IB Diploma Programme

Chuyên luyện thi IELTS/SAT → AP / IB / A-levels

8020 ENGLISH

IB Diploma Programme Economics

Giáo trình luyện thi chuyên sâu

Song ngữ Anh–Việt

8020 ENGLISH

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Lời mở đầu · Foreword

Cuốn sách này thuộc bộ giáo trình luyện thi chương trình quốc tế của **8020 English (8020 Education)** — trung tâm luyện thi trọng điểm **IELTS · SAT · AP · IB · A-level · IGCSE** và săn học bổng du học. Toàn bộ nội dung được biên soạn bởi đội ngũ **Giáo sư · Tiến sĩ · Thạc sĩ** tốt nghiệp các trường top đầu thế giới, bám sát khung chương trình chính thức, trình bày đầy đủ lý thuyết, ví dụ mẫu, hình minh hoạ và hệ thống bài tập có lời giải chi tiết.

This book is part of the 8020 English international exam-prep series: complete English theory with Vietnamese explanations, worked examples, illustrations and fully-solved practice, aligned to the official framework.

Thành tích 8020 English

9.0 IELTS cao nhất	**1570** SAT cao nhất
5/5 AP — điểm tuyệt đối	**90/100** IB Diploma
100% GV $\geq$ 8.0 IELTS / 1500 SAT	**CMU** Tiến sĩ ĐH #1 Hoa Kỳ về CS

Đội ngũ tiêu biểu: Thầy Châu Cát Tường (Academic Head, ThS Western Sydney, top 1% IELTS 8.5) · TS Nguyễn Anh Huy (Carnegie Mellon, cựu kỹ sư Amazon) · TS Nguyễn Phước Trường (Toán, ĐH Klagenfurt) · cùng đội ngũ giảng viên SAT 1500–1600, IELTS 8.0–8.5.

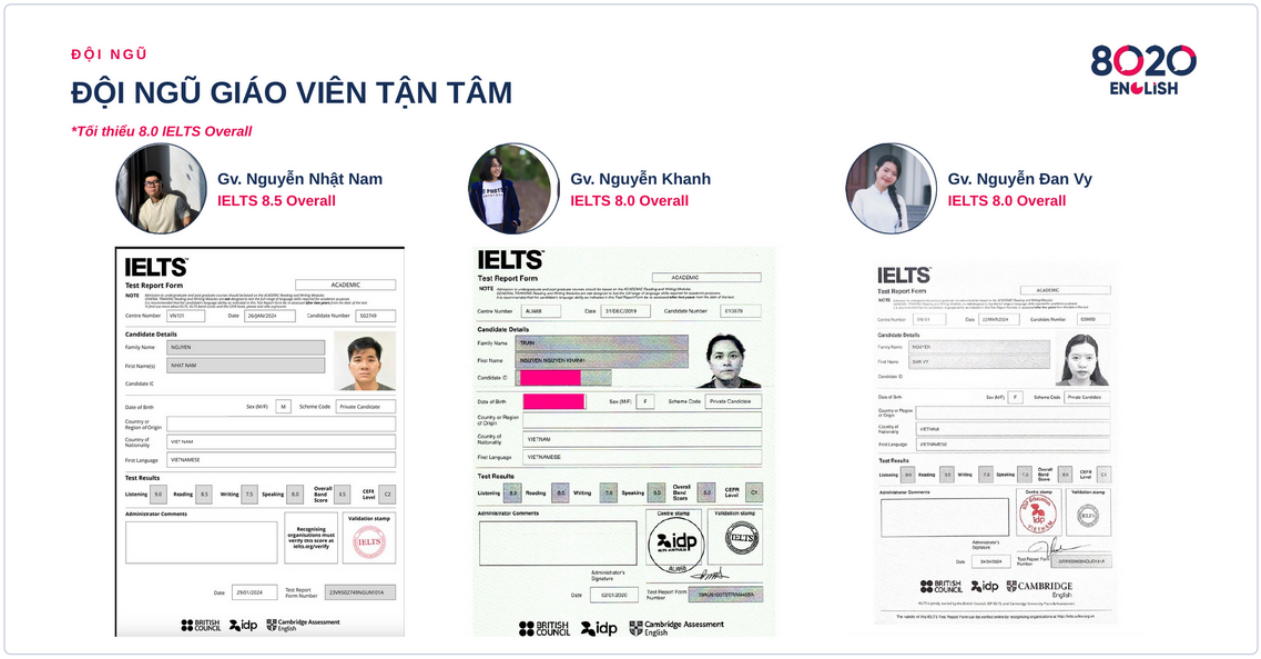
Kết quả học viên — điểm thi thật: IELTS 8.0–9.0 · SAT 1550 / 1570 / 1590 · AP 5/5 (Calculus BC, Microeconomics) · IB 90/100 (Economics) · Duolingo 110 · PTE 90 · TOEFL 120. **Bảng vàng SAT:** Khánh Đăng 1510 · Thảo Nguyên 1520 · Tâm Anh 1530.

