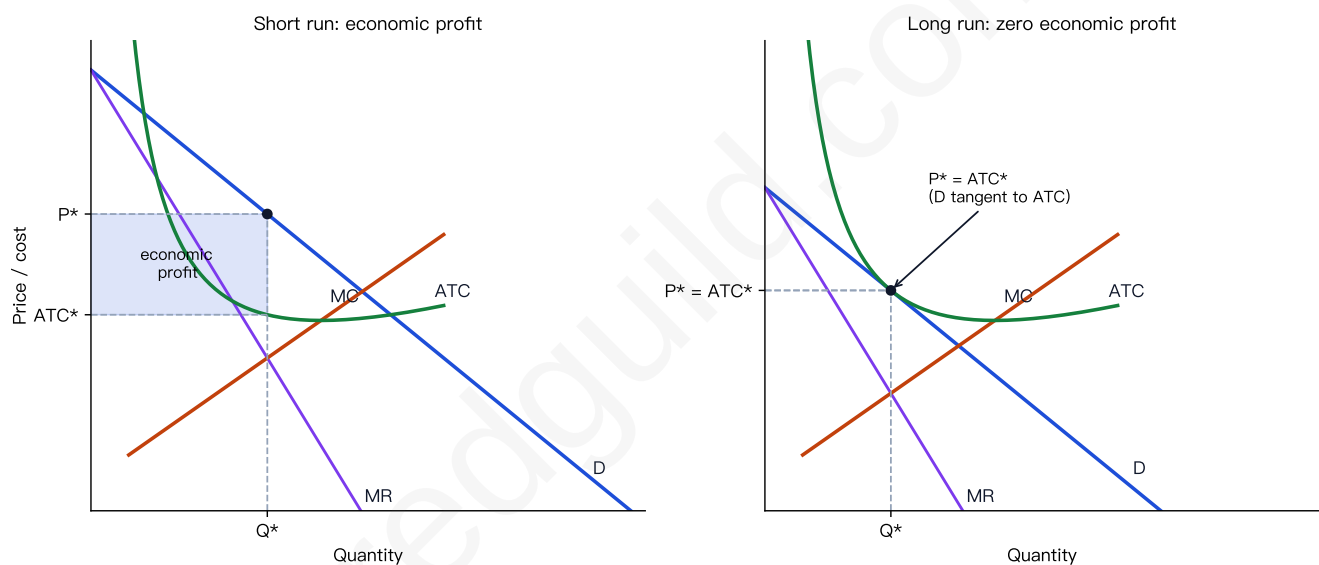
1. **Many independent sellers.** Each firm's share is small, so no firm has significant power over price; firms watch the *average* market price rather than individual rivals' prices; there are too many firms for collusion (price-fixing) to work.

2. **Differentiated products** that are close substitutes. Firms compete more on quality, features and marketing than on price. Because close substitutes exist, firm demand is relatively **elastic**: a firm that raises its price loses many customers.
3. **Low barriers to entry**: because entering and exiting cost little, new firms arrive whenever existing firms earn economic profit.

Short run. The firm sets its price and output in three steps (left panel below):

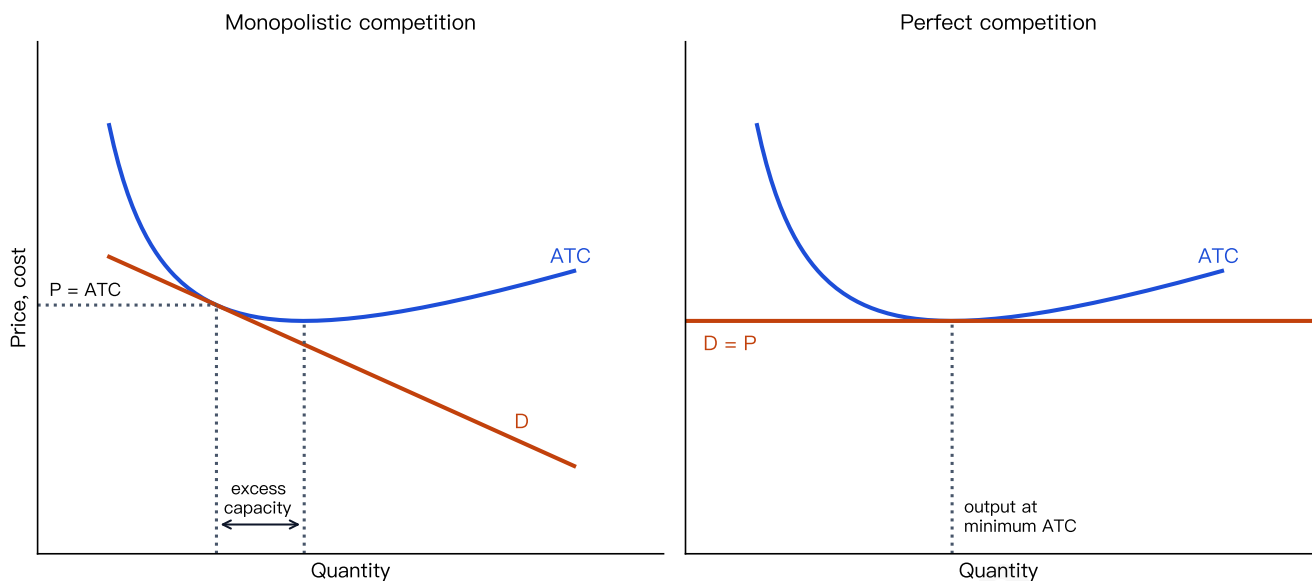
1. Find the output Q^* at which $MR = MC$.
2. Go up from Q^* to the demand curve and read off the price P^* that buyers will pay for that quantity.
3. Compare P^* with ATC at Q^* . Economic profit is $(P^* - ATC^*) \times Q^*$, positive when price exceeds ATC and negative when it falls short.

Long run. Low barriers attract entrants, and each existing firm's demand shifts left until it is just tangent to ATC : $P = ATC$ and **economic profit is zero** (right panel). The same outcome can arise without entry if firms keep raising marketing spending (part of ATC) to defend market share. Accounting profit can stay positive even while economic profit is driven to zero.



Monopolistic competition: short-run economic profit and long-run equilibrium

Long-run comparison with perfect competition: in monopolistic competition $P > MR = MC$, ATC is *not* at its minimum (excess capacity), price is higher and quantity lower. The offset is product variety, which consumers value.



Long-run equilibrium: monopolistic competition versus perfect competition (illustrative)

Product differentiation and brands. The fewer close substitutes buyers see for a product, the steeper (less elastic) its demand curve. A medicine that some patients tolerate better than its rivals faces steeper demand than one brand of shampoo among many, and a new product with no close rival is in the same position. **Brand names** can signal quality and help consumers choose. There is no well-defined firm supply curve.

Worked example. A craft-coffee roaster sells 5,000 bags a month at \$14 while its ATC is \$11: economic profit $(14 - 11) \times 5,000 = \$15,000$. New roasters enter; the roaster's demand shifts left until, at its new $MR = MC$ output, price equals ATC (for example, both at \$12.50) and economic profit is zero.

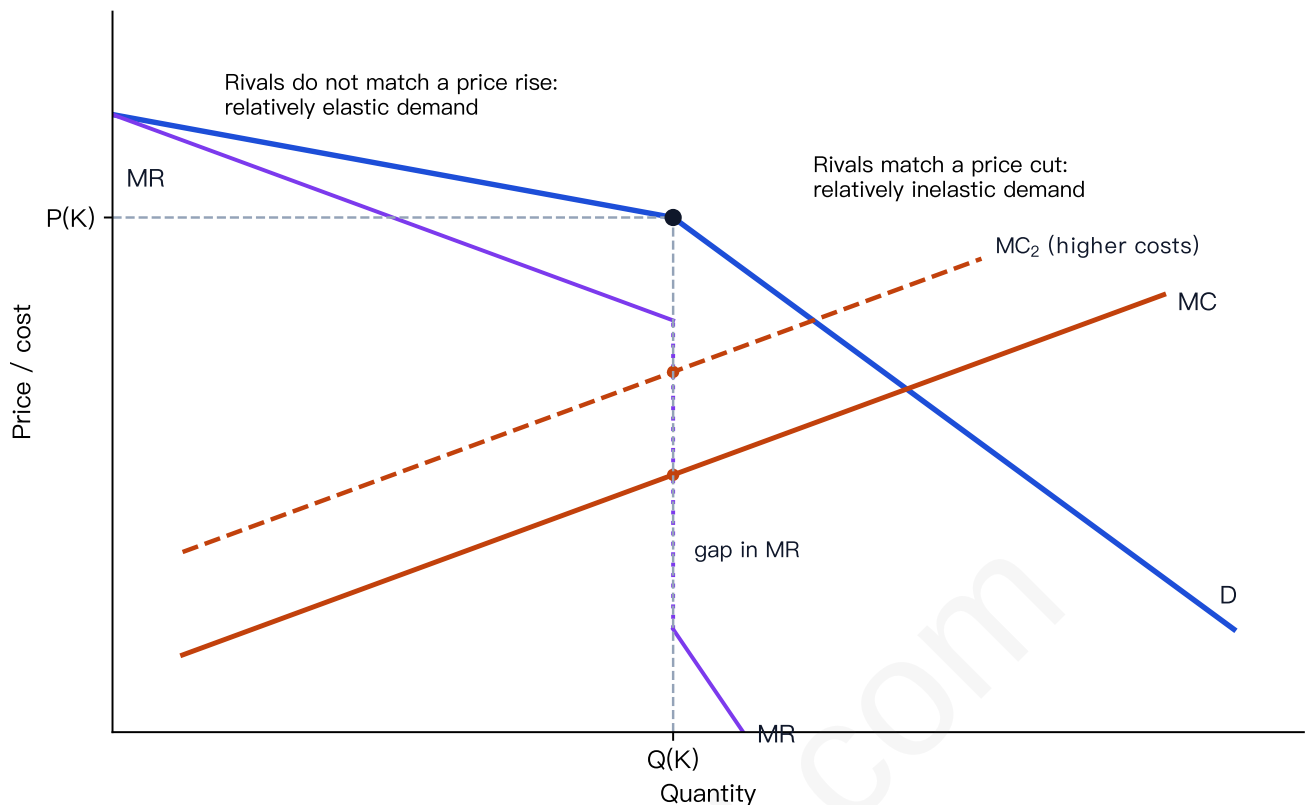
COMMON EXAM TRAPS

- Reading the price off the MR or MC curve at Q^* understates it: both lie below the demand curve there, because $P > MR$ for a price searcher.

LOS 12.d — Oligopoly: interdependence and pricing models

Because oligopolists are **interdependent**, a price change by one firm is likely to trigger a response that shifts the others' demand curves. The optimal price therefore depends on what a firm assumes about its rivals' reactions. Four models:

1. Kinked demand curve model. Rivals are assumed *not* to match a price increase but *to* match a price cut. The firm's demand curve is therefore relatively elastic above the current price P_K and relatively inelastic below it, creating a kink at P_K . Each segment of demand has its own MR curve, and the MR of the steep lower segment starts well below the MR of the flat upper segment, so MR drops straight down at Q_K and leaves a gap. Any MC curve passing through the gap leaves the profit-maximizing price at P_K and output at Q_K . A rise in costs that keeps MC inside the gap (from MC to MC_2 in the figure) therefore leaves price and output unchanged, so prices tend to be sticky. Only a cost change that pushes MC above or below the gap moves them.



Kinked demand curve model: any MC through the MR gap gives the same price and output

2. Cournot duopoly model. Two firms with identical MC curves selling a homogeneous product; each chooses its **output (quantity)** assuming the competitor's output will not change, and the firms choose **simultaneously** each period. The market price is whatever single price clears the combined output. In the long-run equilibrium both firms sell the same quantity and split the market equally, at a price below the monopoly price but above the perfectly competitive price. With more firms, the price moves toward the competitive price.

3. Stackelberg model (the Stackelberg dominant firm model). Decisions are **sequential**: the leader chooses its output first and the follower then chooses its own output in response. The leader exploits this **first-mover advantage** to produce the larger quantity and so gains the larger market share and the larger share of total profits, even in the long run. Both firms still sell the homogeneous product at one common market price; the leader does not charge a different price from the follower.

Exam convention: both models are described with each firm choosing its selling price; a Cournot firm assumes the rival keeps last period's price, and the Stackelberg leader sets its price first, charges a higher price and earns the larger share of total profit. Current practice: both are the quantity-setting models described above, with one market price. Both are rules-based models and fall under **strategic games**, decision models in which a firm's best choice depends on rivals' expected actions.

4. Nash equilibrium. A **Nash equilibrium** is reached when no firm can improve its profit by *unilaterally* changing its choice, given the others' choices. The Cournot outcome is a Nash equilibrium. Absent collusion, the long-run oligopoly equilibrium is a Nash equilibrium.

To find a Nash equilibrium in a payoff table:

1. For each choice the rival could make, mark the firm's best reply, meaning the choice that earns the firm more.
2. Repeat for the rival, taking each of the firm's choices in turn.

3. A cell in which both choices are marked is a Nash equilibrium.

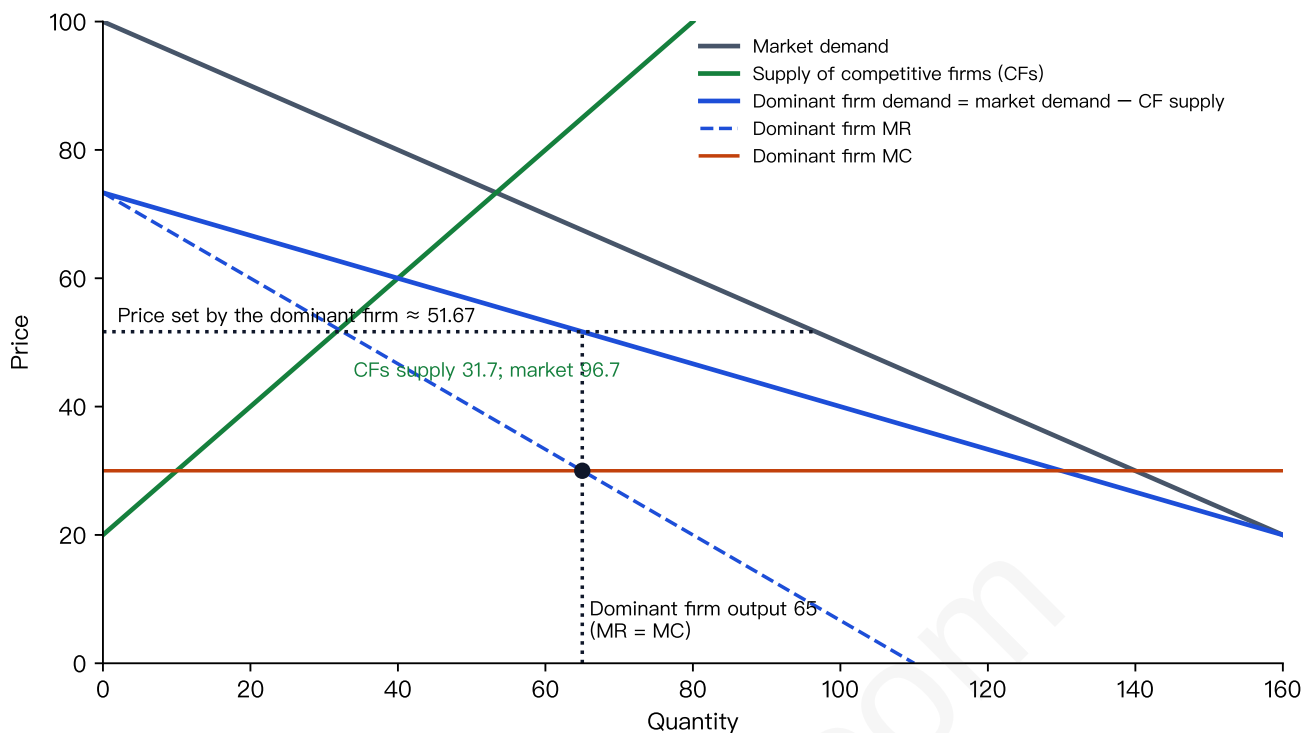
Worked example. Kestrel and Osprey each choose a high or low price; payoffs are shown below. Step 1: if Osprey prices high, Kestrel's best reply is low ($850 > 700$); if Osprey prices low, it is low again ($400 > 250$). Step 2: the payoffs are symmetric, so Osprey's best reply is also low whatever Kestrel does. Step 3: only (low, low) has both choices marked, so it is the Nash equilibrium, with 400 each, even though (high, high) would give both 700.

Profits (Kestrel, Osprey) for each pricing combination

	Osprey: high price	Osprey: low price
Kestrel: high price	Kestrel 700, Osprey 700	Kestrel 250, Osprey 850
Kestrel: low price	Kestrel 850, Osprey 250	Kestrel 400, Osprey 400

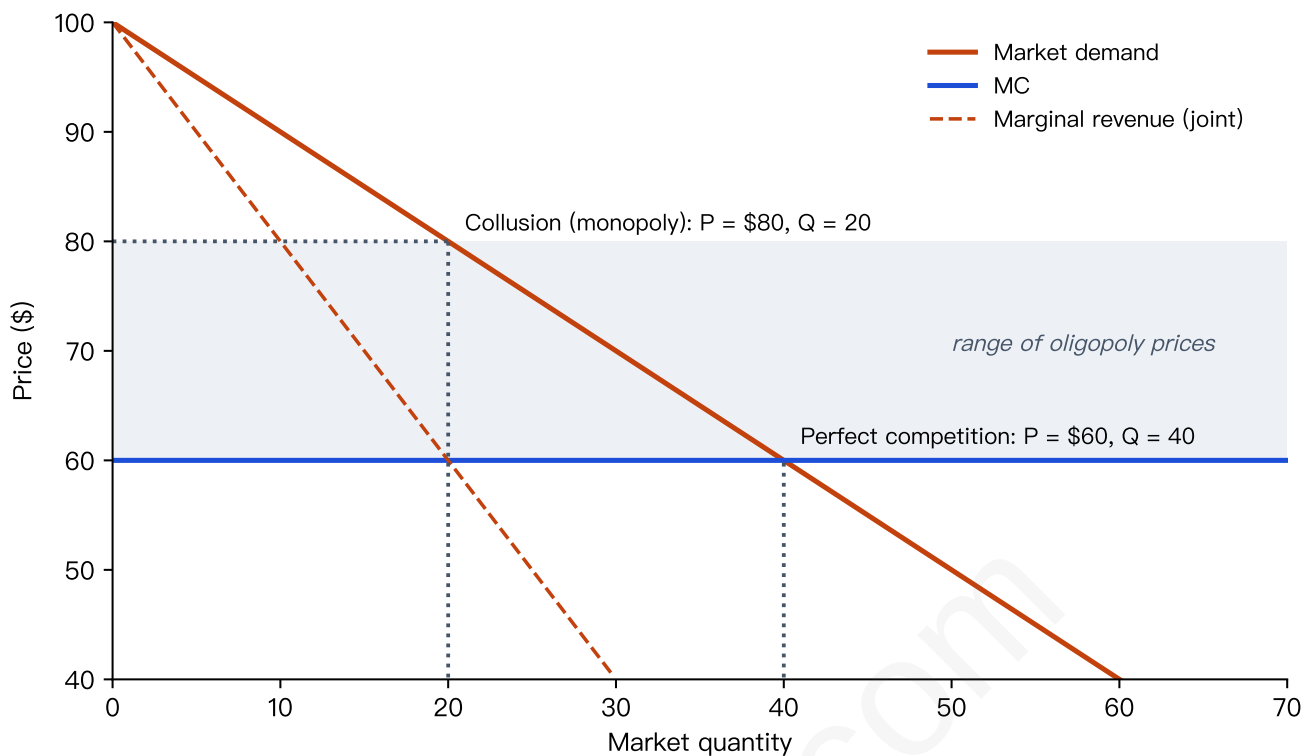
Collusion. Collusion is an agreement among competitors to charge a given price or to limit output to agreed levels. If the firms could agree on (and enforce) high prices, both would earn more; side payments can make the collusive outcome better for each firm than the Nash equilibrium. That is the incentive behind a **cartel** such as OPEC, whose members agree to restrict output to raise price. Members have an incentive to cheat by producing more. Collusion is more likely to hold when there are fewer firms, products are more similar, cost structures are more similar, purchases are small and frequent, retaliation against cheaters is more certain and severe, and there is little competition from outside the cartel. Such agreements are illegal in many countries.

Dominant firm model. One firm with a large market share, owing to its greater scale and lower cost structure, effectively sets the market price; the smaller **competitive firms (CFs)** take that price as given and produce where their MC equals it. The dominant firm's demand curve is market demand minus the CFs' supply (the CFs supply less at lower prices); the dominant firm sets price where its own MR equals its MC. If CFs cut price, the dominant firm follows; in the long run the CFs reduce output or exit, and the dominant firm's market share rises.