"Cuối cùng đã đậu vào trường top như mong muốn." — Phan Thị Thanh Hằng, IELTS Overall 8.5.

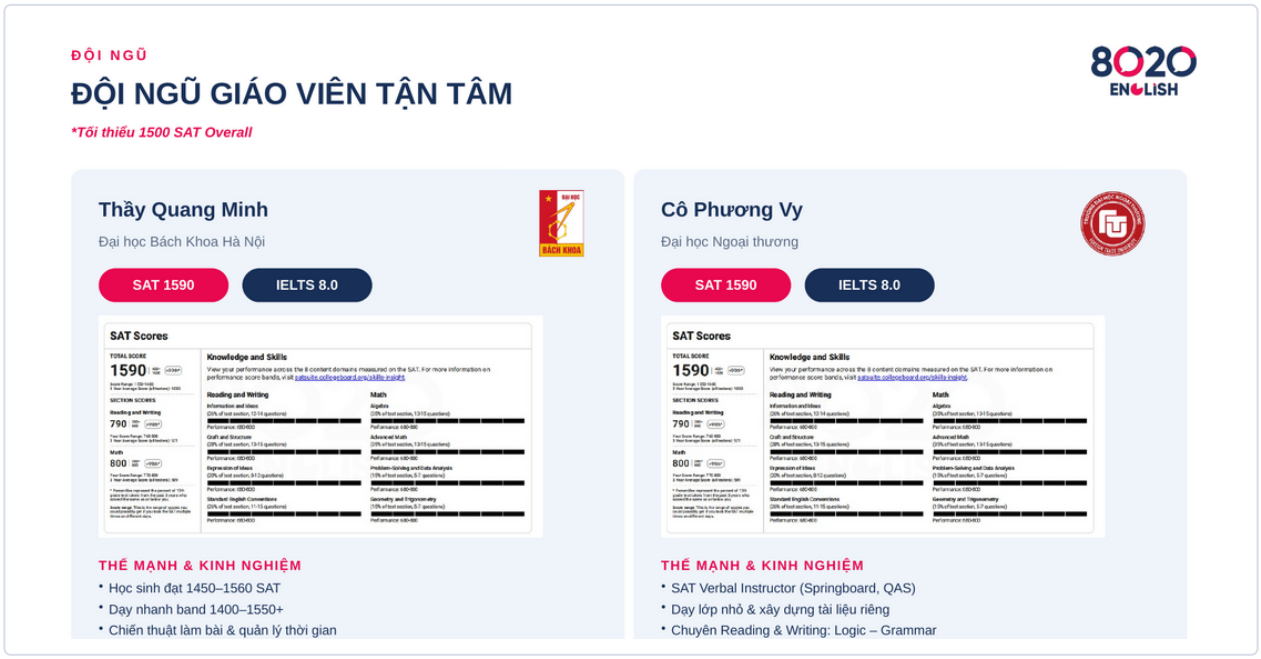
Cách dùng sách hiệu quả: mỗi Unit gồm (1) **Lý thuyết trọng tâm** tiếng Anh kèm **giải thích tiếng Việt**; (2) **Ví dụ mẫu** có lời giải; (3) **Hệ thống bài tập** kèm **lời giải chi tiết**. Hãy tự làm bài trước khi xem lời giải để đạt hiệu quả tối đa.