Dominant firm model (illustrative linear curves): the dominant firm sets price where its MR equals its MC

Range of outcomes. Oligopoly price lies between two limits: the **collusion (monopoly) price** that maximizes joint profit, and the **perfectly competitive price** that yields zero economic profit. Example: if the joint-profit-maximizing price is \$80 and the competitive price is \$60, the oligopoly price should be somewhere in between, e.g. about \$70, and neither above \$80 nor below \$60.



Oligopoly outcomes lie between the collusive and the competitive price (illustrative)

As in monopolistic competition, $P > MR = MC$ in equilibrium, there is no well-defined supply curve, and economic profit may be positive in the long run, though it may erode over time.

COMMON EXAM TRAPS

- Cournot and Stackelberg differ in timing (simultaneous versus sequential choices). Both are strategic-game (rules-based) models, so that is not a difference between them.
- An option that cites many sellers or low barriers to entry does not describe an oligopoly.
- A Nash equilibrium need not maximize joint profit; the collusive outcome usually earns more.

EXAM SHORTCUTS

- Classify a market from two facts first: the number of firms and the barriers to entry. Many firms with identical products is perfect competition; many with differentiated products and low barriers is monopolistic competition; a few interdependent firms behind high barriers is oligopoly; one firm with no close substitutes is monopoly.
- To find a Nash equilibrium, mark each player's best reply to every choice of the rival; a cell with both choices marked is an equilibrium.
- Under the kinked demand curve model, a cost change that keeps MC inside the gap in MR leaves price and output unchanged.

BOTTOM LINE

- Every firm maximizes profit where $MR = MC$; a price taker has $P = MR$, while a price searcher has $MR < P$.

- Monopolistic competition has many firms, differentiated products and low barriers, and earns zero economic profit in the long run with excess capacity.
- Oligopoly is defined by interdependence among a few large firms protected by high barriers to entry.
- Cournot firms decide simultaneously and the Stackelberg leader decides first; exam convention: they choose prices, the Cournot firm assuming its rival keeps last period's price and the Stackelberg leader charging a higher price and earning the larger share of total profit; current practice: they choose quantities and sell at one market price.
- In a Nash equilibrium no firm can gain by changing its choice alone, and the outcome need not maximize joint profit.
- The oligopoly price lies between the collusive (monopoly) price and the perfectly competitive price.

QUICK CHECK

Question 2

An industry study reports the following:

- many sellers act independently of one another;
- product features differ from firm to firm;
- entry into the industry is easy;
- each firm's demand curve slopes downward but is quite elastic.

The industry is best characterized as:

- A** an oligopoly.
- B** monopolistic competition.
- C** a monopoly.

Answer: B

Many independent sellers, differentiated products, low barriers to entry and downward-sloping, highly elastic firm demand are the conditions of monopolistic competition.

Why the other options are wrong

- **A.** An oligopoly has a small number of interdependent sellers and high barriers to entry.
- **C.** A monopoly has a single seller protected by high barriers to entry.

Key takeaway Checklist for monopolistic competition: many sellers, differentiation, easy entry, elastic downward-sloping demand.

MODULE 12.3

Identifying Market Structures

LOS 12.e — Identifying the market structure and measuring concentration

Identifying the structure

To classify the market a firm operates in, compare the industry with the characteristics of each structure (see the comparison table in Module 12.2): the **number of firms** and their relative sizes, the **barriers to entry**, the nature of **substitute products** (identical, differentiated, none), and the nature of competition (price only versus marketing and features). For an analyst trying to gauge **pricing power**, these are the factors that matter. Significant interdependence in pricing and output is present in every oligopoly, and some interdependence can appear even under monopolistic competition.

Classifying a market does not, however, show how much pricing power each firm has. The ideal would be to measure the **elasticity of firm demand** directly, but that is statistically difficult and imprecise. Regulators and analysts therefore use measures based on market shares, called **concentration measures**, as a proxy for market power and to help identify the market structure. Competition authorities often block mergers when the combined firm's share would be too high.

The two concentration measures

Measure	Calculation	Strength	Weakness
N-firm concentration ratio	Sum of the percentage market shares of the largest N firms	Simple to compute and interpret	Relatively insensitive to mergers among the largest firms; does not measure market power or elasticity directly
Herfindahl-Hirschman Index (HHI)	Sum of the <i>squared</i> market shares of the largest N firms	Squaring gives big firms more weight, so it is more sensitive to mergers	Still does not measure market power directly

KEY CONCEPT

$$\text{N-firm concentration ratio} = \sum_{i=1}^N s_i \quad \text{HHI} = \sum_{i=1}^N s_i^2$$

where s_i is firm i 's market share as a decimal. With shares in percent, the HHI is expressed on a 0 to 10,000 scale. A market served by one firm has a concentration ratio of 100% and an HHI of 1 (10,000 in percent terms), the highest possible values.

To compute either measure:

1. Rank the firms by market share and keep the N largest. If the data are sales rather than shares, first divide each firm's sales by total industry sales, including the sales of all the smaller firms.
2. For the concentration ratio, add their shares. For the HHI, square each share and add the squares.

3. To assess a merger, combine the merging firms' shares into one firm, re-rank all the firms and repeat steps 1 and 2. The list of the N largest can change: the merged firm may move up the ranking, and if two of the top N firms merge, the next-largest firm moves into the top N.

Worked example. Market shares are shown below. Two of the top five firms, Dunmore and Easton, plan to merge.

Market shares before a merger of Dunmore and Easton

Firm	Market share
Ashby	28%
Brennan	22%
Corlett	16%
Dunmore	10%
Easton	8%
All others (each below 5%)	16%

Before the merger: 4-firm ratio = $28 + 22 + 16 + 10 = 76\%$; 4-firm HHI = $0.28^2 + 0.22^2 + 0.16^2 + 0.10^2 = 0.0784 + 0.0484 + 0.0256 + 0.0100 = 0.1624$.

After the merger the combined firm has 18%, and the top four are 28%, 22%, 18%, 16%: 4-firm ratio = 84% ; 4-firm HHI = $0.0784 + 0.0484 + 0.0324 + 0.0256 = 0.1848$.

Limitations common to both measures

- Neither considers **barriers to entry** or **potential competition**. Firms with large market shares may still have little pricing power if entry is easy: would-be entrants stand ready to come in if incumbents raise prices, so firm demand can be quite elastic despite high concentration. A few firms making an easily copied product with no brand or patent protection may therefore behave much like perfectly competitive firms.
- Neither measures the elasticity of firm demand (market power) directly.

COMMON EXAM TRAPS

- Mixing scales: an HHI of 0.1624 (shares as decimals) is the same as 1,624 (shares in percent).
- Reading a small rise in the N-firm ratio after a merger as a small rise in concentration. When two of the top N firms combine, the ratio grows only by the share of the firm that enters the top N, while the HHI can rise sharply.

EXAM SHORTCUTS

- With shares in whole percentages, square and add them to get the HHI on the 0 to 10,000 scale without converting to decimals.
- When two of the top N firms merge, the N-firm concentration ratio rises only by the share of the firm that enters the top N.

BOTTOM LINE

- A market structure is identified by the number of firms, the barriers to entry, the nature of substitutes and the nature of competition.
- The N-firm concentration ratio is the sum of the N largest market shares; the HHI is the sum of their squared shares.
- The HHI is more sensitive than the concentration ratio to mergers among the largest firms.
- Neither measure accounts for barriers to entry or potential competition, and neither measures the elasticity of firm demand directly.

QUICK CHECK**Question 3**

An analyst has annual sales for the producers of industrial fasteners in a region:

Annual sales of industrial fastener producers (€ millions)

Firm	Sales (€ millions)
Arlo	240
Brisk	180
Calder	150
Dunmark	120
Eske	60
All other firms	50

The industry's three-firm concentration ratio and three-firm Herfindahl-Hirschman Index (HHI) are *closest* to:

- A** 71.25% and 0.1758.
- B** 71.25% and 0.1983.
- C** 76.00% and 0.2000.

Answer: A

Both measures use market shares, so each firm's sales must first be divided by total industry sales, including the sales of all the smaller firms. The three-firm concentration ratio adds the shares of the three largest firms; the three-firm HHI adds the squares of those shares.

Total industry sales = $240 + 180 + 150 + 120 + 60 + 50 = 800$.

Shares of the three largest firms: $240/800 = 30\%$, $180/800 = 22.5\%$, $150/800 = 18.75\%$.

$$3\text{-firm ratio} = 30 + 22.5 + 18.75 = 71.25\%$$

$$\text{HHI} = 0.30^2 + 0.225^2 + 0.1875^2 = 0.0900 + 0.0506 + 0.0352 = 0.1758$$

Why the other options are wrong

- **B.** 0.1983 also squares Dunmark's 15% share ($0.1758 + 0.0225$), which is a four-firm HHI. The question asks for the three largest firms only.
- **C.** These values leave the other firms' sales of 50 out of the total, so shares are computed on 750: $32\% + 24\% + 20\% = 76\%$ and $0.1024 + 0.0576 + 0.0400 = 0.2000$.

Key takeaway Convert sales to shares using total industry sales, then use the same N largest firms for both measures.

Practice questions

Question 4

Lindqvist Ferries operates in a market in which it faces a downward-sloping demand curve. For the coming year it forecasts total revenue of \$2.10 million, total variable costs of \$1.65 million and total fixed costs of \$0.72 million. If these conditions are expected to persist, the firm should *most appropriately*:

- A** shut down in the short run, because total revenue is less than total cost.
- B** continue operating in the short run but exit the market in the long run.
- C** continue operating in both the short run and the long run, because total revenue exceeds total variable cost.

Question 5

Norden Cement and Solvik Cement are the only two suppliers in a regional market. Each firm independently chooses a high or a low price, and the resulting annual profits are shown below.

Annual profits (in \$ thousands) of Norden Cement and Solvik Cement under each pricing strategy

	Solvik: high price	Solvik: low price
Norden: high price	Norden 800, Solvik 700	Norden 300, Solvik 900
Norden: low price	Norden 950, Solvik 250	Norden 500, Solvik 450

Based on the concept of a Nash equilibrium, the *most likely* outcome is that:

- A** both firms charge a high price.
- B** both firms charge a low price.
- C** Norden charges a high price and Solvik charges a low price.

Answers: 4. B · 5. B

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/oligopoly/.
The full bank has 65 questions on this reading.

credguild.com

ECONOMICS · READING 13

Business Cycle

What you'll learn

LOS 13.a Describe the business cycle, its four phases (trough, expansion, peak, contraction) and the classical, growth and growth rate cycle measures.

LOS 13.b Describe credit cycles and how they interact with and can amplify business cycles.

LOS 13.c Describe how inventories, labor and capital use, consumer, housing and external trade activity vary over the cycle, and classify leading, coincident and lagging indicators.

MODULE 13.1

Business Cycles

This reading describes the four phases of the business cycle, how cycles are drawn and dated, and how credit cycles interact with them. It then explains how inventories, the use of labor and capital, consumer spending, housing and external trade change over the cycle, and how leading, coincident and lagging indicators help identify its turning points.

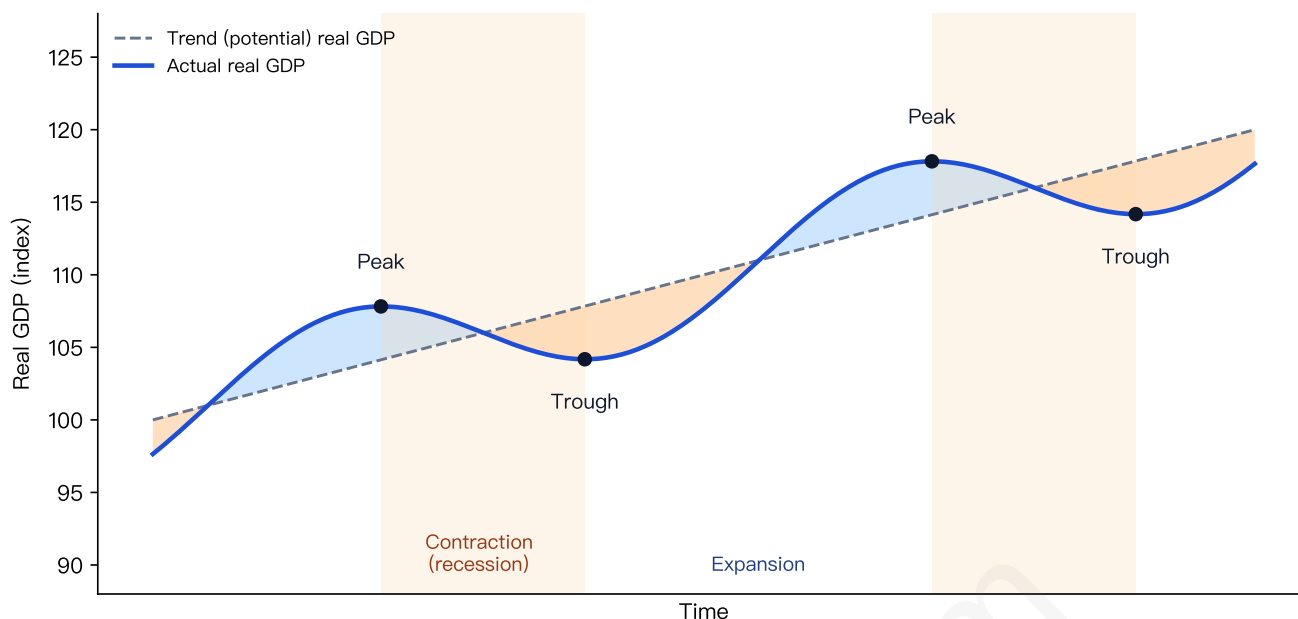
LOS 13.a — The business cycle and its four phases

A **business cycle** is the recurring (but irregular) swing of aggregate economic activity, usually tracked through **real GDP**. Most sectors of the economy grow together in an expansion and shrink together in a contraction.

Every cycle passes through four phases:

KEY CONCEPT

Phase	What real GDP is doing	Typical conditions
Trough	Stops falling and starts rising; growth turns from negative to positive	Unemployment high; firms start using more overtime and temporary staff; durable goods and housing spending may pick up; inflation moderate or still falling; employment growth may not pick up until the recovery is well established
Expansion	Rising	GDP growth picks up; unemployment falls as hiring speeds up; investment in equipment and new homes rises; inflation may rise; imports rise with domestic incomes
Peak	Reaches its highest level for the cycle, then starts to fall	Growth slows; unemployment is still falling, but hiring slows; consumer and business spending grow more slowly; inflation is rising
Contraction (recession)	Falling	Hours worked cut, unemployment rises; consumer spending, home building and business investment fall; inflation eases, but with a lag; imports fall

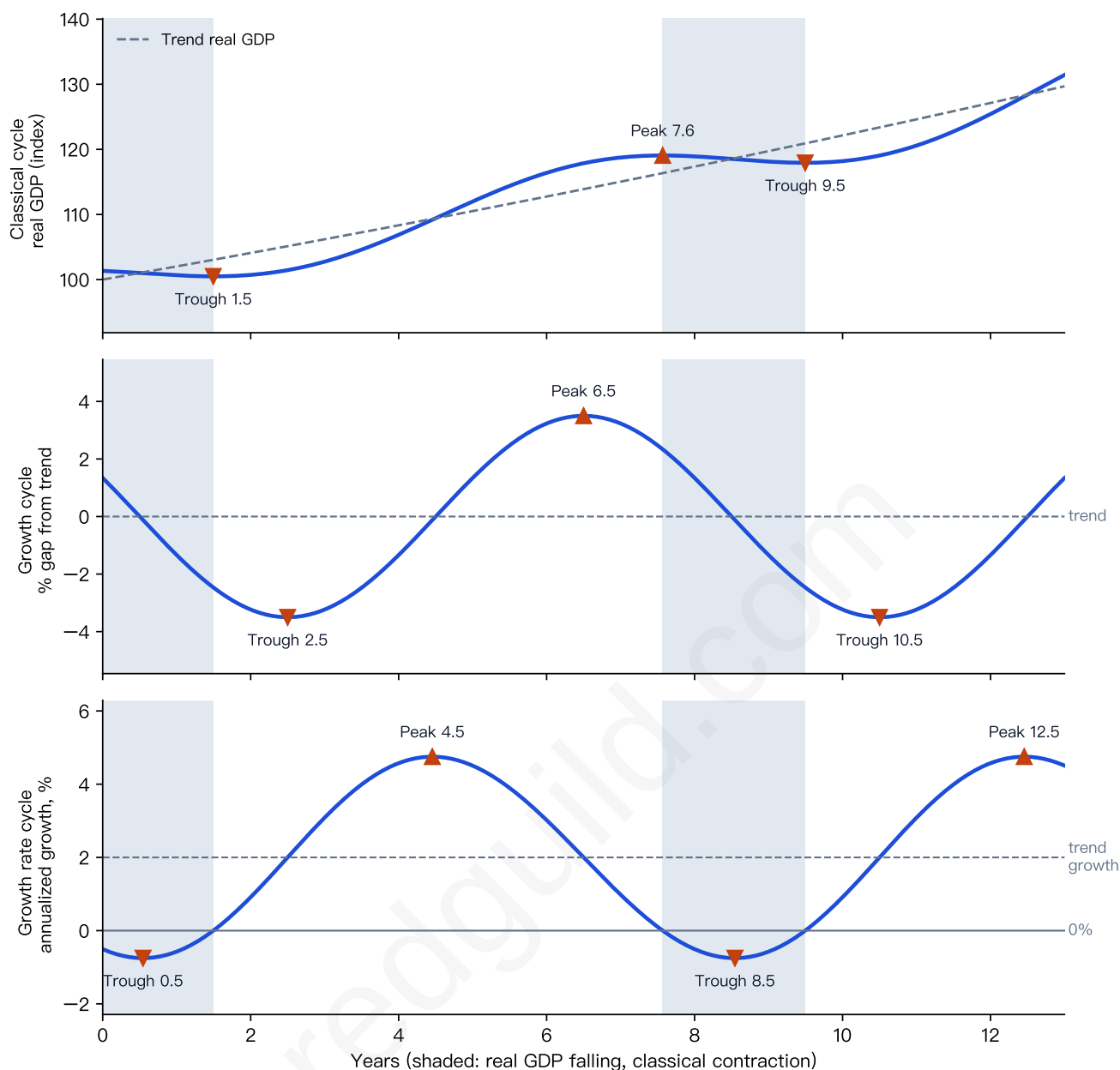


Business cycle phases: actual real GDP fluctuating around its rising trend

Three ways to draw a cycle.

- The **classical cycle** plots the level of real GDP against a starting value; turning points are highs and lows in the *level*.
- The **growth cycle** plots the percentage gap between real GDP and its long-term trend (potential) value.
- The **growth rate cycle** plots the period-to-period (annualized) growth rate of real GDP. It tends to turn *earlier* than the other two measures, at both peaks and troughs. Growth starts to slow while the level of GDP is still rising, and starts to recover while the level is still falling, so the growth rate reaches its high and low points first. Exam convention: the growth rate cycle is the measure economists and practitioners prefer, and it shows GDP relative to a trend rate, like the growth cycle. Current practice: the gap between GDP and its trend is what the growth cycle measures; the growth rate cycle tracks the growth rate itself, which can then be compared with the trend growth rate.

The figure below draws one real GDP path all three ways, with the classical contraction shaded.



One real GDP path measured three ways: classical, growth and growth rate cycles

Dating a cycle. A common rule of thumb treats two consecutive quarters of falling real GDP as the start of a contraction, and two consecutive quarters of rising real GDP as the start of an expansion. Official dating bodies (in the US, the National Bureau of Economic Research) also weigh unemployment, industrial production, inflation and other data.

Worked example. Real GDP starts at an index of 100.0 and grows as follows over nine quarters:

Quarter	1	2	3	4	5	6	7	8	9
Growth, quarter on quarter (%)	0.6	1.0	0.6	0.3	-0.1	-0.5	-0.2	0.3	0.8
Real GDP (index)	100.60	101.61	102.22	102.52	102.42	101.91	101.70	102.01	102.83

1. Classical cycle: the level of real GDP peaks in quarter 4 (102.52) and bottoms in quarter 7 (101.70).
2. Rule of thumb: real GDP falls in quarters 5 and 6, two quarters in a row, so a contraction began after quarter 4. The rises in quarters 8 and 9 mark the start of the next expansion.
3. Growth rate cycle: growth is highest in quarter 2 and lowest in quarter 6, two quarters before the level peaks and one quarter before it bottoms.

Cycles are not regular. They recur, but their length and severity vary widely, from about a year to more than a decade. The concept applies to economies made up mainly of private businesses. Subsistence and centrally planned economies do not have business cycles in this sense.

Common exam traps

- "Growth turns from negative to positive" describes the trough. The expansion is the phase that follows it.
- Easing inflation belongs to the contraction, not to the expansion or the peak.
- In a contraction, real GDP growth is low or negative, never above its sustainable long-run rate.

LOS 13.b — Credit cycles

Credit cycles are cyclical swings in the availability of loans and in interest rates. In expansions lenders are eager to lend and charge lower rates. When the economy slows, they tighten standards and demand higher rates.

- Credit cycles tend to amplify business cycles. Expansions that coincide with easy credit tend to be stronger, and contractions that coincide with tight credit tend to be deeper and longer.
- Loose credit can feed **asset price bubbles**, meaning prices built on unrealistic expectations. Housing and mortgage credit before 2007–2009 is the classic case.
- The two cycles do not always line up. On average, credit cycles have lasted longer than business cycles.
- Credit-sensitive sectors such as construction and housing move most closely with the credit cycle.

Common exam traps: an option saying that credit cycles dampen business cycles, or that they are shorter than business cycles, reverses the relation.

LOS 13.c — How activity varies over the cycle, and economic indicators

Inventories and the inventory-sales ratio. Firms aim for a normal **inventory-sales ratio** during steady growth.

- *Late in an expansion (approaching the peak):* sales growth slows while production still reflects optimistic plans, so unsold goods pile up and the ratio rises above normal. Firms then cut production, which helps bring on the contraction. Unplanned inventory growth counts as output in GDP, so GDP alone may look strong just as weakness begins.
- *Near the trough:* firms have already cut output. When sales pick up, inventories run down quickly and the ratio falls below normal, so firms raise production to restock.
- *Inventories falling faster than planned* mean sales are running ahead of production, so firms raise output to rebuild stock. If the economy is already at full employment, the extra spending also tends to push inflation up, as it does when an expansion nears its peak.

Worked example. A distributor normally holds inventory of 1.5 times monthly sales, for example 330 against sales of 220. Late in an expansion, sales slip to 210 while deliveries planned earlier lift inventory to 357.

The ratio is now $357/210 = 1.70$, well above normal, which is a signal to cut orders and production.

Labor and physical capital. Hiring and firing are costly and hurt morale, so firms adjust existing resources first:

KEY CONCEPT

	Early response (change intensity)	Later response (change capacity), once the trend looks durable
Labor	Change overtime and output per hour	Hire (expansion) or lay off workers (contraction)
Physical capital	Run existing plant and equipment more or less intensively	Expansion: invest in new capacity. Contraction: defer maintenance and delay replacing worn-out equipment rather than sell assets

Consumer sector. Consumer spending is the largest part of GDP and rises and falls with current and expected income.

- **Durable goods** (cars, appliances, furniture) are the most cyclical. Buyers postpone them in contractions and sometimes into early recovery.
- **Services** are moderately cyclical: travel and restaurant meals are discretionary, while health care and telecom are not.
- **Nondurable goods** (groceries, household supplies) are the least cyclical.

Housing sector. Housing is small relative to consumer spending but swings sharply. Its main drivers are:

- **Mortgage rates:** low rates stimulate buying and building.
- **Housing costs relative to income:** activity can fall late in an expansion if prices outrun incomes.
- **Speculative activity:** rising prices attract buyers who expect further gains, which leads to overbuilding and then a slump.
- **Demographics:** a larger share of people aged 25–40 means more household formation, and urbanization raises construction needs.

External trade sector.

- **Imports** rise with domestic GDP growth: when home incomes rise, residents buy more foreign goods.
- **Exports** depend mainly on the GDP growth of trading partners.
- An appreciating domestic currency tends to raise imports and reduce exports; a depreciating currency does the reverse. Currency effects work through persistent trends and can point in a different direction from GDP effects. GDP effects are more direct and immediate.

Economic indicators.

KEY CONCEPT

Type	Turning points and use	US examples
Leading indicators	Before peaks and troughs; used to anticipate a turn	Average weekly hours in manufacturing; average weekly initial claims for unemployment insurance; manufacturers' new orders; building permits for private housing; the S&P 500 index; the 10-year Treasury minus fed funds spread; average consumer expectations for business conditions (index of consumer expectations); ISM new orders index; Leading Credit Index
Coincident indicators	At about the same time; show the current phase	Employees on nonagricultural payrolls; personal income less transfer payments; manufacturing and trade sales; industrial production
Lagging indicators	After the turn is under way; confirm a turn that has already happened	Average duration of unemployment ; ratio of manufacturing and trade inventories to sales ; change in unit labor costs; average bank prime rate; commercial and industrial loans outstanding; ratio of consumer installment credit to personal income; change in CPI for services

Other countries build their own composite indexes from different components.

Most leading series turn early for a plain reason: they record decisions that come before output changes. Firms cut overtime (average weekly hours) before they lay workers off, new orders and building permits come before production and construction, and share prices reflect expected future earnings.

Common exam traps

- The inventory-sales ratio is sometimes used in forecasting, but it is classified as a lagging indicator because it peaks after the economy does.
- *Initial* jobless claims lead; the *duration* of unemployment lags.
- Layoffs and asset sales are not a firm's first response to a slowdown.
- Domestic expansion raises imports. It does not directly raise or cut exports.

EXAM SHORTCUTS

- The growth rate cycle reaches its high and low points before the level of real GDP does, because growth slows while the level is still rising and recovers while the level is still falling.
- Series that record decisions made before output changes, such as average weekly hours, new orders, building permits and share prices, are leading indicators.

BOTTOM LINE

- The business cycle has four phases: trough (real GDP stops falling and growth turns positive), expansion (real GDP rising), peak (real GDP at its high for the cycle, then starting to fall) and contraction or recession (real GDP falling).

- The classical cycle plots the level of real GDP and the growth cycle its percentage gap from trend; the growth rate cycle turns earlier at peaks and troughs and, under the exam convention, is the preferred measure that shows GDP relative to a trend rate, while in current practice it tracks the growth rate itself, which can be compared with trend growth.
- A common rule of thumb dates a contraction from two consecutive quarters of falling real GDP and an expansion from two consecutive quarters of rising real GDP, while official dating bodies also weigh unemployment, industrial production and inflation.
- Credit cycles, swings in loan availability and interest rates, tend to amplify business cycles, can feed asset price bubbles and have on average lasted longer than business cycles.
- The inventory-sales ratio rises above normal late in an expansion as sales growth slows, leading firms to cut production, and falls below normal near the trough as sales pick up, leading firms to raise output.
- Firms first change how intensively they use existing workers and equipment, and only once the trend looks durable do they hire or lay off workers, invest in new capacity, or defer maintenance and delay replacing equipment.
- Durable goods spending is the most cyclical, services spending moderately cyclical and nondurable goods spending the least; imports rise with domestic GDP growth, while exports depend mainly on trading partners' growth.
- Leading indicators turn before peaks and troughs, coincident indicators turn at about the same time, and lagging indicators turn after a new phase is under way and confirm it.

QUICK CHECK

Question 1

An economy that is in the contraction phase of the business cycle would *most typically* display:

- A** a falling unemployment rate.
- B** real GDP growth above its sustainable long-term rate.
- C** decreasing inflationary pressure.

Answer: C

A contraction (recession) is a period of declining real GDP. Weaker demand and rising unemployment reduce pressure on prices, so inflation pressure typically decreases, often with a lag.

Why the other options are wrong

- **A.** Unemployment usually rises in a contraction because hours are cut and, if the downturn persists, workers are laid off.
- **B.** In a contraction real GDP growth is low or negative. Growth above the sustainable rate is associated with an expansion, especially one nearing its peak.

Key takeaway Contraction: output falls, unemployment rises, inflation eases.

Practice questions

Question 2

A bank economist makes three claims about the lending (credit) cycle and its link to the business cycle. Which claim is *least accurate*?

- A Easy credit conditions during an expansion can contribute to asset price bubbles.
- B Credit cycles tend to amplify business cycles.
- C On average, credit cycles have been shorter than business cycles.

Question 3

Orders at Brightwater Castings, a maker of pump housings, have started to fall as the economy begins to contract. Management is not yet convinced the downturn will last and wants to keep its workforce and its productive capacity intact for now. Its *first* adjustment is *most likely* to be:

- A laying off part of its workforce.
- B postponing scheduled maintenance on its machinery.
- C cutting back the overtime hours its employees work.

Question 4

An analyst wants a US data series that tends to change direction *before* the overall economy does. Which of the following should she choose?

- A The index of consumer expectations.
- B The average duration of unemployment.
- C The index of industrial production.

Answers: 2. C · 3. C · 4. A

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/business-cycle/. The full bank has 21 questions on this reading.

ECONOMICS · READING 14

Fiscal Policy

What you'll learn

LOS 14.a Compare fiscal policy (taxes and spending, set by government) with monetary policy (money and credit, set by the central bank).

LOS 14.b Describe the objectives of fiscal policy, discretionary policy versus automatic stabilizers, and the arguments for and against concern about deficits and the debt-to-GDP ratio.

LOS 14.c Describe spending and revenue tools of fiscal policy, their advantages and disadvantages, the fiscal multiplier, the balanced budget multiplier and Ricardian equivalence.

LOS 14.d Explain how fiscal policy is implemented, the recognition, action and impact lags and other difficulties, and how to judge whether policy is expansionary or contractionary.

MODULE 14.1

Fiscal Policy Objectives

This reading compares fiscal and monetary policy, sets out the objectives of fiscal policy and the arguments over whether the size of the national debt relative to GDP matters. It then covers spending and revenue tools, the fiscal and balanced budget multipliers, the lags and difficulties of implementation, and how to judge whether fiscal policy is expansionary or contractionary.

LOS 14.a — Fiscal policy versus monetary policy

Fiscal policy is the government's use of **taxation** and **government spending** to influence economic activity.

Monetary policy is the central bank's management of the **quantity of money and credit** (and so of short-term interest rates) in the economy.

Budget vocabulary: the budget is **balanced** when tax revenues equal expenditures. A **budget surplus** means revenues exceed spending, and a **budget deficit** means spending exceeds revenues.

KEY CONCEPT

	Fiscal policy	Monetary policy
Who decides	Government (legislature / finance ministry)	Central bank
Tools	Tax rates, government spending, transfer payments	Money supply, policy (short-term) interest rates, credit availability
Expansionary form	Higher spending or lower taxes, so a larger deficit or smaller surplus	More money and credit, lower short-term rates: expansionary (accommodative, easy)
Contractionary form	Lower spending or higher taxes, so a smaller deficit or larger surplus	Less money and credit, higher short-term rates: contractionary (restrictive, tight)

	Fiscal policy	Monetary policy
Goals	Price stability and economic growth, plus redistribution of income and wealth	Price stability and economic growth

Key points:

- Only fiscal policy is a direct tool for **redistribution** of income and wealth, through who pays taxes and who receives transfers.

Common exam traps: "fiscal policy aims at growth, monetary policy at price stability" is false because both aim at both. "Accommodative" is another name for expansionary monetary policy, not a neutral stance.

LOS 14.b — Roles and objectives of fiscal policy; does the debt-to-GDP ratio matter?

Objectives of fiscal policy

- Influencing the level of economic activity and **aggregate demand**.
- Shifting income and wealth between different groups in the population.
- Allocating resources among economic agents and sectors.

Lower taxes and higher spending raise aggregate demand, growth and employment; higher taxes and lower spending do the opposite.

Schools of thought. **Keynesian** economists hold that fiscal policy can strongly affect output when the economy is below full employment. **Monetarists** see fiscal stimulus as only temporary and prefer monetary policy for managing inflation over time. They also oppose using monetary policy to fine-tune aggregate demand over the cycle.

Discretionary fiscal policy vs. automatic stabilizers

KEY CONCEPT

	Discretionary fiscal policy	Automatic stabilizers
What it is	Active, deliberate decisions on spending and taxes to steer the economy	Built-in features of the tax and transfer system that respond to the state of the economy
New legislation needed?	Yes, so it is slowed by the policy lags described under LOS 14.d	No, so they work without the delay of legislative action
Examples	A stimulus package, a temporary tax cut, a new infrastructure program	Unemployment compensation , the progressive income tax , the corporate profits tax
Effect in a recession	Whatever lawmakers choose	Transfers rise and tax receipts fall, so the budget moves toward deficit (expansionary)

Discretionary fiscal policy**Automatic stabilizers**

Effect in a boom

Whatever lawmakers choose

Tax receipts rise and transfers fall, so the budget moves toward **surplus** (contractionary)

Automatic stabilizers therefore deliver countercyclical fiscal policy and dampen the cycle.

Debt dynamics. Persistent deficits build up debt, which carries interest costs. Analysts judge deficits, debt and interest expense relative to GDP. When these ratios climb past certain levels, markets may start to doubt the country's solvency. The **debt ratio** is aggregate government debt divided by GDP. Because tax revenue is linked to GDP, it grows as real GDP grows. Exam convention: with tax rates held constant,

- if the real interest rate on government debt is above the real growth rate of GDP, the debt ratio rises over time;
- if the real interest rate is below real growth, the debt ratio falls.

Current practice: the rule holds when the **primary budget** (the budget balance before interest payments) is balanced and other changes in the debt, such as valuation changes, are ignored. A primary deficit can raise the ratio even when the real interest rate is below real growth, and a primary surplus can lower it even when the real interest rate is above real growth.

Worked example. Debt is 70% of GDP, the real interest rate on the debt is 4%, real GDP growth is 2%, and the primary budget is balanced. The debt grows only by the interest on it (4%) while GDP grows 2%, so next year the ratio is about $0.70 \times 1.04/1.02 = 0.714$. It creeps up to about 71.4%.

With a primary deficit, next year's ratio $\approx d \times (1 + r)/(1 + g) + \text{primary deficit as a share of GDP}$. For example, with $d = 60\%$, $r = 1\%$, $g = 3\%$ and a primary deficit of 4% of GDP, the ratio becomes $0.60 \times 1.01/1.03 + 0.04 \approx 62.8\%$.

Arguments for and against concern about the size of a fiscal deficit**KEY CONCEPT****Reasons for concern**

Higher deficits imply **higher future taxes**, which weaken incentives to work and start businesses and so reduce long-term economic growth

Markets may lose confidence and refuse to refinance. This can lead to default on foreign-currency debt, or to money printing and inflation for local-currency debt

The **crowding-out effect**: government borrowing displaces private borrowing and investment (steps below)

Reasons against concern

If the debt is held mostly by the country's **own citizens**, the problem is overstated

Debt that finances **productive capital investment** can pay for itself through future growth

Deficits may prompt needed **tax reform**

Reasons for concern**Reasons against concern**

Ricardian equivalence: households raise saving to meet the expected future taxes, which just offsets the deficit's effect on demand

If the economy is below full capacity, deficits do not divert capital from productive uses and can raise GDP and employment

Crowding out, step by step: a larger deficit is financed by borrowing in the loanable funds market. Demand for loanable funds rises, the real interest rate rises, and some private investment projects become uneconomic, which offsets part of the deficit's boost to aggregate demand.

Common exam traps

- Listing Ricardian equivalence as a reason to worry about deficits reverses it.
- Crowding out is not a multiplier effect, and it does not work through higher private saving; the saving response is Ricardian equivalence.
- Unemployment compensation is an automatic fiscal stabilizer. It is neither discretionary nor a monetary policy tool.

EXAM SHORTCUTS

- Classify a policy by who acts: taxes, government spending and transfers set by the government are fiscal policy, while money, credit and short-term rates managed by the central bank are monetary policy.

BOTTOM LINE

- Fiscal policy is the government's use of taxes and government spending to steer economic activity, and monetary policy is the central bank's management of the quantity of money and credit.
- Both policies aim at price stability and economic growth, and only fiscal policy is a direct tool for redistributing income and wealth.
- Expansionary fiscal policy means higher spending or lower taxes, giving a larger deficit or smaller surplus; expansionary monetary policy is also called accommodative or easy, and contractionary monetary policy restrictive or tight.
- Automatic stabilizers such as unemployment compensation and the progressive income tax push the budget toward deficit in a recession and toward surplus in a boom without new legislation, while discretionary fiscal policy needs legislation and is slowed by policy lags.
- Exam convention: with tax rates held constant, the debt ratio rises when the real interest rate on government debt exceeds real GDP growth and falls when it is below; current practice: this holds when the primary budget is balanced, since a primary deficit or surplus can reverse the result.
- Concerns about deficits are higher future taxes, a loss of market confidence and crowding out of private investment; arguments against concern include debt held by citizens, debt that finances productive investment, needed tax reform, Ricardian equivalence and an economy below full capacity.

QUICK CHECK**Question 1**

To support a slowing economy, the finance ministry of Norvessa announces a cut in personal income tax rates together with a larger budget for road and rail projects. These measures are *best* described as:

- A** fiscal policy.
- B** monetary policy.
- C** a combination of fiscal and monetary policy.

Answer: A

Fiscal policy is the government's use of taxation and spending to influence economic activity. Cutting tax rates and raising infrastructure spending are both fiscal tools, and they are chosen here to influence growth.

Why the other options are wrong

- **B.** Monetary policy is conducted by the central bank through the quantity of money and credit (and short-term interest rates). Neither tax rates nor government spending are monetary tools.
- **C.** No central bank action (money supply or policy rate change) is involved, so nothing in the package is monetary policy.

Key takeaway Taxes and government spending mean fiscal policy; money, credit and policy rates mean monetary policy.

MODULE 14.2

Fiscal Policy Tools and Implementation**LOS 14.c — Fiscal policy tools: spending and revenue, advantages and disadvantages****Spending tools**

- **Transfer payments** (entitlement programs) such as government pensions and unemployment benefits redistribute income. They are *not* counted in GDP, because they move income from taxpayers to recipients without paying for any newly produced good or service.
- **Current spending** is routine government purchases of goods and services.
- **Capital spending** pays for infrastructure (for example, roads, bridges, schools and hospitals) and is expected to raise future productivity.

Reasons for government spending include providing public goods (e.g., national defense), building infrastructure, supporting growth and employment through aggregate demand, guaranteeing a minimum standard of living, and subsidizing high-risk research (e.g., green technology).

Revenue tools

- **Direct taxes** are levied on income or wealth: income, wealth, estate, corporate, capital gains and social security taxes. Progressive direct taxes help redistribute income.

- **Indirect taxes** are levied on goods and services: sales taxes, **value-added taxes (VATs)** and excise taxes. They can discourage specific consumption (tobacco, alcohol, gambling).

Desirable attributes of tax policy: **simplicity** (easy to comply with and to enforce); **efficiency** (little interference with market forces or work incentives); **fairness**, which includes **horizontal equality** (similar people pay similar taxes) and **vertical equality** (richer people pay more); and **sufficiency** (enough revenue to meet spending needs).

Advantages

Indirect taxes can be changed quickly to implement social policy

Indirect taxes can raise revenue quickly at little extra cost

Disadvantages

Direct taxes and transfer payments take time to change, which delays the effect

Capital spending takes a long time; the economy may have recovered before it bites

Announcing a fiscal change can itself move expectations. A pledge to raise taxes next year may cut consumption at once, so the drop in aggregate demand arrives well before the tax does.

Which tools pack the biggest punch? Spending has the largest effect on aggregate demand because every unit is spent. Tax cuts are weaker because households save part of the tax cut instead of spending it. The **marginal propensity to consume (MPC)** is the share of an extra unit of disposable income that households spend. The rest is saved, so the **marginal propensity to save (MPS)** is $1 - MPC$. Tax cuts aimed at low-income households work better because those households have a higher MPC.

The fiscal multiplier. Extra government spending becomes someone's income, and part of that income is spent again. The rounds build up as follows:

1. Spending of ΔG raises incomes by ΔG .
2. Taxes take the fraction t , so disposable income rises by $\Delta G(1 - t)$.
3. Households spend the fraction MPC of that, so the next round of income is $\Delta G \times MPC(1 - t)$.
4. Every later round is $MPC(1 - t)$ times the one before, so the rounds shrink and their total converges:

KEY CONCEPT

$$\text{fiscal multiplier} = \frac{1}{1 - MPC(1 - t)}$$

The multiplier rises with the MPC and falls with the tax rate.

Worked example. With $MPC = 0.85$ and $t = 0.20$, each round of income is $0.85 \times 0.80 = 0.68$ times the one before. A \$40 billion rise in spending adds \$40 billion of income, then $40 \times 0.68 = \$27.2$ billion, then $27.2 \times 0.68 \approx \18.5 billion, and so on. The multiplier is $1/(1 - 0.68) = 1/0.32 = 3.125$, so aggregate demand can rise by up to $40 \times 3.125 = \$125$ billion.