THÀNH TÍCH THỰC TẾ · 8020 ENGLISH

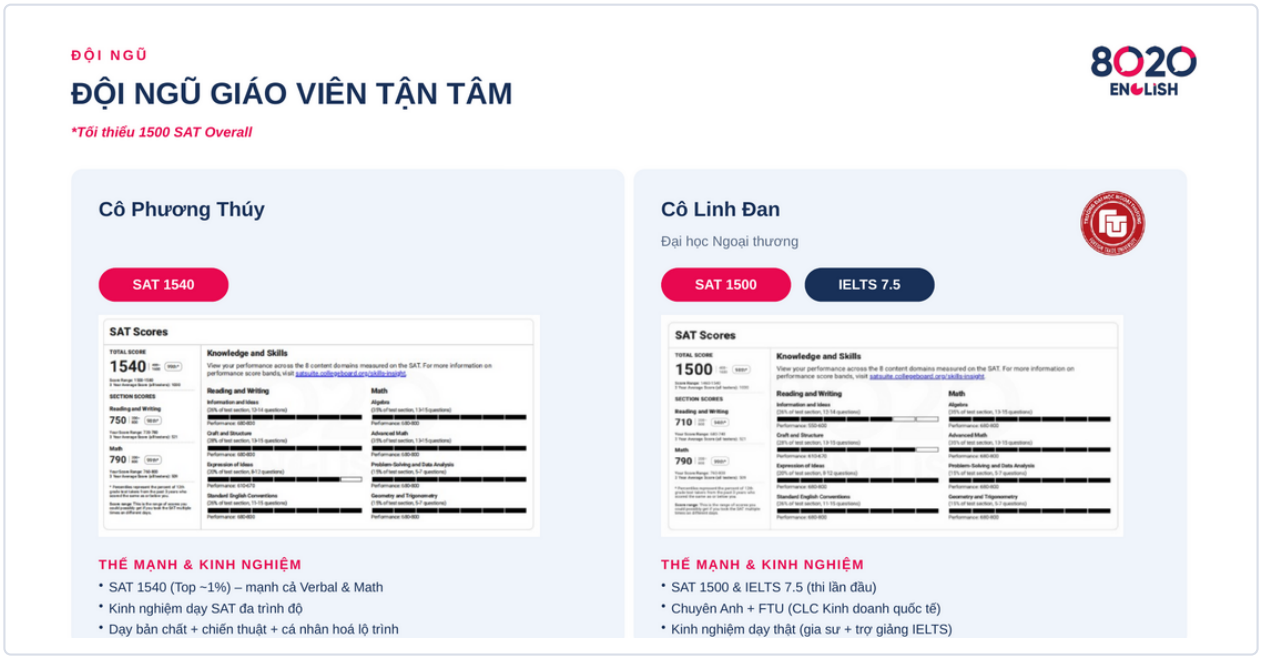
Điểm thi thật · Bằng & bảng điểm thật của giảng viên và học viên 8020 English — **Điểm thật · Thầy thật · Kết quả thật**



Đội ngũ giảng viên — IELTS 8.5 & 8.0 Overall (British Council · IDP · Cambridge)



Giảng viên SAT 1590 — ĐH Bách Khoa Hà Nội & ĐH Ngoại thương



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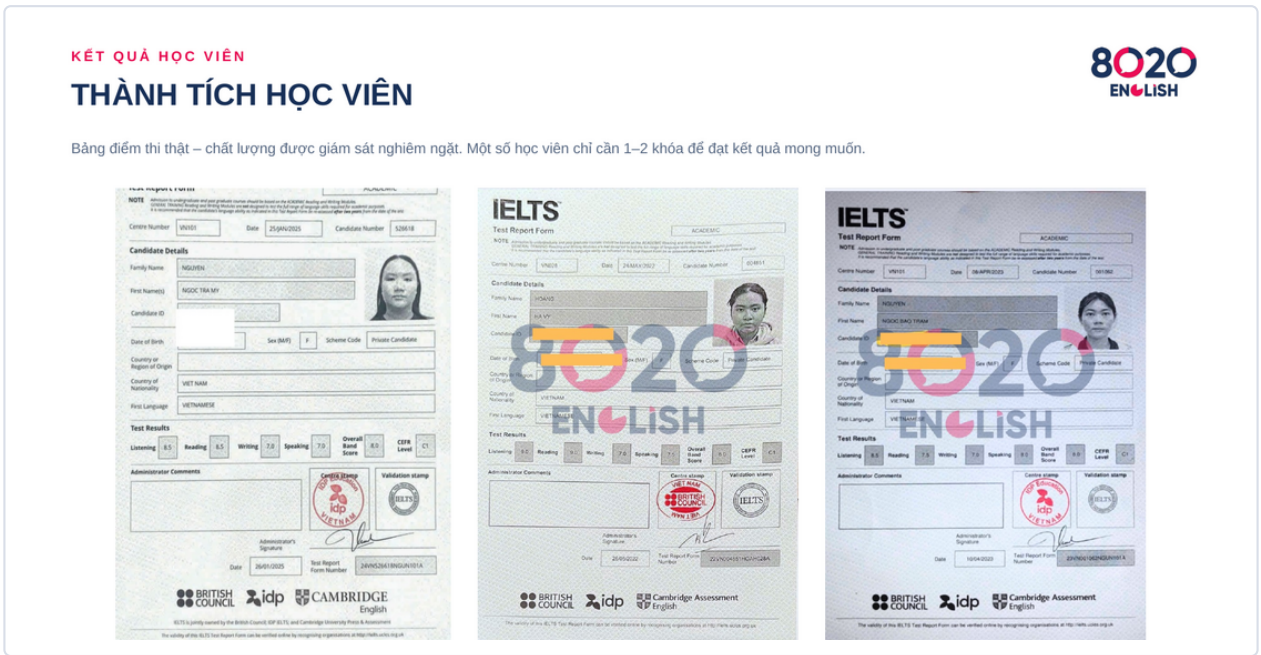