Balanced budget multiplier. A tax increase lowers disposable income, and the first-round cut in spending is $\Delta T \times MPC$, which is then multiplied:

$$\Delta AD_{\text{tax}} = -\Delta T \times MPC \times \text{fiscal multiplier}$$

Continuing the example, a \$40 billion tax increase reduces AD by $40 \times 0.85 \times 3.125 = \106.25 billion. Exam convention: an equal rise of \$40 billion in government spending and (autonomous) taxes leaves the budget balanced and raises AD by $125 - 106.25 = \$18.75$ billion, so the **balanced budget multiplier is positive**. Current practice: with a 20% income tax, the higher output also brings in extra tax receipts of about $0.20 \times 18.75 = \$3.75$ billion, so the budget ends slightly in surplus; the direction of the output effect is unchanged. The multiplier is positive because all of the extra spending enters the economy, while part of the tax increase comes out of saving (the MPS share) rather than consumption. To leave AD unchanged, taxes would have to rise by $40/0.85 \approx \$47.06$ billion.

Tax cuts and Ricardian equivalence. Ricardian equivalence (LOS 14.b) also limits what a debt-financed tax cut can do. If taxpayers save the whole cut to meet the future tax bill, aggregate demand does not change. If they underestimate that liability, the equivalence fails. Whether it holds in practice is an open question.

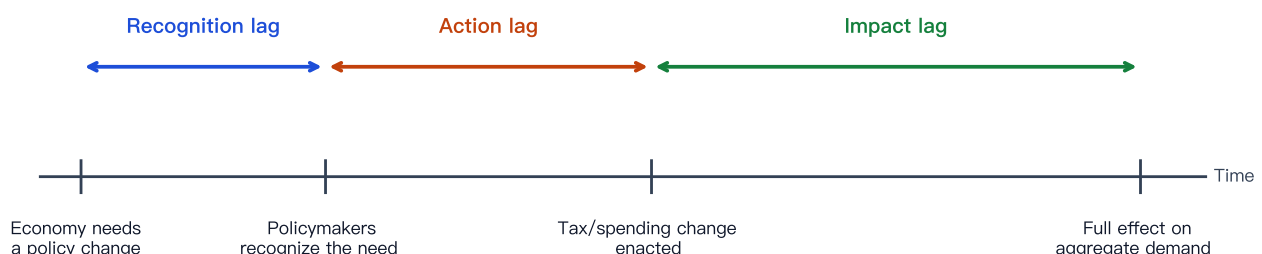
Common exam traps

- Equal increases in spending and taxes are not neutral: real GDP rises. In the worked example, AD rises by \$18.75 billion instead of staying unchanged.
- When consumption is given as a share of *pre-tax* income, that share already equals $MPC(1 - t)$. Do not multiply it by $(1 - t)$ again.
- Use $(1 - t)$ in the multiplier, not t , and don't forget the tax rate. $1/(1 - MPC)$ ignores taxes and overstates the effect. In the worked example, $1/(1 - 0.85) = 6.67$ and $1/(1 - 0.85 \times 0.20) = 1.20$, instead of 3.125.
- Cutting the fed funds target rate or changing the money supply is monetary policy, even when the goal is the same.

LOS 14.d — Implementing fiscal policy: lags, difficulties, and judging the stance

Discretionary fiscal policy should be expansionary (higher spending, lower taxes) when the economy is below full employment, and contractionary (lower spending, higher taxes) during an inflationary boom. The aim is to stabilize aggregate demand by changing how much households and firms have to spend and invest.

Why timing is hard. Forecasts can be wrong, and recessions and expansions cannot be predicted accurately. On top of that, three lags separate the need for policy from its effect:



The three lags of discretionary fiscal policy

KEY CONCEPT

Lag	Time between ...	Example
Recognition lag	the economy needing a change and policymakers realizing it (the data describe where the economy was a few months ago, not where it is now)	Data arrive late and are revised, so the slowdown is confirmed only months later
Action lag	recognizing the need and enacting the change	Drafting, debating and voting on a budget bill
Impact lag	enactment and the change actually affecting the economy	Households and firms respond gradually, and multiplier rounds take time

Because of these lags, a badly timed policy can *destabilize* the economy. Stimulus may arrive after a private-sector recovery is already under way. Proper timing is what lets discretionary policy exert a stabilizing influence.

Other difficulties

- **Misreading economic statistics:** full employment cannot be measured precisely. Stimulus applied at full capacity only raises inflation.
- **Crowding-out effect** (LOS 14.b): it can shrink the demand boost from expansionary policy, and opinions differ on how large it is.
- **Supply shortages:** if output is held back by scarce labor or resources rather than weak demand, stimulus mainly produces inflation.
- **Limits to deficits:** if markets consider the deficit already too high relative to GDP, financing becomes hard and interest rates rise.
- **Multiple targets:** fiscal policy cannot fight high unemployment and high inflation at the same time.

Is fiscal policy expansionary or contractionary?**KEY CONCEPT**

Change	Stance
Deficit increases, or surplus decreases	Expansionary
Deficit decreases, or surplus increases	Contractionary
Higher spending item (e.g., highway construction, transfers)	Expansionary
Higher revenue item (e.g., sales tax, income tax rates)	Contractionary

Structural vs. actual deficit. In a recession the actual deficit widens automatically because tax receipts fall and transfers rise, even if lawmakers change nothing. To judge the *policy stance*, economists use the **structural budget deficit (cyclically adjusted budget deficit)**: the deficit current policies would produce if the economy were at full employment. The difference between the actual and the structural deficit is the part caused by the cycle. To read the stance from budget data:

1. Use the change in the budget balance over the period; the level of the deficit alone does not reveal the stance.

2. Remove the effect of the cycle by using the structural deficit. A change in the actual deficit that leaves the structural deficit unchanged reflects the cycle rather than a change in policy.
3. A rise in the structural deficit (or a fall in a structural surplus) means expansionary policy; the reverse means contractionary policy.

Worked example. Last year the actual deficit was 6% of GDP and the structural deficit 2.5%, so 3.5 percentage points came from the weak economy. This year the economy recovers and the actual deficit narrows to 4.5%, but a tax cut lifts the structural deficit to 3.5%. The smaller actual deficit reflects the recovery; the larger structural deficit shows that fiscal policy has turned expansionary.

Common exam traps

- Higher government spending is not expansionary if taxes rise by more. Judge the stance by the change in the budget balance.
- An actual deficit above the structural deficit does not show the stance either way: the gap reflects the cycle, while the change in the structural deficit shows the discretionary stance.

EXAM SHORTCUTS

- To leave aggregate demand unchanged when government spending rises by ΔG , taxes must rise by $\Delta G/MPC$, more than the spending increase.

BOTTOM LINE

- Fiscal spending tools are transfer payments (not counted in GDP), current spending and capital spending, and revenue tools are direct taxes on income or wealth and indirect taxes on goods and services; indirect taxes can be changed quickly, while direct taxes, transfers and capital spending take time.
- Government spending raises aggregate demand more than an equal tax cut, because households save part of a tax cut, and tax cuts aimed at low-income households, who have a higher MPC, work better.
- The fiscal multiplier is $1/[1 - MPC(1 - t)]$, which rises with the MPC and falls with the tax rate.
- Exam convention: equal increases in government spending and taxes leave the budget balanced and raise aggregate demand, so the balanced budget multiplier is positive; current practice: with an income tax the higher output also raises tax receipts, but the direction of the output effect is unchanged.
- Recognition, action and impact lags separate the need for discretionary fiscal policy from its effect, so a badly timed policy can destabilize the economy.
- The stance is judged from the change in the structural (cyclically adjusted) deficit, the deficit current policies would produce at full employment: a rise means expansionary policy, while a change in the actual deficit that leaves it unchanged reflects the cycle.

QUICK CHECK

Question 2

Inflation in Brennholt is running well above target. Which of the following is an appropriate *discretionary fiscal policy* response?

- A Scaling back government spending on large public construction projects.
- B Raising the central bank's target for the overnight interbank rate.
- C Reducing the money supply.

Answer: A

Discretionary fiscal policy consists of the government's decisions about spending and taxes. Cutting spending on major public construction lowers aggregate demand and eases pressure on prices, which is the appropriate direction when inflation is high.

Why the other options are wrong

- **B.** Raising a policy interest rate target (like the federal funds target rate in the US) is a monetary policy action by the central bank. It fights inflation, but it is not fiscal policy.
- **C.** Reducing the money supply is also a monetary policy action.

Key takeaway Right direction is not enough; check the tool. Spending and taxes are fiscal, while interest rates and the money supply are monetary.

Practice questions

Question 3

The governments of Tarsia and Morvenna both keep their tax rates unchanged and both run a balanced primary budget, meaning that tax revenue exactly covers all government spending other than interest on the debt.

Tarsia's government debt equals 85% of GDP, the real interest rate on that debt is 3.1%, and Tarsia's real GDP grows by 1.3% a year. Morvenna's government debt equals 50% of GDP, the real interest rate on that debt is 0.9%, and Morvenna's real GDP grows by 2.7% a year. If these conditions persist, the ratio of government debt to GDP will *most likely*:

- A rise in Tarsia and fall in Morvenna.
- B rise in both Tarsia and Morvenna.
- C fall in both Tarsia and Morvenna.

Question 4

The government of Kestrel Isles increases its spending by \$60 million. Households have a marginal propensity to consume of 90%, and the tax rate is 30%. The potential increase in aggregate demand is *closest* to:

- A \$600 million.
- B \$162 million.
- C \$82 million.

Question 5

Over the past year, new tax and spending decisions (not the business cycle) have widened the budget deficit of Estavia's government and shrunk the budget surplus of Marquessa's government. How would the fiscal policies of the two countries *best* be described?

- A Both are expansionary.
- B Both are contractionary.
- C One is expansionary and the other is contractionary.

Answers: 3. A · 4. B · 5. A

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/fiscal-policy/. The full bank has 37 questions on this reading.

credguild.com

ECONOMICS · READING 15

Quantitative Easing

What you'll learn

LOS 15.a Describe the roles of central banks (currency supplier, bankers' bank, regulator, lender of last resort, reserve holder, monetary policy) and their objectives, chiefly price stability.

LOS 15.b Describe the policy rate, reserve requirements and open market operations, the monetary transmission mechanism, and how monetary policy affects growth, inflation, interest rates and exchange rates.

LOS 15.c Describe the qualities of effective central banks, compare inflation, interest rate and exchange rate targeting, judge the policy stance against the neutral rate, and describe the limitations of monetary policy.

LOS 15.d Explain how combinations of monetary and fiscal policy affect interest rates, output and the private and public sectors.

MODULE 15.1

Central Bank Objectives and Tools

This reading covers the roles and objectives of central banks, the tools of monetary policy and the transmission mechanism through which a policy-rate change reaches inflation. It then describes the qualities of an effective central bank, inflation, interest rate and exchange rate targeting, the neutral interest rate, the limits of monetary policy, and how monetary and fiscal policy interact.

LOS 15.a — What central banks do and what they aim for

Roles of a central bank. A modern **central bank** typically performs six roles:

KEY CONCEPT

Role	What it means in practice
Sole supplier of currency	Only the central bank can issue the country's currency (notes and coins) and bank reserves. Exam convention: the central bank is described as the sole supplier of money. Current practice: its monopoly covers currency and bank reserves, while most deposit money is created by commercial banks when they lend. Today currency is fiat money — money with no backing in gold or any other tangible asset, accepted because the law makes it legal tender and because it keeps its value.
Banker to the government and other banks	Holds accounts for the government and for commercial banks and provides them with banking services.
Regulator and supervisor of the payments system	Sets risk-taking standards and reserve requirements for banks and oversees domestic and cross-border clearing.
Lender of last resort	Because it can create money, it can lend to banks that run short of funds. Knowing this backstop exists reassures depositors and helps prevent bank runs .

Role	What it means in practice
Holder of gold and foreign exchange reserves	Keeps the nation's official gold and foreign currency reserves.
Conductor of monetary policy	Controls or influences the quantity of money and its growth over time.

Collecting taxes is not a central bank function; a separate government agency does it. Being banker to the government means providing it with banking services, such as holding its accounts; making loans to government agencies is not among the central bank roles listed here.

KEY CONCEPT

Objectives. The **primary objective** is to **control inflation** so as to promote **price stability**. High inflation imposes **menu costs** (firms repeatedly re-pricing their goods) and **shoe leather costs** (people making extra trips to the bank to avoid holding cash that loses value). Some central banks have additional goals:

- stable exchange rates with foreign currencies;
- **full employment**;
- sustainable positive economic growth;
- moderate long-term interest rates.

Inflation targets. Most developed-country central banks aim for inflation in a range around **2% to 3%**. They avoid a **zero** target because random swings around zero would often mean **deflation**, which is disruptive. Exam convention: the US Federal Reserve and the Bank of Japan are the developed-country exceptions without an explicit inflation target. The Fed's goals also include maximum employment and moderate long-term rates, and Japan has struggled with persistent deflation. Current practice: both now have explicit 2% goals. The Fed adopted a longer-run goal of 2% inflation, measured by the PCE price index, in January 2012, alongside its **dual mandate** (maximum employment as well as stable prices). The Bank of Japan adopted a 2% CPI price stability target in January 2013 while fighting deflation.

Pegging. Some countries instead **peg** their currency to another currency, most often the US dollar, and run monetary policy to hold that exchange rate. How a peg is defended, and what it does to the money supply, interest rates and inflation, is covered under exchange rate targeting (LOS 15.c).

Common exam traps

- "Minimize long-term interest rates" is not a goal. The goal is *moderate* long-term rates.
- A mandate focused only on price stability means the bank fights above-target inflation even during a recession.

LOS 15.b — Policy tools and the monetary transmission mechanism

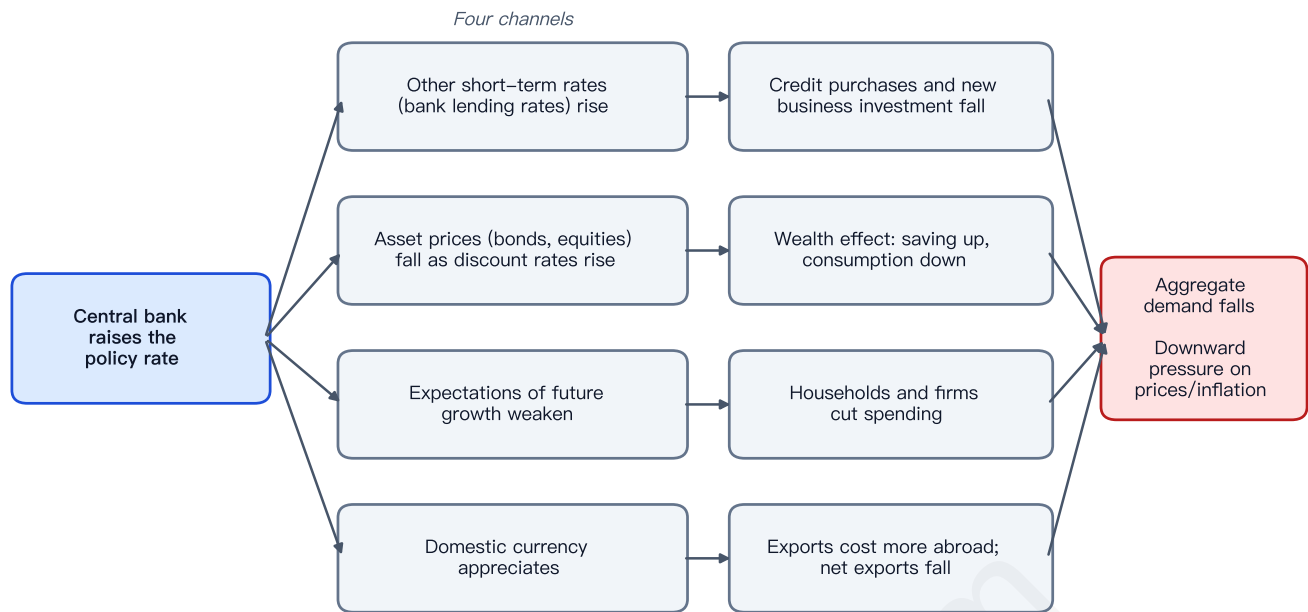
The three main tools

KEY CONCEPT

Tool	Expansionary use	Contractionary use
Policy rate — the rate at which the central bank lends reserves to banks: the discount rate (US), the refinancing rate (ECB), the two-week repo rate (Bank of England, lending through a repurchase agreement)	Lower it	Raise it
Reserve requirements — percentage of deposits banks must hold as reserves	Lower them (more funds to lend)	Raise them
Open market operations — buying and selling (usually government) securities	Buy securities	Sell securities

- In a **repurchase agreement** (repo), the central bank buys securities from a bank that agrees to buy them back later at a slightly higher price. The percentage difference between the two prices is the interest rate on what is, in effect, a short-term loan to the bank.
- **Open market purchases**: cash replaces securities in investors' accounts, banks get **excess reserves**, more funds are available for lending, the **money supply** rises and interest rates fall. **Open market sales** do the reverse and push rates up.
- In the US, the **federal funds rate** is the market rate banks charge *each other* for overnight loans of reserves. The Federal Reserve sets a **target** for it and uses open market operations (its most-used tool) to steer the actual rate there. Do not confuse it with the **discount rate**, which is the rate a bank pays when it borrows *from the Federal Reserve*.
- The central bank does not set exchange rates, the prices of government securities or the yield on existing bonds directly. It also cannot *compel* banks to tighten or loosen their credit standards. It can only encourage them.
- Lowering reserve requirements has an effect only when banks want to extend more loans and borrowers want to take them.
- Exam convention: the policy rate, reserve requirements and open market operations are the three working tools of monetary policy. Current practice: the Federal Reserve set its reserve requirement ratios to zero in March 2020, and with reserves plentiful since the 2008 financial crisis it steers the federal funds rate mainly through the interest rate it pays on banks' reserve balances rather than through day-to-day open market operations.

The monetary transmission mechanism is how a change in the policy rate reaches the price level and inflation. It works through **four channels**: other short-term rates, **asset prices**, **expectations**, and **exchange rates**. The figure traces a policy-rate *increase*:



Monetary transmission mechanism of a policy-rate increase

1. Banks raise their short-term lending rates, so consumers cut credit purchases and firms cut investment.
2. Higher rates for discounting future cash flows lower bond, equity and other asset prices. The resulting **wealth effect** raises saving and lowers consumption.
3. Expectations of future growth weaken, so spending falls.
4. Higher rates attract foreign capital, the **domestic currency appreciates**, exports become more expensive for foreigners and **net exports** fall. Through this channel the **trade balance** worsens.

Together these reduce **aggregate demand** and push the price level down. The policy rate acts directly on the first links in the chain: other short-term rates, asset prices, expectations and the exchange rate. Inflation is the end point, reached through these channels and only after a lag. A policy-rate cut works through the same channels in the opposite direction.

Expansionary policy step by step. The central bank buys securities, so bank reserves rise and the interbank rate falls. Other short-term rates and then longer-term rates fall, and the currency depreciates. Business investment, consumer purchases of houses, autos and durable goods, and net exports all rise. Aggregate demand increases, which raises inflation, employment and real GDP in the short run. If **money neutrality** holds, monetary policy has no effect on real output in the long run.

Example. The central bank of a small economy raises its policy rate from 3.00% to 3.50% and sells government bonds to make the higher rate stick. Expected effects: bank reserves and excess reserves fall; short- and long-term market rates rise; bond and share prices fall; the currency appreciates; investment, durable-goods spending and exports fall. Aggregate demand falls, so in the short run both real GDP and the price level fall, and the unemployment rate rises.

Common exam traps

- Tightening raises the currency's foreign exchange value, so a "decrease in the foreign exchange value" is not a channel through which tightening cuts spending.

- Tightening raises *real* interest rates in the short run and increases unemployment.
- If inflation is below target, the central bank eases: it buys securities or cuts the policy rate or reserve requirement.

EXAM SHORTCUTS

- Monetary tightening makes the domestic currency appreciate, so an answer in which tightening cuts spending through a weaker currency can be ruled out.

BOTTOM LINE

- A central bank supplies currency, acts as banker to the government and other banks, regulates and supervises the payments system, is lender of last resort, holds gold and foreign exchange reserves and conducts monetary policy; under the exam convention it is the sole supplier of money, while in current practice its monopoly covers currency and bank reserves and commercial banks create most deposit money.
- Controlling inflation to promote price stability is a central bank's primary objective, and some central banks also aim for stable exchange rates, full employment, sustainable growth and moderate long-term interest rates.
- Most developed-country central banks aim for inflation in a range around 2% to 3%, not zero, because swings around a zero target would often mean deflation.
- Exam convention: open market operations, the policy rate and reserve requirements are the three working tools, used expansionarily by cutting the rate or requirements and buying securities; current practice: the Federal Reserve has set reserve requirements to zero and steers the federal funds rate mainly through the rate it pays on reserve balances.
- The federal funds rate is the market rate US banks charge each other for overnight loans of reserves, which the Federal Reserve targets, while the discount rate is what a bank pays to borrow from the Federal Reserve.
- A policy-rate change reaches the price level through other short-term rates, asset prices, expectations and exchange rates; a rate increase lowers aggregate demand and appreciates the currency, and if money neutrality holds, monetary policy has no long-run effect on real output.

QUICK CHECK

Question 1

Rumors about loan losses lead depositors at several banks in Harwick to start withdrawing their money. Harwick's central bank announces that it will provide whatever funds are needed to any sound bank facing a cash shortage, and the withdrawals soon stop. This announcement reflects the central bank's role as:

- A lender of last resort.
- B holder of gold and foreign exchange reserves.
- C sole supplier of currency.

Answer: A

Because the central bank can create central bank money (reserves and currency) at will, it can lend to banks that run short of funds. Knowing this backstop exists assures depositors their money is safe and helps prevent bank runs. That is the lender-of-last-resort role.

Why the other options are wrong

- **B.** Holding the nation's gold and foreign currency reserves is a separate role. It concerns official reserves rather than emergency lending to domestic banks.
- **C.** Being the sole supplier of currency is what *enables* emergency lending, but the role being performed here is lending to banks in distress, i.e., lender of last resort.

Key takeaway Preventing bank runs by standing ready to lend to banks is the lender-of-last-resort role.

MODULE 15.2

Monetary Policy Effects and Limitations

LOS 15.c — Effective central banks, targeting regimes and limits of policy

Three essential qualities of an effective central bank

KEY CONCEPT

Quality	Meaning	Clue in a question
Independence	Free from political interference, which matters because politicians may want to boost growth before elections at the cost of higher inflation	Who decides the policy rate or the target?
Credibility	The bank follows through on what it says, so its targets become self-fulfilling: wages and contracts are set on the expected (target) inflation rate. A target set by a heavily indebted government instead would lack credibility, because that government gains from letting inflation overshoot	Economic actors <i>base their decisions</i> on the stated target
Transparency	Regular disclosure, e.g. inflation reports , and a clear statement of which indicators it uses and how. This supports credibility and makes policy moves easier to anticipate	Publishes reports and explains which indicators it uses and how

Relevance, reliability, comparability and consistency are financial-reporting qualities. They are not on the central bank list.

Independence comes in degrees rather than all-or-nothing. Even a fairly independent central bank may have its head appointed by politicians.

- **Operational independence:** the central bank alone sets the **policy rate**.

- **Target independence:** in addition, it defines how inflation is computed, chooses the target inflation level and sets the horizon for reaching it. The ECB has both types. Most other central banks have operational independence alone.

Targeting regimes

KEY CONCEPT

Regime	How it works	Notes
Interest rate targeting	Add money when rates rise above a target band, withdraw money when they fall below it	Used in the past
Inflation targeting	Adjust policy to keep <i>expected</i> inflation (about two years ahead) inside a band	Most widely used today, and required by law in some countries. Users include the Bank of England, the ECB and the central banks of Canada, Australia, Brazil and Mexico
Exchange rate targeting	Buy or sell the domestic currency to hold a target exchange rate, often against the US dollar	Common in developing countries

The most common inflation target is **2%**, with a permitted deviation of **±1%** (band 1% to 3%). Because of the deflation risk described under LOS 15.a, the band is set so that its lower edge (target minus deviation) stays at or above zero.

Exchange rate targeting mechanics. If the domestic currency falls *below* the target, the central bank **buys domestic currency with foreign reserves**. This reduces money supply growth and raises interest rates. If the currency rises *above* the target, the bank sells domestic currency, which increases the money supply and lowers rates. As a result, the money supply and interest rates can become more volatile. A country can run out of foreign reserves, so intervention has limits. Monetary policy must follow the peg regardless of domestic conditions, and the pegging country ends up with the anchor country's **inflation rate**.

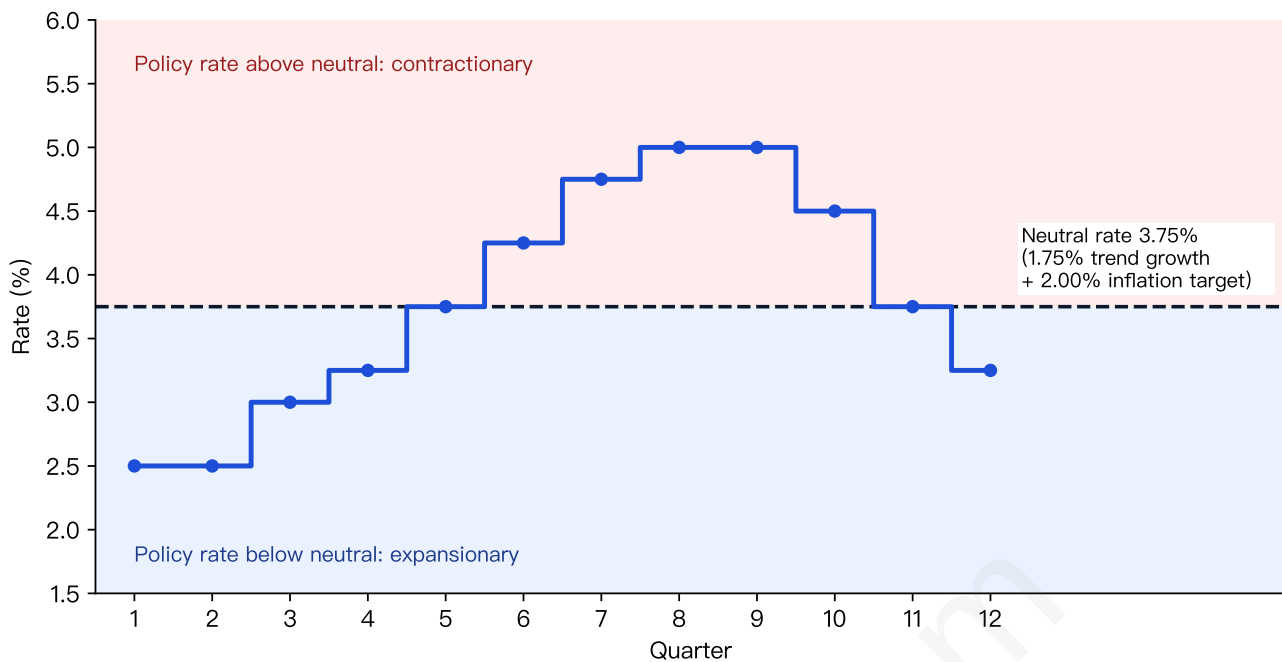
Neutral interest rate and policy stance

Exam convention: the **neutral interest rate** is described as the growth rate of the money supply that neither speeds up nor slows economic growth. Current practice: it is treated as the policy interest rate at which policy neither stimulates nor restrains the economy, which is what the formula and the stance test below use:

KEY CONCEPT

$$\text{neutral interest rate} = \text{real trend rate of economic growth} + \text{inflation target}$$

- Policy rate above neutral: **contractionary**. Policy rate below neutral: **expansionary**. Equal: **neutral**.



Policy rate versus the neutral interest rate

Example. Trend real growth 1.75% and inflation target 2.00% give a neutral rate of $1.75\% + 2.00\% = 3.75\%$. A policy rate of 4.50% (above 3.75%) is contractionary. A policy rate of 3.00% is expansionary.

Limitations of monetary policy

- **Long-term rates may not follow short-term rates.** The central bank controls short-term rates directly, but long-term rates, which drive most household and business decisions, reflect **expected inflation**. Tightening can *lower* long-term yields. If markets believe it will work, expected inflation falls. If they see it as too severe, the higher probability of a recession makes long-term bonds more attractive. Easing that markets see as inflationary can *raise* long-term yields. Investors who sell long-term bonds for this reason are called **bond market vigilantes**. With a credible central bank this effect is small.
- **Liquidity trap.** When the **demand for money becomes very elastic**, people simply hold the extra money as cash, so adding money does not push rates down or stimulate spending. **Deflation** that persists despite expansionary policy points to a liquidity trap.
- **Zero lower bound.** Exam convention: the nominal policy rate cannot be cut below zero, so a central bank whose rate is already at zero has little room left to stimulate. Current practice: some central banks (e.g., the ECB, the Swiss National Bank and the Bank of Japan) have set slightly negative policy rates, but not far below zero. Either way, **deflation** is harder to reverse than inflation. Inflation can be fought by raising rates, which have no upper limit.
- **Banks may not lend** even when excess reserves rise (as after 2008). With short-term rates near zero, central banks turned to **quantitative easing (QE)**: large-scale purchases of longer-term government bonds, mortgage securities and even securities with credit risk. The aim was to lower long-term rates and create excess reserves that encourage lending. Buying securities with credit risk may also shift risk from the private to the public sector.
- **Developing economies** face extra problems: illiquid government debt markets (making interest rate signals unreliable and open market operations hard), difficulty estimating the neutral rate, rapid financial innovation that changes money demand, and central banks that lack credibility or independence.

Common exam traps

- The benchmark for stance is the neutral interest rate. The inflation target and the trend growth rate are only its components.
- Setting the policy rate alone does not make a central bank target independent.

LOS 15.d — Interaction of monetary and fiscal policy

Monetary	Fiscal	Interest rates	Output	Private sector	Public sector
Tight	Tight	Higher	Lower	Lower	Lower
Easy	Easy	Lower	Higher	Higher	Higher
Tight	Easy	Higher	Higher (exam convention, from the fiscal stimulus)	Lower	Higher
Easy	Tight	Lower	Varies (lower rates tend to raise it)	Higher	Lower

When the two policies pull in *opposite* directions, the output entries follow the exam convention. Exam convention: expansionary fiscal with contractionary monetary policy is taken to raise aggregate demand and output. Contractionary fiscal with expansionary monetary policy has an output effect that varies, although the lower interest rates tend to raise private consumption and output. Current practice: in both mixed cases output rises only if the expansionary policy is the stronger of the two, so the direction depends on their relative strength. The **sector-share** effects (private vs. public share of GDP) and the direction of interest rates do not depend on that assumption.

- **Contractionary fiscal + expansionary monetary:** lower government borrowing and a larger money supply both lower rates, so the **private sector grows** and government spending as a share of GDP falls.
- **Expansionary fiscal + contractionary monetary:** rates rise (heavier government borrowing plus tight money), the **public sector's share of GDP rises** and the private sector is squeezed.
- **Fiscal multipliers** differ: direct government spending has had a larger multiplier than transfers or tax cuts. Among the latter, transfers to the poor have the greatest effect, followed by tax cuts for workers, then broad untargeted transfers. Every type of fiscal stimulus is **more powerful when combined with expansionary monetary policy**, possibly because of higher inflation, falling real interest rates and the extra business investment they bring. Cutting the discount rate or buying securities therefore reinforces expansionary fiscal policy during high unemployment.

Common exam traps

- Selling bonds or raising reserve requirements works *against* an expansionary fiscal stance.

EXAM SHORTCUTS

- To judge the stance, add the real trend growth rate and the inflation target and compare the policy rate with that sum: above it means contractionary, below it expansionary.

BOTTOM LINE

- An effective central bank has independence, credibility and transparency; operational independence means it sets the policy rate alone, and target independence means it also defines the inflation measure, the target and the horizon for reaching it.
- Inflation targeting, the most widely used regime, keeps expected inflation inside a band, most commonly $2\% \pm 1\%$, while an exchange rate target makes the central bank buy its currency with foreign reserves when it falls below target and sell it when it rises above, so the pegging country ends up with the anchor country's inflation rate.
- The neutral interest rate equals the real trend rate of economic growth plus the inflation target, and a policy rate above it is contractionary and below it expansionary; the exam convention describes the neutral rate as the money supply growth rate that neither speeds up nor slows growth, while current practice treats it as the policy rate that neither stimulates nor restrains the economy.
- Monetary policy can fail when long-term rates move against short-term rates because of expected inflation, in a liquidity trap where demand for money is very elastic, and when banks will not lend despite excess reserves, which led central banks to quantitative easing.
- Exam convention: the nominal policy rate cannot be cut below zero, leaving little room to stimulate; current practice: some central banks have set slightly negative rates; either way deflation is harder to reverse than inflation.
- With expansionary fiscal and contractionary monetary policy, interest rates rise and the public sector's share of GDP rises, while contractionary fiscal and expansionary monetary policy lower rates and let the private sector grow.

QUICK CHECK**Question 2**

In Taviston, unions and employers routinely write the central bank's announced inflation target into multi-year wage agreements, and lenders price loans on the assumption that inflation will stay close to that target. This behavior indicates that Taviston's central bank has:

- A** credibility.
- B** transparency.
- C** target independence.

Answer: A

A credible central bank is one whose stated targets people believe. They then base their decisions (wages, nominal contracts, loan pricing) on the target inflation rate, which helps make the target self-fulfilling.

Why the other options are wrong

- **B.** Transparency means periodically disclosing the state of the economy (e.g., inflation reports) and the indicators used. It supports credibility, but the behavior described is the definition of credibility itself.
- **C.** Target independence means the central bank determines how inflation is computed, sets the target level and the horizon. It says nothing about whether the public believes the target.

Key takeaway Decisions based on the announced target = credibility. Regular inflation reports = transparency. Deciding the policy rate or the target = independence.

Practice questions

Question 3

Suppose the Federal Reserve carries out open market sales of Treasury securities. What happens to bank reserves and to the federal funds rate?

- A Reserves decrease, banks can lend less, and the federal funds rate rises.
- B Reserves decrease, banks can lend less, and the federal funds rate falls.
- C Reserves increase, banks can lend more, and the federal funds rate falls.

Question 4

Quellan's central bank has set its policy rate at 4.0% and aims for inflation of 2.4%. Economists expect real GDP to expand at a trend pace of 1.6% a year. How is Quellan's monetary policy *most likely* classified?

- A Neutral.
- B Expansionary.
- C Contractionary.

Question 5

Growth in Tarnovia has stalled. Its government and central bank want both public-sector spending and private-sector consumption and investment to expand. Which policy mix fits this goal, and what is its *most likely* effect on interest rates?

- A Expansionary fiscal and contractionary monetary policy; interest rates rise.
- B Contractionary fiscal and expansionary monetary policy; interest rates fall.
- C Expansionary fiscal and expansionary monetary policy; interest rates usually fall.

Answers: 3. A · 4. A · 5. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/quantitative-easing/. The full bank has 47 questions on this reading.

ECONOMICS · READING 16

Introduction to Geopolitics

What you'll learn

LOS 16.a Describe geopolitics as the degree of cooperation versus competition among state and nonstate actors, and why countries cooperate.

LOS 16.b Relate geopolitics to globalization versus nationalism and classify countries as autarky, hegemony, bilateralism or multilateralism.

LOS 16.c Describe the functions and objectives of the IMF, the World Bank and the WTO.

LOS 16.d Describe event, exogenous and thematic geopolitical risk and its likelihood, impact and velocity (including black swan risk).

LOS 16.e Describe national security, economic and financial tools of geopolitics and their effects.

LOS 16.f Describe how geopolitical risk affects investments: impact, discrete vs broad effects, business cycle, scenario analysis and signposts.

MODULE 16.1

Geopolitics

This reading describes geopolitics through two lenses, cooperation versus competition and globalization versus nationalism, which combine into four archetypes, and it sets out the roles of the IMF, the World Bank and the WTO. It then classifies geopolitical risks and the tools of geopolitics, and explains how investors judge a risk's likelihood, impact and velocity using scenario analysis and signposts.

LOS 16.a — Geopolitics as cooperation versus competition

Geopolitics is the study of interactions among nations. The players are **state actors** (national governments) and **nonstate actors** (companies, nongovernment organizations and individuals). Geopolitics also looks at how geography shapes these interactions: a country with a long coastline and deep-water ports, for example, tends to produce firms that dominate seaborne shipping.

A useful lens is the degree of **cooperation** among countries. Cooperation means engaging with other countries on diplomatic, military, economic and cultural matters. Economic cooperation includes:

- letting goods, services and capital move freely between countries;
- agreeing on common tariff levels;
- adopting common international rules (e.g., shared financial reporting standards);
- transfers of information and technology.

A country that restricts these flows, for example by banning exports of a particular good, is acting noncooperatively. In practice cooperation varies along a spectrum. A country may cooperate on trade but not on defense, and its stance can shift with elections or a change of leadership, so analysts watch the current decision makers and the length of the political cycle.

Why countries cooperate. A country cooperates when doing so advances its **national interests**, which can be ranked as a hierarchy with survival at the top. The motives fall into three groups:

1. **Security.** Survival comes first, so a country may join its neighbors in a military alliance to protect its citizens from invasion.

2. *Economic interests.* Resource endowments shape these: a country rich in minerals but short of farmland must trade minerals for food, so it wants international trade lanes kept open. Nonstate actors cooperate across borders because they want to put resources to their highest-valued use, and they push for standardized regulations and processes.
3. *Culture.* **Cultural factors** (a shared language, historical migration) and strong, stable **institutions** (laws, organizations, customs) make cooperation easier. Large exporters of films, music and other cultural content usually have strong legal protection for intellectual property. Such exports are one source of **soft power**: influencing other countries without using or threatening force.

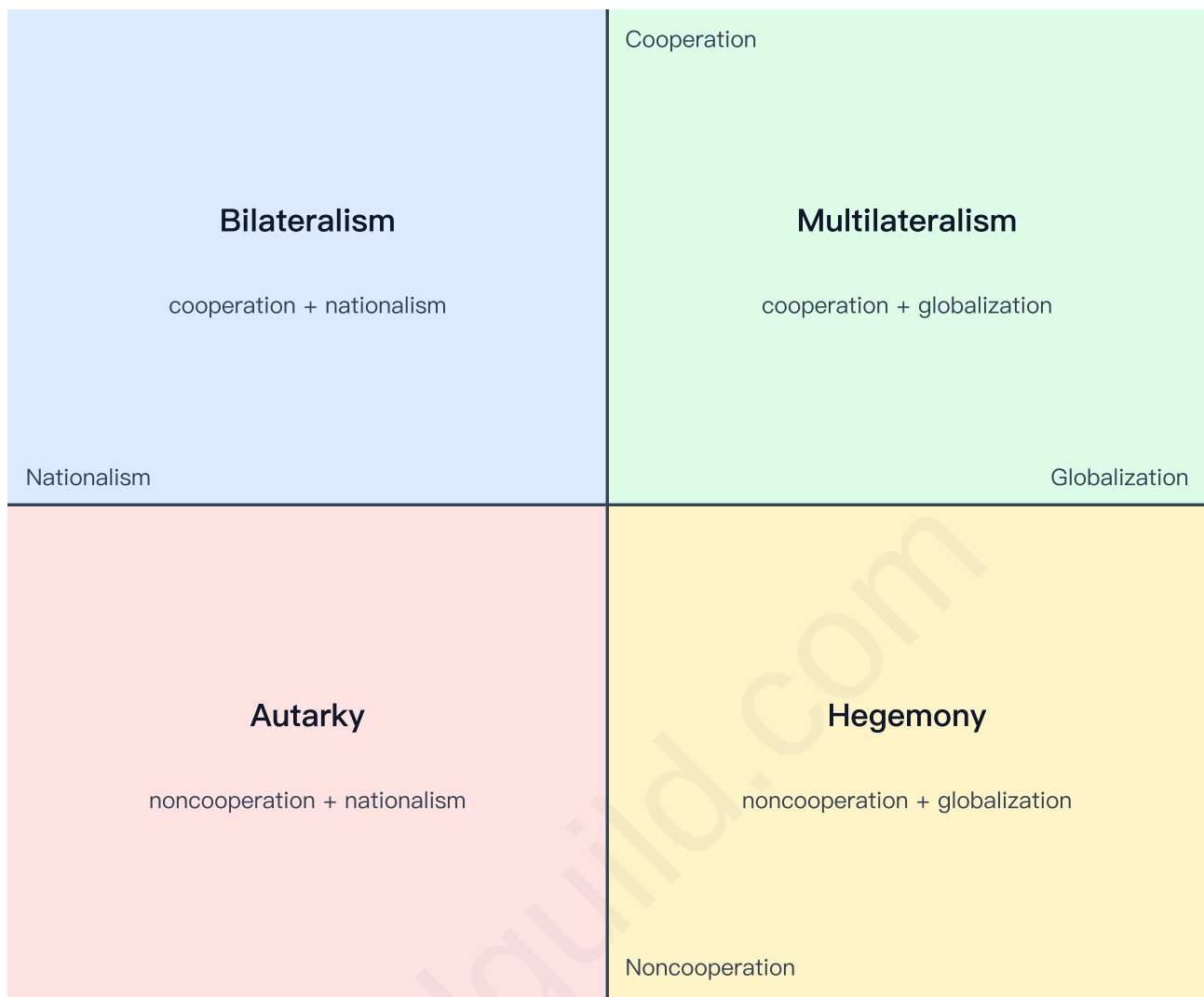
Common exam traps

- Treating cooperation as all-or-nothing; a country can be cooperative on some issues and noncooperative on others.
- Assuming cooperation is altruistic; it is driven by national interest.