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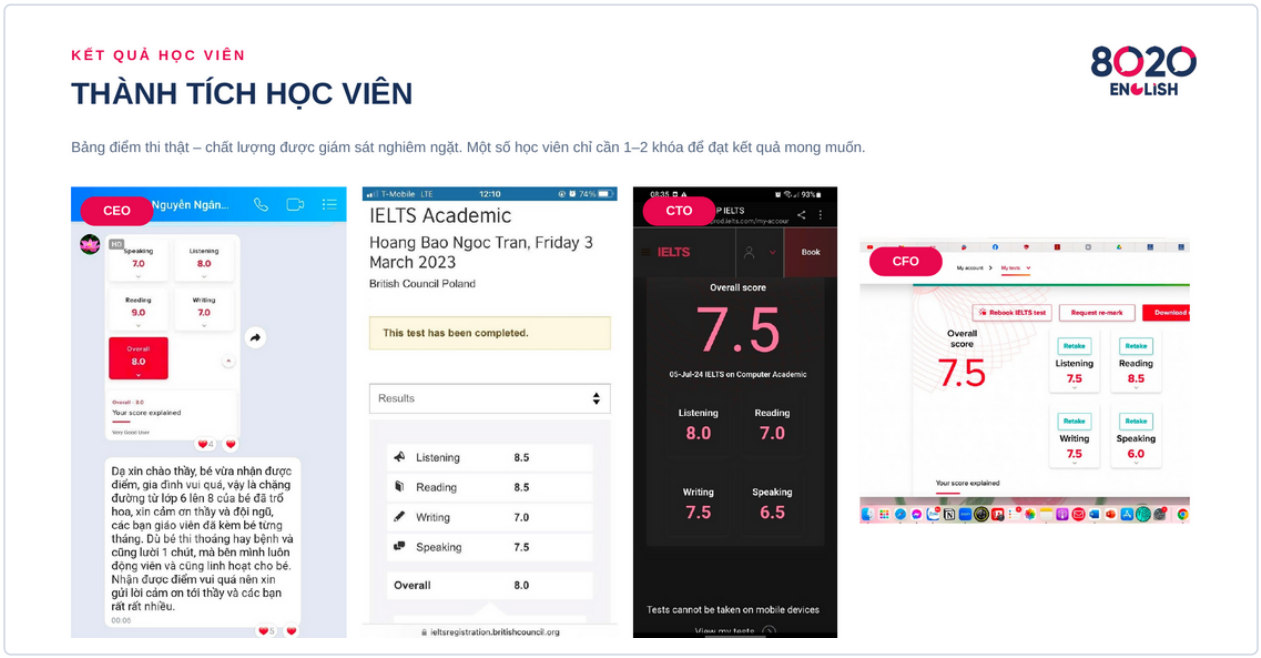

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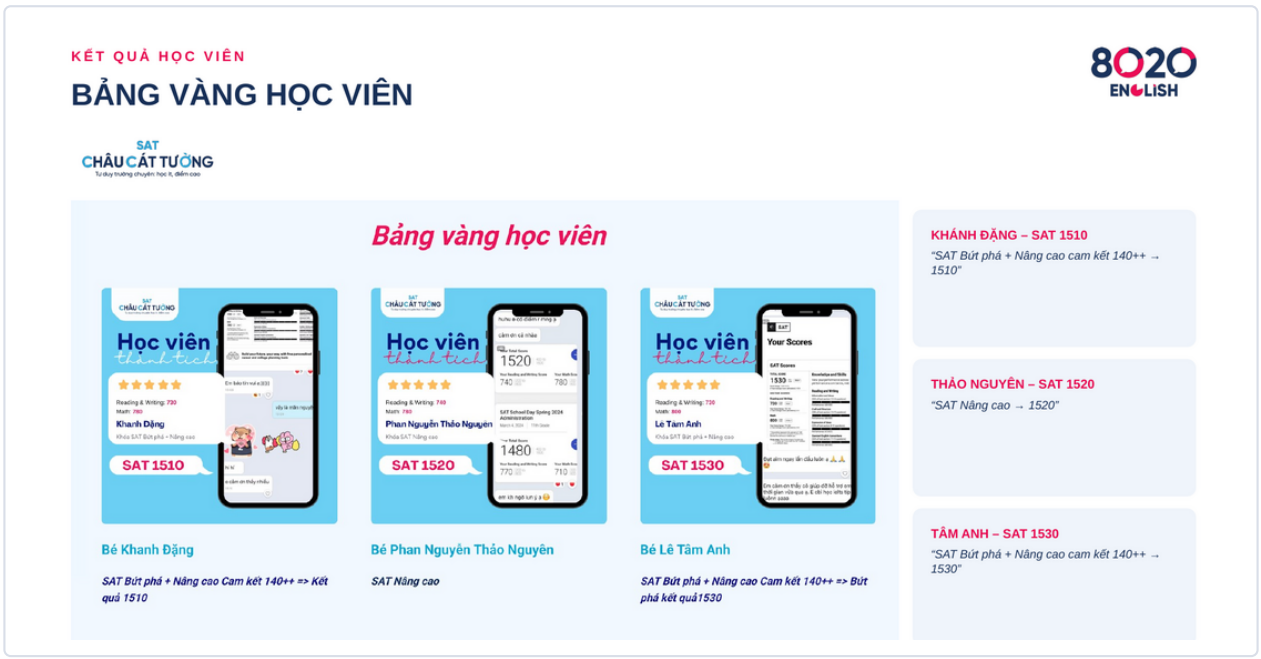
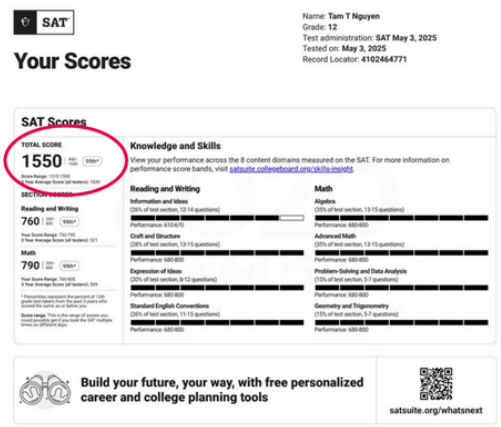
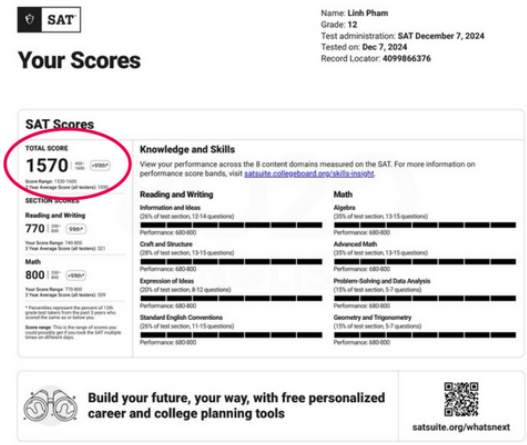


Bảng vàng SAT — Học viên đạt 1510 · 1520 · 1530

KẾT QUẢ HỌC VIÊN

TUTOR 1-1 – ĐIỂM SỐ ẤN TƯỢNG

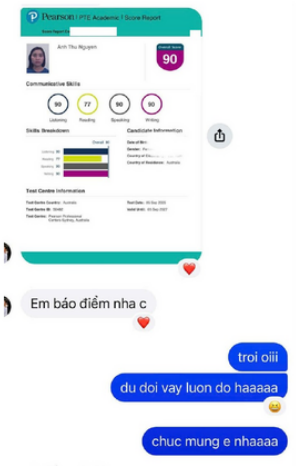


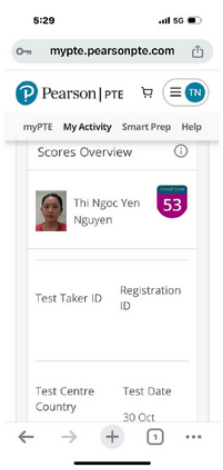


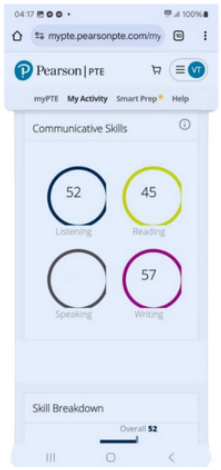
Học viên 8020 — SAT 1550 & 1570 (College Board)