LOS 16.b — Geopolitics and globalization

Globalization is the long-run trend toward worldwide integration of economic activity and cultures. Economic openness (trade as a share of world output) climbed from roughly a quarter of output in the early 1970s to around 60% before the 2008 financial crisis and has stayed near that level. Its opposite, **nationalism**, here means a country putting its own economic interests first, acting either alone or in competition with other countries. Countries near the globalization end trade more, allow freer movement of capital and currency exchange, and are more open to cultural interaction.

Crossing the cooperation spectrum with the globalization spectrum gives four **archetypes** of geopolitical behavior:



Four archetypes of geopolitical behavior on the cooperation and globalization axes

KEY CONCEPT

Archetype	Cooperation axis	Globalization axis	Typical behavior
Autarky	Noncooperation	Nationalism	Seeks national self-reliance and self-sufficiency; produces most goods at home, so little or no external trade; often a state-dominated society with government control of industry and media
Hegemony	Noncooperation	Globalization	Open to global trade but large enough to influence other countries without needing to cooperate
Bilateralism	Cooperation	Nationalism	Cooperates through one-to-one relationships with individual countries (possibly many of them) but avoids multicountry arrangements

Archetype	Cooperation axis	Globalization axis	Typical behavior
Multilateralism	Cooperation	Globalization	Trades extensively and cooperates with many countries at once; regionalism is a variant that cooperates multilaterally mainly with neighbors

Nonstate actors may be more globally minded than their governments: firms look abroad for profits, lower costs and new markets; investors look abroad for returns and diversification, through **portfolio investment flows** (buying foreign securities) or **foreign direct investment** (owning production capacity abroad).

Example. Country Q trades heavily with the rest of the world and is so large that it sets terms on its own rather than joining multicountry agreements. It is globalized but noncooperative, so it fits **hegemony**. If instead it signed dozens of separate two-country trade deals but kept away from regional blocs, it would fit **bilateralism**.

Common exam traps

- Bilateralism is *cooperative*, even though it sits on the nationalist side.
- Hegemony is *globalized*, even though it is noncooperative.

LOS 16.c — International organizations that facilitate trade

Organization	Core mission	Key functions
International Monetary Fund (IMF)	International monetary stability	Article I goals: promoting international monetary cooperation ; facilitating the expansion and balanced growth of international trade ; promoting exchange stability ; assisting in the establishment of a multilateral system of payments ; making resources available (with adequate safeguards) to members experiencing balance of payments difficulties
World Bank	Fighting poverty	Financial and technical assistance to developing countries: low-interest loans, interest-free credits and grants for education, health, infrastructure, agriculture, public administration and more. Made up of the IBRD (middle-income and creditworthy poorer countries) and the IDA (the poorest countries)
World Trade Organization (WTO)	Global rules of trade	The only international organization dealing with the rules of trade between nations; aims for trade that flows smoothly, predictably and freely; negotiated agreements bind members' trade policies; a dispute settlement process resolves trade friction

Common exam traps

- Thinking only the WTO works to expand trade. The IMF's Article I goals include the expansion and balanced growth of international trade.

- Thinking only one body provides funds. The IMF makes resources available to members with balance of payments difficulties, and the World Bank lends to developing countries for development and poverty reduction.
- Mixing up the roles that belong to one body: fighting poverty is the World Bank's mission (it is not among the IMF's Article I goals), exchange stability is an IMF goal, and settling trade disputes is the WTO's job.

LOS 16.d — Geopolitical risk

Geopolitical risk is the possibility of events that disrupt peaceful international relations. Three types:

KEY CONCEPT

Type	What is known	Example
Event risk	Timing known, outcome unknown	A national election or a scheduled referendum
Exogenous risk	Not anticipated at all	A sudden war, coup or rebellion
Thematic risk	Known factors whose effects play out over a long period	Migration patterns, climate trends, cyber risks

Geopolitical risk changes the **risk premium** investors demand for holding assets in a country or region. A higher risk premium means a higher discount rate, and therefore lower asset values, for the same expected cash flows. Three dimensions describe a risk:

- **Likelihood**: the probability that it occurs.
- **Impact**: how large its effect on investment outcomes would be.
- **Velocity**: how quickly investment values reflect the effect.

The cooperation/globalization framework helps with likelihood: more cooperative and globalized countries face less risk of some events (armed conflict) but more of others (e.g., supply chain disruptions such as those of 2020–2021).

Velocity classes

Velocity	Horizon	Typical effect
High	Short term	Exogenous shocks moving markets quickly; includes black swan risk — low-likelihood exogenous events with substantial short-term effects
Medium	Intermediate	Raises costs or disrupts production for specific companies or industries
Low	Long term	Affects companies mainly in the environmental, social, and governance (ESG) realm

Investors with long horizons usually do not need to react to black swan events; short-horizon investors may have to. Long-horizon investors should instead analyze medium- and low-velocity risks.

Common exam traps

- Velocity measures how fast *investment values* respond. How fast the event itself unfolds is a separate matter.
- A black swan is *low* probability with a *short-term* (not long-term) impact.
- Calling a scheduled election exogenous because its result is unknown. A known date makes it event risk.

LOS 16.e — Tools of geopolitics

Tools of geopolitics are the means (mostly used by state actors) to advance national interests. There are three categories, and they are classified in two different ways.

National security tools include armed conflict, espionage, and bilateral or multilateral defense agreements meant to reinforce or prevent armed conflict. They are classified by status: *active* if a country is using the tool now, *threatened* if it is not using it but appears likely to. Armed conflict destroys productive capital and drives migration away from conflict zones.

Economic tools and **financial tools** are classified by whether a country uses them cooperatively:

KEY CONCEPT

Category	Cooperative use	Noncooperative use
Economic tools	Free trade areas, common markets, economic and monetary unions	Domestic content requirements, voluntary export restraints, nationalization of companies or industries
Financial tools	Allowing foreign investment and the free exchange of currencies	Restricting foreign investment or currency exchange

Sanctions restrict the financial interests of a specific geopolitical actor. They count as a financial tool, and state actors often combine them with national security tools.

Common exam traps

- Classifying sanctions as a national security tool because they accompany military pressure. They are a *financial* tool.
- Restrictions on currency conversion are a noncooperative *financial* tool; voluntary export restraints are a noncooperative *economic* tool.

LOS 16.f — Geopolitical risk and investments

Analysis costs time and money, so investors should concentrate on risks with potentially high impact, and for those, judge whether the effect is **discrete** (a single company or industry) or **broad** (a country, region or the world). The business cycle matters: a geopolitical risk may have a larger effect on investment values in a recession than in an expansion.

Tools for the analysis:

- **Scenario analysis** (qualitative or quantitative) estimates how a geopolitical risk would affect a portfolio.

- **Signposts** are data or indicators that signal whether an event's likelihood is rising or falling (e.g., market volatility measures), helping investors track a risk over time.

Common exam traps

- Mixing up the two tools. A volatility index watched for a change in the chance of conflict is a signpost; a what-if estimate of the portfolio loss if conflict breaks out is scenario analysis.

EXAM SHORTCUTS

- Place a country on the two axes and the archetype follows: noncooperative and nationalist is autarky, noncooperative and globalized is hegemony, cooperative and nationalist is bilateralism, and cooperative and globalized is multilateralism.
- Classify a geopolitical risk by what is known in advance: a known date with an unknown outcome is event risk, an unanticipated event is exogenous risk, and known factors with long-lasting effects are thematic risk.

BOTTOM LINE

- Geopolitics studies interactions among nations, involving state actors (national governments) and nonstate actors (companies, nongovernment organizations and individuals), and a country's cooperation varies along a spectrum, driven by its national interests in security, economic needs and culture.
- Globalization is the long-run integration of economic activity and cultures across the world, and nationalism here means a country putting its own economic interests first, alone or in competition with others.
- The IMF promotes international monetary cooperation, balanced growth of trade and exchange stability and makes resources available, with adequate safeguards, to members with balance of payments difficulties; the World Bank fights poverty with loans, credits and grants to developing countries; the WTO, the sole international body for the rules of trade between nations, runs a dispute settlement process.
- Geopolitical risk changes the risk premium on a country's or region's assets and is described by its likelihood, its impact and its velocity, meaning how quickly investment values reflect it.
- A black swan is a low-likelihood exogenous event with substantial short-term effects; long-horizon investors usually need not react to one and should instead analyze medium- and low-velocity risks.
- National security tools are classified as active or threatened, while economic and financial tools are classified as cooperative or noncooperative, and sanctions count as a financial tool.
- Investors should focus on geopolitical risks with potentially high impact, judge whether their effects are discrete or broad, estimate them with scenario analysis and track their likelihood with signposts.

QUICK CHECK

Question 1

During the same year, the government of Aldmere (1) signs an agreement with neighboring states to harmonize product standards and lower tariffs among them, and (2) bans all exports of rare-earth minerals mined within its borders. From a geopolitical perspective, which of the two actions counts as

cooperative?

- A Neither of the actions.
- B Both of the actions.
- C Only one of the actions.

Answer: C

In geopolitics, cooperation means interacting and engaging with other countries, for example by allowing goods to move freely across borders, harmonizing tariffs and standardizing rules. The regional agreement is therefore cooperative. Banning exports of a particular good restricts engagement with other countries, so it is noncooperative. Only one of the two actions is cooperative.

Why the other options are wrong

- **A.** The trade and standards agreement is a clear example of economic cooperation, so it is not true that neither action is cooperative.
- **B.** An export ban limits interaction with other countries and is noncooperative, so both actions cannot be cooperative. A country can be cooperative on some issues and noncooperative on others at the same time.

Key takeaway Cooperation is a spectrum and is judged issue by issue: trade agreements and harmonization are cooperative, while export bans and investment restrictions are noncooperative.

Practice questions

Question 2

An analyst compares the goals listed in Article I of the International Monetary Fund's (IMF's) Articles of Agreement with the stated mission of the World Bank and the role of the World Trade Organization (WTO). Which of her conclusions is *most accurate*?

- A Of the three, only the World Bank has fighting poverty as its explicit mission.
- B Of the three, only the WTO works to expand international trade.
- C Of the three, only the IMF lends financial resources to member countries.

Question 3

A portfolio manager is classifying the geopolitical risks that could affect her emerging market holdings. Which of the following is *best* described as an event risk?

- A A gradual shift in migration patterns that is expected to play out over several decades.
- B A rebellion that breaks out suddenly, with no warning signs identified in advance.
- C A referendum on leaving a customs union, scheduled for a date set a year ahead.

Question 4

Which of the following statements about the effect of geopolitical risk on investments is *most accurate*?

- A** Scenario analysis is generally not an appropriate technique for estimating how geopolitical risks could affect a portfolio.
- B** A given geopolitical risk may have a larger effect on investment values in a recession than in an expansion.
- C** Geopolitical risks affect entire countries or regions, rather than individual companies or industries.

Answers: 2. A · 3. C · 4. B

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/introduction-to-geopolitics/. The full bank has 24 questions on this reading.

credguild.com

ECONOMICS · READING 17

Comparative Advantage

What you'll learn

LOS 17.a Describe the benefits (comparative advantage, scale, variety, competition) and costs (import-competing job losses, inequality) of international trade.

LOS 17.b Compare tariffs, quotas, export subsidies, VERs and domestic content rules, the arguments for them, and their welfare effects on consumers, producers and government.

LOS 17.c Explain why countries form trading blocs and rank free trade areas, customs unions, common markets, economic unions and monetary unions by integration.

MODULE 17.1

International Trade

This reading weighs the benefits and costs of international trade, starting from comparative advantage, and compares tariffs, quotas, voluntary export restraints and export subsidies by their effects on prices, consumer and producer surplus and national welfare. It closes with capital restrictions and with the levels of integration in regional trading agreements, from free trade areas to monetary unions.

LOS 17.a — Benefits and costs of international trade

Why countries gain from trade. Traditional trade models focus on **comparative advantage**. A country has a comparative advantage in a good when its *relative* (opportunity) cost of producing that good is lower than other countries'. Comparative advantage comes from differences in technology and resource endowments. When each country specializes in the goods where it has a comparative advantage, exports them, and imports the rest, total output rises.

Example. In one day a worker in Quilland can make 6 tablets or 3 bicycles, and a worker in Dorvik can make 2 tablets or 2 bicycles. To find comparative advantage, compare opportunity costs rather than output:

1. Cost of one bicycle in tablets given up: Quilland $6/3 = 2$, Dorvik $2/2 = 1$. Dorvik has the lower cost.
2. Cost of one tablet in bicycles given up: Quilland $3/6 = 0.5$, Dorvik $2/2 = 1$. Quilland has the lower cost.
3. Quilland specializes in tablets and Dorvik in bicycles.

Quilland's workers produce more of both goods, yet Dorvik still has a comparative advantage in bicycles. Gains from trade come from differences in relative cost, so even the less productive country has something to export.

Newer trade models add further sources of gains:

- **Economies of scale:** specialized producers selling to a world market have lower unit costs;
- greater **variety** of goods for consumers;
- more **competition**, which lowers costs, improves quality and limits the pricing power of domestic monopolies;
- a more **efficient allocation of resources**.

Countries can also trade *the same* kind of good. In markets with differentiated products (monopolistic competition, e.g., cars), a country may export one type and import others, so consumers get more variety at lower cost.

Who gains and who loses.

Group	Effect of freer trade
Domestic consumers of imported goods	Gain: lower prices, more choice
Domestic producers (and workers) in export industries	Gain: larger markets
Domestic producers and workers in industries competing with imports	Lose: lower profits, lost jobs, possibly lower wages
Domestic consumers of goods that are now exported	May lose: stronger foreign demand can raise domestic prices

The most cited costs of trade are job losses in import-competing industries and greater income inequality. For example, a high-wage country that imports labor-intensive textiles may see wages and jobs fall in its textile industry.

Net effect. Economic analysis concludes that the overall gains from trade exceed the losses, especially in the long run. In principle the gainers could fully compensate those who lose and still come out ahead, and both the importing and the exporting country share the net gains. The costs are concentrated in specific import-competing industries and are largely short-run: over time, retrained workers move into other industries, and the costs shrink or even reverse.

COMMON EXAM TRAPS

- "Everyone gains from trade" is wrong. Import-competing industries and their workers bear real costs.
- "Only the exporting country gains" is wrong; in the long run both trading partners benefit.
- Expecting openness to raise consumer prices or cut jobs in export industries. Import competition tends to lower consumer prices, export industries expand, and specialization increases.

LOS 17.b — Trade restrictions and their economic implications

Reasons given for trade restrictions

KEY CONCEPT

Supported by economists (at least conceivably valid)

Infant industry: temporary protection lets a new industry reach internationally competitive scale and move down the learning curve

National security: keep domestic production of goods vital to national defense, even if imports are cheaper

Little or no support in economic theory

Protecting domestic jobs: jobs lost to imports are offset by jobs created elsewhere (export and growing industries), so restrictions do not raise the net number of jobs in the long run, and consumers pay more

Protecting domestic industries: usually the result of political lobbying, at the expense of consumers

Other stated reasons include retaliation against foreign restrictions, raising government revenue from tariffs, countering foreign governments' subsidies, and preventing **dumping**, in which foreign firms sell exports below their cost of production to capture market share. An industry in which a country already has a comparative advantage needs no protection.

Types of trade restrictions

Restriction	What it is
Tariffs	Taxes on imported goods, collected by the government
Quotas	Limits on the amount of imports allowed over some period
Export subsidies	Government payments to firms that export goods
Minimum domestic content	A required percentage of a product's content must come from the domestic country
Voluntary export restraint (VER)	The <i>exporting</i> country agrees to limit the quantity of a good it exports, often to avoid tariffs or quotas from its trading partner

Consumer surplus is the difference between what buyers would be willing to pay and the price they actually pay. **Producer surplus** is the difference between the price sellers receive and the lowest price at which they would be willing to sell.

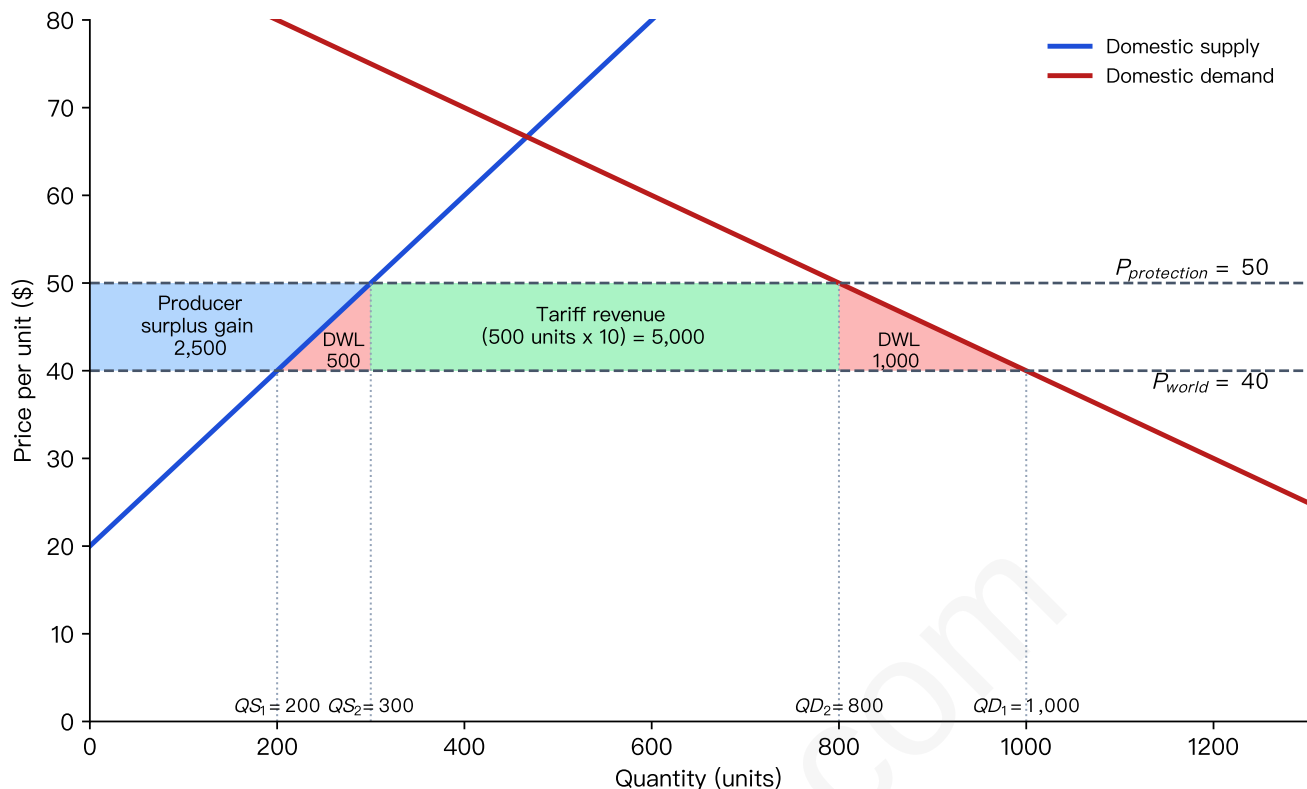
Effects compared. Most effects of the four policies run the same way, even though an export subsidy works in a different market:

KEY CONCEPT

Effect	Tariff	Import quota	VER	Export subsidy
Market affected	Importing country	Importing country	Importing country	Exporting country
Trade volume	Imports fall	Imports fall	Imports fall	Exports rise
Domestic price	Rises	Rises	Rises	Rises
Domestic quantity supplied and producer surplus	Rise	Rise	Rise	Rise
Consumer surplus	Falls	Falls	Falls	Falls
Domestic government	Collects tariff revenue	Collects revenue only if it sells the import licenses	Collects nothing	Pays the subsidy
National welfare	Falls	Falls	Falls	Falls

The national welfare row has one exception: quotas and tariffs imposed by a *large* importing country could raise its welfare under certain assumptions, because its reduced demand can lower the world price.

Tariffs vs quotas. An **equivalent quota** is one that cuts imports by the same amount as a given tariff; both raise the domestic price from the world price P_{world} to $P_{protection}$.



Welfare effects of a \$10 tariff in a small importing country (world price \$40)

- The loss of consumer surplus is the whole area between P_{world} and $P_{protection}$ to the left of the demand curve.
- Part of it goes to domestic producers (the **producer surplus** gain, left of the supply curve).
- The rectangle (new imports $\times$ price increase) is **tariff revenue** for the government under a tariff.
- The two triangles are the **deadweight loss**: welfare lost to the economy as a whole.