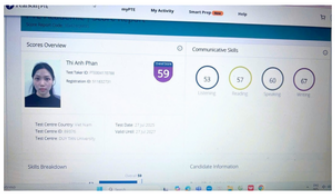
KẾT QUẢ HỌC VIÊN

ĐIỂM SỐ PTE



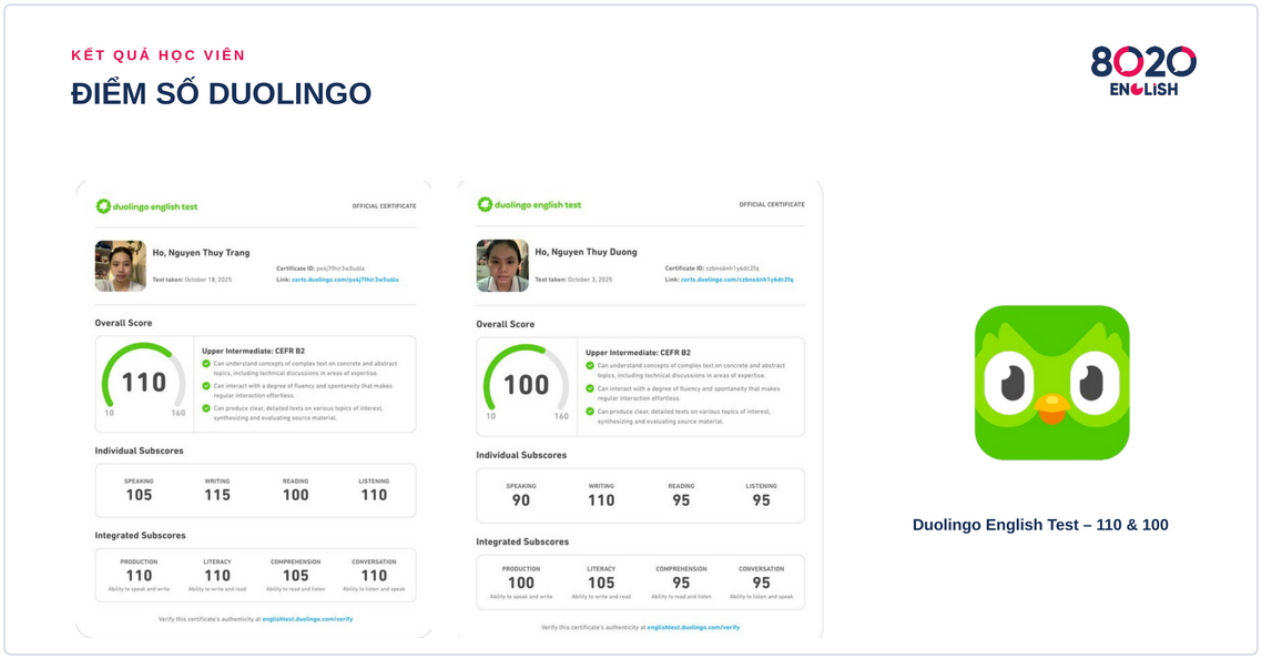






Bảng điểm PTE thật của học viên

Học viên 8020 — PTE Academic 90



Học viên 8020 — Duolingo English Test 110 & 100

Mục lục · Contents

Introduction to Economics

Mục tiêu Unit: Vấn đề kinh tế cốt lõi (khan hiếm, lựa chọn, chi phí cơ hội) và ra quyết định hợp lý; chín khái niệm trung tâm xuyên suốt chương trình IB Economics; kinh tế học thực chứng vs chuẩn tắc; các yếu tố sản xuất và vòng luân chuyển thu nhập; đường giới hạn khả năng sản xuất (PPC) cùng các tính toán chi phí cơ hội; và so sánh các hệ thống kinh tế (thị trường, kế hoạch hoá, hỗn hợp).

1.1 Scarcity, choice, and the central economic problem

1.1.1 Why economics exists

Every society, at every point in history, has faced the same underlying tension: human wants are effectively **unlimited** — for food, housing, healthcare, education, leisure, status — while the resources available to satisfy those wants are **finite**. Economists call this condition **scarcity**, and it is the single fact from which the entire discipline of economics is built. If resources were unlimited, there would be no need to study how they are allocated; every want could simply be met. Because resources are scarce relative to wants, every individual, firm, and government is forced to make **choices** about how to use the resources it controls.

Khái niệm cốt lõi

The **central economic problem** facing every economy is that scarce resources must be allocated among competing, unlimited wants. This forces every economic agent — consumers, firms, and governments — to answer three fundamental questions:

1. **What** to produce, and how much of it?
2. **How** to produce it (which combination of resources/technology)?
3. **For whom** is it produced (how is output distributed among members of society)?

Scarcity and **choice** are the first two of the course's nine central concepts, and every topic in this book — from a single consumer's purchase decision to global trade patterns — ultimately returns to them.

Resources used to produce goods and services are grouped into four **factors of production** (studied in depth in Section 1.5): land, labour, capital, and entrepreneurship. Because these factors are scarce, an economy cannot produce unlimited quantities of every good and service simultaneously — producing more of one thing generally requires producing less of something else. This trade-off is captured by the concept of **opportunity cost**.

Opportunity cost is the value of the next-best alternative forgone when a choice is made. It is not simply "what you gave up" in a vague sense, but specifically the *single best* alternative that was sacrificed. Opportunity cost applies to consumers (which good to buy), firms (which good to produce, or whether to invest), and governments (which programme to fund) alike.

VN **GIẢI THÍCH TIẾNG VIỆT**

Vấn đề kinh tế cốt lõi: nguồn lực (đất đai, lao động, vốn, năng lực kinh doanh) là **khan hiếm** trong khi nhu cầu con người là **vô hạn**. Vì vậy mọi cá nhân, doanh nghiệp, chính phủ đều phải **lựa chọn**, và mỗi lựa chọn đều có **chi phí cơ hội** — giá trị của phương án tốt nhất bị bỏ qua (không phải "mọi thứ bị bỏ qua" mà là phương án *tốt nhất* trong số các phương án bị bỏ qua). Ba câu hỏi lớn mọi nền kinh tế phải trả lời: sản xuất **cái gì**, sản xuất **như thế nào**, và sản xuất **cho ai**.

Identifying opportunity cost

A trainee accountant is offered an extra evening client shift paying $180, or she can instead attend a professional development course that evening (course fee $60, already paid and non-refundable). If she chooses to attend the course, what is the opportunity cost of that decision?

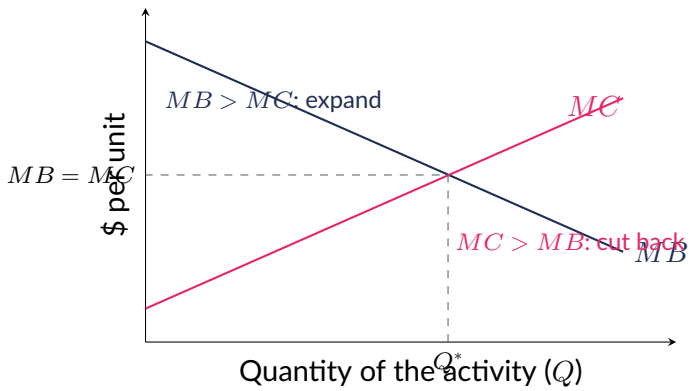
Reasoning: the opportunity cost is the value of the *best forgone alternative* at the moment of choice — here, the $180 she could have earned from the client shift. The $60 course fee is a cost of attending, but it is *not* the opportunity cost of choosing the course over the shift (that fee is paid either way once committed, or is simply a separate expense). The opportunity cost of attending the course is **$180 of forgone income**, not $60 and not "$240" (the two should not be added, since they answer different questions: cost of attendance vs. opportunity cost of the choice).

VN **GIẢI THÍCH TIẾNG VIỆT**

Chi phí cơ hội là giá trị của phương án **tốt nhất** bị bỏ lỡ, không phải "tổng mọi thứ liên quan". Trong ví dụ trên, học phí $60 là chi phí trực tiếp của việc tham gia khoá học; còn $180 tiền công bị mất là chi phí cơ hội của việc **lựa chọn** khoá học thay vì đi làm ca đó. Học sinh thường nhầm hai loại chi phí này với nhau — đây là lỗi rất phổ biến trong đề thi.

1.1.2 Marginal analysis and rational decision-making

Economists typically assume that rational agents make decisions **at the margin**: rather than asking "should I do this activity at all?", a rational decision-maker asks "should I do *one more unit* of this activity?" An activity should be expanded as long as its **marginal benefit** (MB) exceeds its **marginal cost** (MC), and should be reduced whenever $MC > MB$. The optimal quantity is therefore where $MB = MC$ — beyond this point, further units cost more than they are worth; before this point, valuable opportunities are being left unexploited.



The marginal decision rule: the optimal quantity Q^* occurs where $MB = MC$. To the left, expanding the activity adds more benefit than cost; to the right, it adds more cost than benefit.

Applying the marginal decision rule

A city government estimates that the marginal benefit of an additional police officer on patrol is $MB = 80 - 2Q$ (in thousands of $ of crime/damage prevented per year), while the marginal cost of hiring an additional officer is $MC = 10 + 3Q$ (in thousands of $, wages and equipment), where Q is the number of extra officers. Find the optimal number of extra officers to hire.

Set $MB = MC$:

$$80 - 2Q = 10 + 3Q \implies 70 = 5Q \implies Q^* = 14.$$

At $Q^* = 14$: $MB = MC = 80 - 28 = 52$ (thousand $). Hiring fewer than 14 extra officers leaves valuable crime-prevention benefits unexploited ($MB > MC$); hiring more than 14 costs more than the additional protection is worth ($MC > MB$).