Under a quota, the rectangle goes to whoever holds the import licenses. If the domestic government sells the licenses for their full value, the outcome equals the tariff. If it gives them away, the rectangle becomes **quota rents** earned by the license holders. When the licenses are given free to **foreign exporters**, the rents leave the country and the domestic welfare loss is larger by that amount. A **VER** produces the same welfare loss as an equivalent quota whose licenses are given to foreign exporters free of charge, because the importing country captures none of the quota rents.

Tariff welfare formulas (small country)

For a small importing country (the world price does not change) and straight-line supply and demand between the two prices, let subscript 0 denote free trade at P_{world} , subscript 1 denote the protected price $P_{protection}$, $\Delta P = P_{protection} - P_{world}$, and $M_1 = Q_{D,1} - Q_{S,1}$ denote imports after the restriction. Then:

KEY CONCEPT

$$\text{Loss of consumer surplus} = \frac{Q_{D,0} + Q_{D,1}}{2} \Delta P$$

$$\text{Gain in producer surplus} = \frac{Q_{S,0} + Q_{S,1}}{2} \Delta P$$

$$\text{Tariff revenue} = M_1 \Delta P = (Q_{D,1} - Q_{S,1}) \Delta P$$

$$\begin{aligned} \text{Deadweight loss} &= \text{consumer surplus loss} - \text{producer surplus gain} - \text{tariff revenue} \\ &= \frac{1}{2}(Q_{S,1} - Q_{S,0}) \Delta P + \frac{1}{2}(Q_{D,0} - Q_{D,1}) \Delta P \end{aligned}$$

Worked example (small country). The world price of a good is \$40; a tariff of \$10 per unit raises the domestic price to \$50. Domestic supply rises from 200 to 300 units and domestic demand falls from 1,000 to 800 units, so imports fall from 800 to 500.

$$\text{Loss of consumer surplus} = \frac{1,000 + 800}{2} \times 10 = \$9,000$$

$$\text{Gain in producer surplus} = \frac{200 + 300}{2} \times 10 = \$2,500 \quad \text{Tariff revenue} = 500 \times 10 = \$5,000$$

$$\text{Deadweight loss} = 9,000 - 2,500 - 5,000 = \$1,500 \left(= \frac{1}{2}(100)(10) + \frac{1}{2}(200)(10) \right)$$

With an equivalent quota and free licenses granted to foreign exporters, the \$5,000 becomes quota rents for those exporters and the domestic loss rises to \$6,500.

Export subsidies and other effects of trade restrictions

Export subsidies. For a small exporting country, the domestic price rises by the full amount of the subsidy (world price + subsidy), because producers will not sell at home for less than they earn on each exported unit. For a large exporter, the world price falls, so foreign consumers capture part of the benefit and foreign producers are hurt.

Other winners and losers from a tariff. Workers in the protected industry gain along with its producers. Domestic consumers also lose choice, foreign exporters lose sales, and domestic *users* of the protected good (e.g., firms buying protected machinery as an input) face higher costs. Tariff revenue helps explain why trade restrictions remain widespread, but the gains to protected producers and the government are usually smaller than the losses to consumers and other industries.

Capital restrictions limit cross-border flows of financial capital: bans on foreign investment in the country, prohibitions or taxes on the income residents earn on foreign investments, bans on foreign investment in certain industries, and limits on repatriating the earnings of foreign-owned firms. They are generally thought to reduce welfare. Developing countries have sometimes used them in the short run to damp surges of capital inflows in booms and outflows in panics, but these short-run benefits may not offset the longer-run cost of being excluded from global capital markets.

COMMON EXAM TRAPS

- Assuming every quota earns the government revenue. Revenue needs sold licenses; licenses given free to foreign exporters send the quota rents abroad. In the worked example, free licenses to foreign exporters raise the domestic loss from \$1,500 to \$6,500.
- Foreign consumers are unaffected by a small (price-taking) country's tariff or quota. A *large* importer's restriction can lower the world price, which benefits foreign consumers rather than harming them.
- A VER is imposed by the *exporting* country, yet it protects producers in the *importing* country.
- Forgetting downstream users. A tariff on imported lumber raises costs for domestic home builders, so they lose even though lumber producers gain.

LOS 17.c — Trading blocs, common markets and economic unions

Motivation. All **regional trading agreements (RTAs)**, also called **trading blocs**, reduce trade barriers among members. Their primary purpose is to raise members' **economic welfare**. Gains come from trading according to comparative advantage and from greater competition among member firms. Some firms and workers lose and may need to retrain. On balance, reducing trade restrictions raises welfare. However, if an agreement *raises* barriers against nonmembers, a member may switch from low-cost imports from a nonmember to higher-priced imports from a member, which reduces the gains and in an extreme case could outweigh them. A free trade area leaves each member's own policy toward nonmembers in place, so it is the form least likely to force such a switch.

Levels of integration (each level adds one feature to the previous one):

KEY CONCEPT

Agreement	Free trade among members	Common trade restrictions with nonmembers	Free movement of labor and capital	Common institutions and economic policy	Single currency
Free trade area	Yes	No	No	No	No
Customs union	Yes	Yes	No	No	No
Common market	Yes	Yes	Yes	No	No
Economic union	Yes	Yes	Yes	Yes	No
Monetary union	Yes	Yes	Yes	Yes	Yes

Examples: NAFTA was a free trade area, the European Union is an economic union, and the eurozone is a monetary union. The single currency of a monetary union removes currency conversion costs and exchange rate risk on trade among members.

Example. Four countries scrap all tariffs on trade among themselves and apply one common tariff schedule to imports from outside, but a worker from one member still needs a permit to take a job in another. Free trade and common external restrictions are present, while free movement of labor is not, so the arrangement is a customs union. Dropping the permits and the barriers to capital flows would turn it into a common market.

COMMON EXAM TRAPS

- A common market already has common external trade restrictions; what an economic union adds is common institutions and economic policy.
- Crediting a customs union with free movement of labor. That feature starts at the common market level.
- Only a monetary union requires a single currency.

EXAM SHORTCUTS

- Find comparative advantage from opportunity costs, not output: the country that gives up less of the other good has the advantage, even if the other country produces more of both goods.
- Each level of integration adds one feature to the level below, so classify an agreement by the highest feature it has: free trade among members, common restrictions on nonmembers, free movement of labor and capital, common institutions and economic policy, then a single currency.

BOTTOM LINE

- A country has a comparative advantage in a good when its opportunity cost of producing it is lower than other countries', and specializing according to comparative advantage raises total output.
- Newer trade models add gains from economies of scale, more variety for consumers, stronger competition and a better allocation of resources.
- Consumers of imported goods and export industries gain from trade while import-competing producers and workers lose, but overall gains exceed losses, especially in the long run, and both trading partners share the net gains.
- Infant industry and national security arguments for trade restrictions have some support among economists, while protecting domestic jobs or industries has little or none.
- Tariffs, import quotas and VERs reduce imports, raise the domestic price, domestic quantity supplied and producer surplus, lower consumer surplus and reduce national welfare, with the possible exception of a tariff or quota imposed by a large importing country.
- A quota whose licenses the government sells for full value has the same outcome as an equivalent tariff, while free licenses to foreign exporters send the quota rents abroad, and a VER causes the same welfare loss as an equivalent quota with free licenses to foreign exporters.
- An export subsidy raises the domestic price by the full subsidy in a small exporting country, while a large exporter's subsidy lowers the world price, benefiting foreign consumers and hurting foreign producers.
- A free trade area removes barriers among members, a customs union adds common restrictions on nonmembers, a common market adds free movement of labor and capital, an economic union adds common institutions and economic policy, and a monetary union adds a single currency.

QUICK CHECK**Question 1**

Regarding the gains and losses that international trade creates, which of the following statements is *most accurate*?

- A** Every group in each of the trading countries is made better off by increased trade.
- B** The costs of trade fall mainly on firms and workers in domestic industries that compete with imports.
- C** With respect to domestic employment, the costs of trade outweigh its benefits.

Answer: B

For the economy as a whole, the benefits of trade exceed the costs. The costs are concentrated among firms and workers in domestic industries that compete with imports, who may suffer lower profits or lost jobs.

Why the other options are wrong

- **A.** Not every group gains. Import-competing industries and their workers can lose, even though the gainers could in principle compensate them.
- **C.** Jobs lost in import-competing industries are offset by jobs created in export and growing industries, and over time retrained workers find new work. Economists do not conclude that trade's employment costs exceed its benefits.

Key takeaway Overall gains exceed losses, but the losses are concentrated in import-competing industries.

Practice questions**Question 2**

Which of the following statements correctly describes how a tariff differs from a quota?

- A** A tariff is set by international organizations, whereas a quota is set by an individual country.
- B** A tariff is imposed by one government, whereas a quota is an international agreement capping the total volume of world trade.
- C** A tariff is a tax on imported goods, whereas a quota is a limit on the amount of imports allowed over some period.

Question 3

Tessaly, a small country, is choosing among three measures that would each cut its imports of washing machines by the same quantity: a tariff, an import quota whose licenses the government auctions for their full value, or a voluntary export restraint agreed with the main exporting country. Which measure would cause the greatest loss of national welfare for Tessaly?

- A The voluntary export restraint.
- B The tariff.
- C The import quota with auctioned licenses.

Question 4

Which sequence ranks regional trading agreements correctly, starting with the lowest and ending with the highest level of economic integration?

- A Common market, customs union, economic union.
- B Free trade area, customs union, common market.
- C Customs union, free trade area, monetary union.

Answers: 2. C · 3. A · 4. B

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/comparative-advantage/. The full bank has 28 questions on this reading.

ECONOMICS · READING 18

Capital Flows and the FX Market

What you'll learn

LOS 18.a Describe the FX market's functions and participants (sell side, buy side), distinguish nominal from real exchange rates, and calculate percentage changes in a currency's value.

LOS 18.b Describe exchange rate regimes from dollarization to independent floating, and explain how exchange rates affect trade and capital flows (balance of payments identity).

LOS 18.c Describe the common objectives of government restrictions on capital flows.

MODULE 18.1

The Foreign Exchange Market

This reading describes the foreign exchange market and its participants, how to read price/base quotes, spot and forward rates, the difference between nominal and real exchange rates, and how to calculate a currency's percentage change against another. It then covers the IMF's exchange rate regimes, how exchange rates and the balance of payments link trade and capital flows, and the objectives of capital restrictions.

LOS 18.a — The FX market: functions, participants, nominal vs real rates, percentage changes

Why the foreign exchange market exists

Currencies are exchanged for two broad reasons: to pay for goods and services bought across borders (trade flows) and to buy foreign real and financial assets (capital flows). The capital-flow side is much larger than the trade side.

A firm that already has an exposure to a foreign currency (for example, a receivable of CHF 8 million due in 60 days) can take an offsetting position, such as a forward contract to sell those francs. A position that reduces an existing currency risk is **hedging**. A position that creates or increases currency risk (for example, buying a currency forward only because the buyer expects it to rise) is **speculating**. Corporations, investment funds, banks and governments all do both.

Participants: sell side and buy side

KEY CONCEPT

Group	Who	Notes
Sell side	Large multinational banks	The dealers in currencies and the originators of forward FX contracts
Buy side: corporations	Importers, exporters, multinationals	Buy and sell currencies for cross-border business; hedge future receipts and payments with forwards
Buy side: real money accounts	Mutual funds, pension funds, insurance companies and other institutional accounts	Restricted in their use of leverage

Group	Who	Notes
Buy side: leveraged accounts	Hedge funds, proprietary trading firms, other trading firms	Make substantial use of leverage , typically through derivatives
Buy side: governments	Governments, sovereign wealth funds , government pension funds, central banks	Transactional, investment or speculative needs; central banks may intervene to influence the exchange rate
Buy side: retail FX market	Households and relatively small institutions	Tourism, cross-border investment, speculative trading

Exam convention: real money accounts are accounts that do not use derivatives, and leveraged accounts are accounts that use them. Current practice: the dividing line is leverage. Many pension funds and insurers hedge currency exposure with FX forwards and are still real money accounts.

Reading an exchange rate quote

An **exchange rate** is the price of one currency in terms of another. Quotes are written as **price currency / base currency**: 0.9250 CHF/USD means one US dollar (the **base currency**, in the "denominator") costs 0.9250 Swiss francs (the **price currency**). Read "/" as "per".

- From the viewpoint of an investor whose home currency is the price currency, a price/base quote is a **direct quote**; for an investor whose home currency is the base currency it is an **indirect quote**.
- Inverting a quote swaps the roles: 0.9250 CHF/USD is the same as $1/0.9250 = 1.0811$ USD/CHF.
- Treat the base currency as the item being priced and the price currency as the money it is priced in. A rise in the price/base rate means the item has become more expensive: the base currency has appreciated, and the price currency has lost purchasing power over the base country's goods.

Spot and forward rates

- The **spot exchange rate** is for immediate delivery (for most currencies, settlement is two business days after the trade).
- A **forward exchange rate** is agreed today for an exchange on a specified future date (30, 90, 180 days, one year, ...). A forward contract fixes the amounts of both currencies to be exchanged. Example: a company that will receive NZD 4 million in 90 days and sells them forward at 0.5520 EUR/NZD has locked in EUR 2.208 million.

Nominal and real exchange rates

The rate quoted in the market at a point in time is the **nominal exchange rate**. The **real exchange rate** adjusts the nominal rate for changes in the two countries' price levels since a base period, so it tracks the **purchasing power** of one currency over the other country's goods:

KEY CONCEPT

$$\text{real P/B rate} = \text{nominal P/B rate} \times \frac{CPI_{\text{base currency}}}{CPI_{\text{price currency}}}$$

with both CPIs set to 100 in the base period. What moves the real P/B rate:

Change (other things equal)	Real P/B rate	Purchasing power of the price currency over base-country goods
Nominal P/B rate rises	Rises	Falls
Price level in the base-currency country rises	Rises	Falls
Price level in the price-currency country rises	Falls	Rises

If neither country's price level changes, the CPI ratio stays at 1 and the real rate moves exactly with the nominal rate. The *difference* between nominal and real rates therefore comes only from the ratio of the two price levels (relative inflation).

Example. Base period: both CPIs = 100 and the rate is 1.50 SGD/GBP (price currency SGD, base currency GBP). Two years later the nominal rate is 1.44 SGD/GBP, the UK CPI is 107 and the Singapore CPI is 104.

$$\text{real SGD/GBP} = 1.44 \times \frac{107}{104} = 1.4815$$

The nominal rate fell 4.0%, but faster UK inflation offset part of that, so the real rate fell only about 1.2% (from 1.50 to 1.4815). A Singapore resident gained less purchasing power over UK goods than the nominal move suggests.

For a quick estimate, work in percentage changes: the change in the real P/B rate is approximately the change in the nominal rate, plus inflation in the base-currency country, minus inflation in the price-currency country. In the example this gives $-4.0\% + 7.0\% - 4.0\% = -1.0\%$, close to the exact $1.4815/1.50 - 1 = -1.23\%$.

Percentage change in a currency's value

For a quote P/B, the percentage change in the **base currency** is simply

$$\% \Delta \text{ base} = \frac{\text{new P/B}}{\text{old P/B}} - 1$$

To get the change in the **price currency**, first invert both quotes so that it becomes the base currency:

KEY CONCEPT

$$\% \Delta \text{ price} = \frac{1/\text{new P/B}}{1/\text{old P/B}} - 1 = \frac{\text{old P/B}}{\text{new P/B}} - 1$$

Example. The CHF/USD rate moves from 0.8000 to 0.8600. The USD (base) has appreciated by $0.8600/0.8000 - 1 = 7.50\%$. The CHF (price) has depreciated by $0.8000/0.8600 - 1 = -6.98\%$. The two percentages differ in size.

When a currency buys more of a foreign currency (it has appreciated), foreign goods become cheaper for its residents, and the country's exports become more expensive for foreigners.

Common exam traps

- Reading a rise in USD/EUR as a stronger dollar. The euro is the base currency, so a higher quote means the euro has appreciated.
- Reusing the base currency's percentage change, with the sign flipped, for the price currency. Invert the quotes first; the two percentages differ. In the CHF/USD example, flipping the sign gives -7.50% for the franc instead of -6.98%.
- Putting hedge funds or central banks on the sell side. The sell side is the large dealer banks; hedge funds and central banks are buy-side participants.
- Forgetting that a currency forward is a derivative. An investor whose mandate bars derivatives cannot use one, even to hedge.
- Adjusting a real exchange rate with interest rates, or putting the price country's CPI in the numerator. The base country's CPI goes on top. In the SGD/GBP example, $1.44 \times 104/107 = 1.3996$ instead of 1.4815.
- Reading a pair in the market dealers' order. Dealers usually name the base currency first (EUR/USD 1.25 for 1.25 dollars per euro); the price/base form used here writes the same rate as 1.25 USD/EUR.

EXAM SHORTCUTS

- In a price/base quote a higher number means the base currency (the denominator) has appreciated, so identify the base currency before judging which currency strengthened.
- The percentage change in the real P/B rate is approximately the nominal change plus base-country inflation minus price-country inflation, a quick estimate that needs no CPI ratio.

BOTTOM LINE

- The FX market serves trade flows and the much larger capital flows; a position that reduces an existing currency risk is hedging, and one that creates or increases currency risk is speculating.
- The sell side is the large multinational dealer banks, and the buy side is corporations, real money and leveraged accounts, governments and central banks, and the retail market; the exam convention separates real money from leveraged accounts by derivatives use, while current practice separates them by leverage.
- A P/B quote states how many units of the price currency buy one unit of the base currency, so a higher quote means the base currency has appreciated, and the quote is direct for an investor whose home currency is the price currency.
- A spot rate is for immediate delivery (usually two business days), and a forward rate is agreed today for an exchange of fixed amounts on a specified future date.
- The real P/B rate equals the nominal P/B rate $\times CPI_{\text{base}}/CPI_{\text{price}}$, so it rises with the nominal rate and the base-country price level and falls with the price-country price level.
- The base currency changes by $\text{new P/B} \div \text{old P/B} - 1$ and the price currency by $\text{old P/B} \div \text{new P/B} - 1$, and the two percentages differ in size.

QUICK CHECK**Question 1**

Buy-side participants in the foreign exchange market include real money accounts and leveraged accounts. Compared with a real money account, an investment account classified as a leveraged account is *most likely* distinguished by its:

- A** active use of leverage, typically through derivatives.
- B** role as a dealer quoting two-way prices to other participants.
- C** restriction to long-term, unleveraged holdings of foreign-currency assets.

Answer: A

Leveraged accounts are investment firms such as hedge funds, proprietary trading firms and other trading firms that make substantial use of leverage, typically through derivatives. Real money accounts, such as mutual funds, pension funds, insurance companies and similar institutional accounts, are restricted in their use of leverage. Both are buy-side participants.

Why the other options are wrong

- **B.** Quoting two-way prices is the role of the dealers on the sell side (large multinational banks). Leveraged accounts are buy-side clients of those dealers.
- **C.** Being restricted to long-term, unleveraged holdings describes a real money account, the opposite of a leveraged account.

Key takeaway Leveraged accounts (hedge funds, trading firms) use leverage extensively, typically via derivatives; real money accounts (mutual funds, pension funds, insurers) are restricted in their use of leverage.

MODULE 18.2

Managing Exchange Rates**LOS 18.b — Exchange rate regimes and effects on trade and capital flows****The IMF's classification of regimes**

The IMF lists nine regimes: two for countries that do not issue a currency of their own and seven for countries that do. Moving down the table, the monetary authority generally gains more room for independent monetary policy.

KEY CONCEPT

Regime	Own currency?	How it works	Monetary policy independence
Formal dollarization	No	Uses another country's currency	None; the interest earned on the assets backing the currency goes to the issuing central bank
Monetary union	No	Several countries share one currency (e.g. euro area)	No national policy, but members share in setting the union's policy
Currency board arrangement	Yes	Explicit commitment to exchange domestic currency for a specified foreign currency at a fixed rate; domestic currency issued only when fully backed by foreign reserves	Essentially none (imports the anchor's inflation), some short-term room on interest rates; the board earns interest on its reserves
Conventional fixed peg arrangement	Yes	Pegged to a currency or basket within margins of $\pm 1\%$; maintained by direct intervention (buying/selling FX) and indirect intervention (interest rate policy, FX regulation, persuasion)	More than a currency board, but constrained by the peg
Target zone (pegged exchange rates within horizontal bands)	Yes	Like a peg but with wider fixed bands, e.g. $\pm 2\%$ or more	More discretion than a conventional peg
Crawling peg	Yes	The peg rate is adjusted periodically, usually for inflation differences (passive crawling peg), or along a pre-announced path (active crawling peg , which can anchor inflation expectations)	Similar to a fixed peg
Management of exchange rates within crawling bands	Yes	The band around the central rate is widened over time ; used to move from a fixed peg toward a floating rate when the authority lacks the credibility to float at once	Increases as the bands widen

Regime	Own currency?	How it works	Monetary policy independence
Managed floating exchange rates	Yes	The authority reacts to indicators (balance of payments, inflation, employment) with no target rate or predetermined path; intervention may be direct or indirect. Trading partners may respond in ways that reduce stability	Considerable
Independently floating	Yes	Market-determined; intervention only to slow the rate of change and damp short-term swings, not to hit a target level	Full

A currency board differs from dollarization because the country still issues its own currency (fully backed), and it differs from a conventional peg because it is an explicit commitment to exchange domestic currency at a fixed rate, with the currency issued only when fully backed, rather than a peg that may move within a $\pm 1\%$ band.

Exchange rates, trade and capital flows

Because an appreciation makes imports cheaper and exports dearer, it also shifts trade volumes. If the USD/GBP rate falls (the dollar appreciates), US imports from the UK tend to rise and US exports to the UK tend to fall. These trade effects build up slowly.

The **balance of payments** requires that capital flows offset any imbalance in trade. A country with a **trade deficit** (imports > exports) must have a **capital account surplus** (foreigners buy more of its assets than its residents buy abroad), and a country with a trade surplus has a **capital account deficit**. The identity:

KEY CONCEPT

$$(X - M) \equiv (S - I) + (T - G)$$

where $X - M$ = exports minus imports, $S - I$ = private saving minus investment in physical capital, and $T - G$ = tax revenue minus government spending.

- A trade deficit means total domestic saving (private plus government) falls short of domestic investment; foreign capital fills the gap. At least one of the two gaps must then be negative: private saving below investment, a government budget deficit, or both.
- A government budget deficit that is not covered by an excess of private saving over investment goes together with a trade deficit.

Example. Private saving 260, investment 300, tax revenue 180, government spending 205 (billions). $(S - I) + (T - G) = -40 + (-25) = -65$: a trade deficit of 65, matched by a capital account surplus of 65.

Timing. Capital flows adjust much faster than spending, saving and asset prices, so they dominate exchange rate moves in the short and intermediate term. Trade flows matter more over the long term.

Reducing a trade deficit

The identity shows what has to change for a trade deficit to shrink on a lasting basis: the right-hand side must rise. That means domestic spending must fall relative to income: a smaller government budget deficit (larger $T - G$) or more private saving relative to domestic investment (larger $S - I$). A bigger capital account surplus does not cure a trade deficit; it is the financing side of the same imbalance.

LOS 18.c — Objectives of capital restrictions

KEY CONCEPT

Governments may limit capital flowing in, out, or both. Commonly cited objectives:

1. **Reduce the volatility of domestic asset prices.** Sudden outflows in a crisis can crash the prices of liquid holdings like equities and bonds, especially in small economies with large foreign holdings.
2. **Maintain fixed exchange rates.** Limiting capital flows makes an exchange rate target easier to defend, freeing monetary and fiscal policy for domestic goals.
3. **Keep domestic interest rates low.** If residents cannot move money abroad for higher yields, the central bank can keep rates low and run a more independent monetary policy.
4. **Protect strategic industries** (e.g. defense, telecommunications) from foreign ownership.

Capital restrictions act on flows of investment capital. Tariffs, quotas, **voluntary export restraints** and **regional trading agreements** are trade-policy tools that act on flows of goods and services.

Common exam traps

- Confusing a crawling peg with crawling bands. In a crawling peg the central rate itself is adjusted; with crawling bands the band around it widens, as a step from a peg toward floating.
- Assuming an independent float means no intervention at all. Intervention can still slow the rate of change; it just has no target level.
- Capital controls aim to keep domestic interest rates low (not high).

EXAM SHORTCUTS

- Because $(X - M) \equiv (S - I) + (T - G)$, a trade deficit implies that private saving falls short of investment, the government runs a budget deficit, or both, and a larger capital account surplus cannot be the cure.

BOTTOM LINE

- The IMF lists two regimes for countries without their own currency (formal dollarization and monetary union) and seven for countries with one, and moving toward floating generally gives more room for independent monetary policy.
- A currency board explicitly commits to swap domestic currency for a named foreign currency at a fixed rate, issuing currency only when fully backed, while a conventional fixed peg allows $\pm 1\%$ margins and a target zone wider bands such as $\pm 2\%$.

- A crawling peg adjusts the peg rate itself, crawling bands widen the band over time as a step toward floating, managed floating reacts to indicators without a target rate, and an independent float uses intervention only to slow the rate of change.
- A currency appreciation raises imports and cuts exports, but these trade effects build up slowly; capital flows dominate exchange rate moves in the short and intermediate term, and trade flows matter more in the long term.
- Under $(X - M) \equiv (S - I) + (T - G)$, a trade deficit is matched by a capital account surplus, and shrinking it on a lasting basis requires domestic spending to fall relative to income.
- Capital restrictions aim to reduce the volatility of domestic asset prices, maintain fixed exchange rates, keep domestic interest rates low and protect strategic industries from foreign ownership.

QUICK CHECK

Question 2

Under Pelagia's monetary law, the monetary authority may issue Pelagian dinars only when each new dinar is fully matched by euro reserves, and it must exchange dinars for euros on demand at a fixed rate. The authority earns interest on the euro reserves it holds. The regime Pelagia operates is best classified as:

- A a currency board arrangement.
- B formal dollarization.
- C a conventional fixed peg arrangement.

Answer: A

Under a currency board arrangement the monetary authority commits to convert its own currency into one named foreign currency on demand at a fixed rate, and it may issue domestic currency only when every unit is backed by reserves of that foreign currency. The country keeps its own currency and earns interest on its reserves, but it gives up independent monetary policy and in effect imports the inflation rate of the anchor currency.

Why the other options are wrong

- **B.** Under formal dollarization a country has no currency of its own; it uses another country's currency, and the interest earned on the assets backing that currency goes to the issuing central bank. Pelagia issues its own dinars and earns interest on its reserves.
- **C.** A conventional fixed peg keeps the currency within a narrow band, about 1% either side of the target rate, through intervention and policy, without a rule that every unit of domestic currency be backed by foreign reserves. The monetary authority keeps more policy flexibility than under a currency board.

Key takeaway Currency board: the country has its own currency, fully backed by an anchor currency at a fixed rate; its reserves earn interest, and it has no independent monetary policy.

Practice questions

Question 3

Tomas Riedl, an economist in Lorvania, tracks the real exchange rate of the Lorvanian crown against its main trading partner's currency, quoted as the number of crowns needed to buy one unit of the partner's currency (domestic/foreign). Holding all other factors constant, which of the following would cause this real exchange rate to fall?

- A A rise in the foreign price level.
- B A rise in the nominal exchange rate (domestic/foreign).
- C A rise in the domestic price level.

Question 4

Which of the following is *least likely* to be cited by a government as an objective of restricting capital flows?

- A Maintaining a fixed exchange rate.
- B Protecting strategic industries from foreign ownership.
- C Keeping domestic interest rates high.

Answers: 3. C · 4. C

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/capital-flows-and-the-fx-market/. The full bank has 31 questions on this reading.

ECONOMICS · READING 19

Exchange Rate Calculations

What you'll learn

LOS 19.a Calculate and interpret currency cross rates from two (or more) quotes that share a common currency.

LOS 19.b Explain the no-arbitrage link between spot rates, forward rates and interest rates; calculate forward rates from points, percentages or interest rates; interpret forward premiums and discounts.

MODULE 19.1

Foreign Exchange Rates

This reading calculates currency cross rates from two quotes against a common third currency. It then derives the no-arbitrage forward rate from the spot rate and the two interest rates, converts forward quotes given in points or percentages into outright rates, and interprets forward premiums and discounts.

LOS 19.a — Currency cross-rates

A **cross rate** is the exchange rate between two currencies derived from the rate of each against a third, common currency (usually the USD or EUR). Cross rates are needed when a currency pair has no active market of its own.

Method: make the units cancel. Write every quote as price/base and arrange the quotes so that the common currency cancels, leaving the required pair:

KEY CONCEPT

$$\frac{A}{C} = \frac{A}{B} \times \frac{B}{C}$$

- If a quote has the wrong orientation, invert it first: $B/A = 1/(A/B)$.
- Two quotes with the **same base** (e.g. A/USD and C/USD): divide, $A/C = (A/USD) \div (C/USD)$.
- Two quotes with the **same price currency** (e.g. USD/A and USD/C): divide the other way, $A/C = (USD/C) \div (USD/A)$.
- With three quotes, chain them: $A/D = A/B \times B/C \times C/D$.

Example. Given 1.3620 CAD/USD and 0.7940 EUR/USD, find CAD/EUR:

$$\frac{\text{CAD}}{\text{EUR}} = \frac{\text{CAD}}{\text{USD}} \times \frac{\text{USD}}{\text{EUR}} = 1.3620 \times \frac{1}{0.7940} = 1.7154$$

One euro costs about 1.7154 Canadian dollars. The inverse, EUR/CAD, is $1/1.7154 = 0.5830$.

Sanity check. Ask "how many units of the price currency does one unit of the base currency buy?" If the euro buys more dollars than the Canadian dollar does, the CAD/EUR rate must be above 1.

Common exam traps

- Multiplying where the quotes should be divided, so the units do not cancel. Writing the units next to each number prevents this. In the CAD/EUR example, $1.3620 \times 0.7940 = 1.0814$ instead of 1.7154.
- Forgetting to invert at the end when the answer is asked in the opposite orientation (e.g. the chain gives X/Z but the question asks for Z/X). In the CAD/EUR example, the EUR/CAD rate is 0.5830, not 1.7154.
- "Direct" and "indirect" depend on the investor's home currency; the arithmetic of a cross rate does not change.

LOS 19.b — Spot, forward and interest rates: no-arbitrage, points, percentages, premiums and discounts

The no-arbitrage (interest rate parity) relation

If currencies trade freely and forward contracts are available, the percentage difference between forward and spot rates must approximately equal the difference between the two currencies' **risk-free interest rates**.

Otherwise an investor could borrow one currency, convert it at spot, invest at the other currency's rate, and sell the proceeds forward for a riskless profit. The **no-arbitrage condition** rules this out: the round trip cannot earn more than the domestic riskless rate.

The idea behind it: investing at home, and investing abroad with the currency sold forward, are both riskless, so they must end with the same amount of domestic currency. With quotes as domestic/foreign (d/f, price/base):

$$(1 + r_d) = \frac{1}{S_{d/f}} (1 + r_f) F_{d/f}$$

KEY CONCEPT

$$\frac{F_{d/f}}{S_{d/f}} = \frac{1 + r_d}{1 + r_f} \quad F_{d/f} = S_{d/f} \frac{1 + r_d}{1 + r_f} \quad S_{d/f} = F_{d/f} \frac{1 + r_f}{1 + r_d}$$

The **price currency's** rate is in the numerator and the **base currency's** rate in the denominator. In percentage terms the same relation reads

$$\frac{F_{d/f}}{S_{d/f}} - 1 = \frac{r_d - r_f}{1 + r_f} \approx r_d - r_f$$

so the forward premium or discount on the base currency is roughly the interest rate differential for the period. Exam convention: the percentage relation is printed as $\% \Delta s = (r_f - r_d)/(1 + r_d)$, which holds only when the spot rate is quoted as foreign currency per unit of domestic currency. Current practice: with domestic/foreign (price/base) quotes, as used throughout this module, the forward premium is $(r_d - r_f)/(1 + r_f)$.

KEY CONCEPT

Interest rates	Forward vs spot (P/B quote)	Base currency	Price currency
$r_{\text{price}} > r_{\text{base}}$	Forward > spot	Forward premium	Forward discount
$r_{\text{price}} < r_{\text{base}}$	Forward < spot	Forward discount	Forward premium

Interest rates	Forward vs spot (P/B quote)	Base currency	Price currency
Equal	Forward = spot	Neither	Neither

The currency with the **higher interest rate** trades at a **forward discount** (it "depreciates" in the forward market by roughly the rate differential).

Periods shorter than a year. Use the interest rate for the period rather than the annual rate. Money market rates are annualized, usually on a 360-day basis, so for a 90-day forward each rate becomes $r \times 90/360$:

$$F = S \times \frac{1 + r_{\text{price}} (\text{days}/360)}{1 + r_{\text{base}} (\text{days}/360)}$$

Example. Spot is 1.4800 AUD/GBP, the one-year AUD rate is 4.5% and the one-year GBP rate is 5.0%.

$$F = 1.4800 \times \frac{1.045}{1.050} = 1.4730 \text{ AUD/GBP}$$

The GBP (higher rate, base) is at a forward discount of $1.47295/1.4800 - 1 = -0.48\%$, close to the 0.5% rate gap.

Example. Spot is 1.4650 CHF/GBP. The 180-day CHF rate is 1.20% and the 180-day GBP rate is 4.80%, both quoted as annualized rates on a 360-day basis. Find the 180-day forward rate in points.

1. De-annualize each rate: CHF $1.20\% \times 180/360 = 0.60\%$; GBP $4.80\% \times 180/360 = 2.40\%$.
2. Apply parity with the price currency (CHF) in the numerator: $F = 1.4650 \times 1.0060/1.0240 = 1.43925$.
3. Convert to points using this quote's 0.0001 point size (four decimal places): $(1.43925 - 1.4650)/0.0001 \approx -257.5$ points.

The GBP, the higher-yielding base currency, trades at a forward discount of about 1.76% for the half year.

If the quoted forward differs from the no-arbitrage forward, arbitrage is possible: buy the currency that is cheap in the forward market relative to parity and sell the one that is dear. If the forward price of the base currency is **too high**, borrow the price currency, buy the base currency at spot, invest it at the base-currency rate and sell the proceeds forward. The profit is what is left after repaying the loan with interest. Arbitrage trading pushes the spot and forward rates back to parity.

Forward rates are not forecasts. Reading a forward rate as the expected future spot rate would mean the spot rate is expected to move by roughly the interest rate differential, with the higher-yielding currency expected to depreciate. Capital-market reasoning points the other way: higher domestic rates attract capital and strengthen the currency. Historically, interest rate differentials have forecast future spot rates poorly, though they may be unbiased and usually get the direction right. Treat the no-arbitrage forward as the rate that rules out arbitrage at a point in time. It is not the expected future spot rate.

Forward quotes in points or percentages

Forward points are quoted in units of the last decimal place of the spot quote. For a four-decimal quote, one point = 0.0001:

$$F = S + (\text{points} \times \text{point size})$$

The size of a point follows the number of decimals in the quote. For a two-decimal quote such as 148.25 JPY/USD, one point is 0.01, so +35 points means +0.35.

A **percentage** forward quote is applied multiplicatively:

$$F = S \times (1 + \text{percentage})$$

Examples. Spot 0.6480 USD/AUD and +27.5 points gives $0.6480 + 0.00275 = 0.65075$. Spot 0.6480 with -0.35% gives $0.6480 \times (1 - 0.0035) = 0.64573$.

Forward premium or discount

For the **base currency**:

$$\text{forward premium (+) or discount (-)} = \frac{F}{S} - 1$$

- A positive value means the base currency is at a **forward premium** (it buys more of the price currency forward than spot). The price currency is then at a **forward discount**.
- To state the premium or discount of the **price currency**, invert both quotes first so that it becomes the base currency. The two percentages differ slightly in size.
- A premium or discount for a period shorter than a year can be annualized roughly by multiplying by (12 / months).

Common exam traps

- One point is 0.0001 on a four-decimal quote: +14.2 points = +0.00142, not +0.0142 or +0.142.
- Reading negative forward points as a discount on the price currency. Forward below spot puts the *base* currency at a discount and the price currency at a premium.
- Putting the base currency's interest rate in the numerator, which makes the higher-yielding currency appear to trade at a forward premium. In the AUD/GBP example, $1.4800 \times 1.050/1.045 = 1.4871$ instead of 1.4730.
- Using annual rates directly in a 90- or 180-day parity calculation. Scale each rate to the period first (days/360 for rates quoted on a 360-day basis). In the CHF/GBP example, $1.4650 \times 1.0120/1.0480 = 1.41468$ instead of 1.43925.
- When asked for the forward rate in the inverted quote, compute the forward first, then invert.

EXAM SHORTCUTS

- Before computing a cross rate, check its size: if one unit of the base currency buys more of the common currency than one unit of the price currency does, the cross rate must be above 1.
- The currency with the higher interest rate trades at a forward discount, so whether the forward is above or below spot is known before any calculation: with a P/B quote, forward exceeds spot when the price currency's rate is higher.
- The forward premium or discount on the base currency is roughly the interest rate differential for the period, $r_{\text{price}} - r_{\text{base}}$, which checks a computed forward rate.

BOTTOM LINE

- A cross rate is found by arranging price/base quotes so the common currency cancels, $A/C = A/B \times B/C$, inverting a quote first when it has the wrong orientation.
- Under no-arbitrage, with domestic/foreign (price/base) quotes, $F/S = (1 + r_d)/(1 + r_f)$, with the price currency's rate in the numerator and the base currency's rate in the denominator.
- With price/base quotes the forward premium on the base currency is $(r_d - r_f)/(1 + r_f)$, roughly the rate differential; the exam convention prints the relation as $(r_f - r_d)/(1 + r_d)$, which holds only for quotes of foreign currency per unit of domestic currency.
- For a forward shorter than a year, each annualized money market rate is scaled to the period, usually $r \times \text{days}/360$, before applying parity.
- A forward quoted in points is $F = S + \text{points} \times \text{point size}$, where one point is the last decimal place of the spot quote, and a percentage quote gives $F = S(1 + \text{percentage})$.
- The forward premium (+) or discount (-) on the base currency is $F/S - 1$, and the price currency's premium or discount is found by inverting both quotes first.
- If the quoted forward differs from the no-arbitrage forward, borrowing one currency, converting at spot, investing and selling the proceeds forward earns a riskless profit, and arbitrage trading restores parity.
- The no-arbitrage forward rate is the rate that rules out arbitrage at a point in time, not the expected future spot rate, and interest rate differentials have historically forecast future spot rates poorly.

QUICK CHECK**Question 1**

Using the quotes EUR/USD 0.9240 and NZD/EUR 1.7960, an analyst calculates the spot cross rate between the US dollar and the New Zealand dollar. Stated as USD/NZD, it is *closest* to:

- A 0.51448.
- B 0.60259.
- C 1.65950.

Answer: B

Convert EUR/USD into USD/EUR by inverting, then divide by NZD/EUR (equivalently, multiply by EUR/NZD) so the euro cancels and USD/NZD remains.

$$\text{USD/EUR} = \frac{1}{0.9240} = 1.08225$$

$$\frac{\text{USD}}{\text{NZD}} = \frac{\text{USD/EUR}}{\text{NZD/EUR}} = \frac{1.08225}{1.7960} = 0.60259$$

Why the other options are wrong

- **A.** This divides EUR/USD by NZD/EUR without first inverting EUR/USD, so the units do not cancel to USD/NZD.

- **C.** This multiplies the two quotes: $0.9240 \times 1.7960 = 1.6595$. The units (EUR/USD $\times$ NZD/EUR) give NZD/USD, which is the inverse of the USD/NZD rate asked for ($1/1.6595 = 0.60259$).

Key takeaway Invert first, then chain the quotes so the common currency cancels.

Practice questions

Question 2

The spot exchange rate is 1.3450 CAD/USD. The 180-day money market rate is 4.20% for the Canadian dollar and 5.40% for the US dollar, both quoted as annualized rates on a 360-day basis. The 180-day no-arbitrage forward CAD/USD exchange rate is *closest* to:

- A 1.3297.
- B 1.3371.
- C 1.3529.

Question 3

The central bank of Selvia unexpectedly raises its policy rate, and Selvian money market rates move well above euro-area rates. Two analysts comment on the outlook for the Selvian lev (SLV) against the euro:

- Ruiz: "The higher-yielding currency always trades at a forward discount, so the rate increase tells us the SLV will now weaken against the euro."
- Okoye: "Higher Selvian rates should draw in foreign capital, which tends to push the SLV up against the euro."

Which evaluation of the two comments is *most accurate*?

- A Ruiz is right; the forward discount is a reliable forecast of the future spot rate.
- B Neither is right; a change in the policy rate leaves the spot rate unaffected.
- C Okoye is right; parity sets today's forward rate but does not forecast spot rates.

Question 4

A dealer's SGD/AUD quotes are 0.8870 for spot settlement and 0.8795 for delivery in 12 months. Measured against spot, the forward quote is a:

- A premium of 75 points, and the SGD is at a forward discount to the AUD.
- B discount of 75 points, and the SGD is at a forward premium to the AUD.
- C discount of 7.5 points, and the SGD is at a forward discount to the AUD.

Answers: 2. B · 3. C · 4. B

Why each answer is right and why each other option is wrong: credguild.com/cfa/level-1/notes/economics/exchange-rate-calculations/. The full bank has 29 questions on this reading.

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