VN **GIẢI THÍCH TIẾNG VIỆT**

Nguyên tắc ra quyết định biên (marginal decision rule): nên tiếp tục một hoạt động khi **lợi ích biên** (MB) còn lớn hơn **chi phí biên** (MC), và nên dừng lại khi MC vượt MB. Điểm tối ưu nằm tại $MB = MC$. Đây là công cụ tư duy nền tảng của toàn bộ kinh tế học — sẽ xuất hiện lại dưới dạng $MR = MC$ khi phân tích doanh nghiệp tối đa hoá lợi nhuận ở Unit 2.

1.1.3 Bounded rationality and behavioural economics

The standard economic model assumes agents are **rational**: they have stable preferences, weigh costs and benefits accurately, and choose to maximise their own welfare (utility for consumers, profit for firms). In reality, psychologists and behavioural economists have documented many systematic deviations from this ideal — **bounded rationality** — where people use mental shortcuts (heuristics), are unduly influenced by how choices are framed, or place greater weight on the present than the future (*present bias*).

Positive expected value vs actual behaviour

A lottery ticket costs $2. It offers a 1-in-5,000,000 chance of winning $1,000,000. Calculate the expected monetary value of buying one ticket, and comment on why people buy tickets despite this.

$$\text{Expected value of the prize} = \frac{1}{5{,}000{,}000} \times \$1{,}000{,}000 = \$0.20.$$

$$\text{Expected net value of the ticket} = \$0.20 - \$2.00 = -\$1.80.$$

A purely rational, wealth-maximising agent with no other motive would not buy a ticket with a negative expected value. Yet people persistently do — often explained by behavioural factors such as the *availability heuristic* (vivid media coverage of past winners overstates the perceived probability of winning) or simply the utility of hope/entertainment, which is not captured by expected monetary value alone.

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Giá trị kỳ vọng (expected value) của tấm vé số trong ví dụ là $-\$1.80$ — về lý thuyết, một tác nhân "duy lý hoàn toàn" sẽ không mua. Việc con người vẫn mua cho thấy **tính duy lý có giới hạn** (bounded rationality): con người thường đánh giá sai xác suất hiếm gặp (bị ảnh hưởng bởi truyền thông, cảm xúc), hoặc coi trọng "niềm hy vọng"/giải trí — những yếu tố không nằm trong mô hình lợi ích tiền tệ đơn giản. Kinh tế học hành vi (behavioural economics) nghiên cứu những sai lệch có hệ thống này so với mô hình duy lý chuẩn.

1.2 The nine central concepts of IB Economics

The IB Economics guide organises the entire two-year course around nine *central concepts* that recur in every unit. Learning to *name* which concept a diagram, data set, or policy illustrates is itself an assessed skill — Paper 1 extended-response questions and the internal assessment commentary both explicitly reward analysis "through the lens of" a named central concept.

The nine central concepts:

- **Scarcity** — resources (land, labour, capital, entrepreneurship) are finite relative to unlimited wants.
- **Choice** — scarcity forces decisions and trade-offs; every choice has an opportunity cost.
- **Efficiency** — using resources to maximise output/welfare without waste (productive, allocative, and dynamic efficiency).
- **Equity** — fairness in the distribution of resources, income, wealth, and opportunity (not the same as strict equality).
- **Economic well-being** — living standards understood broadly: not just income, but health, education, environment, freedom, and security.
- **Sustainability** — meeting the needs of the present without compromising the ability of future generations to meet their own needs.
- **Change** — economies evolve continuously (growth, business cycles, structural and technological change).
- **Interdependence** — economic agents, markets, and countries are linked through trade, finance, and shared resources, so a decision in one place has consequences elsewhere.
- **Intervention** — governments and institutions act (through policy, regulation, or provision) to influence or correct market outcomes.

Naming the central concept

A government introduces a carbon tax on power plants that burn coal. State *two* central concepts most directly illustrated by this policy, and briefly justify each.

Intervention: the tax is a deliberate government action altering a market outcome that would otherwise persist under laissez-faire conditions.
Sustainability: the tax targets carbon emissions specifically because unpriced pollution threatens the ability of future generations to enjoy a stable climate and usable natural resources — a textbook sustainability concern. (A strong answer could also justify **efficiency**: the tax aims to correct a market failure where the private cost of coal-fired power understates its true social cost.)

VN **GIẢI THÍCH TIẾNG VIỆT**

Chín khái niệm trung tâm sẽ xuất hiện lặp lại xuyên suốt chương trình: **scarcity** (khan hiếm), **choice** (lựa chọn), **efficiency** (hiệu quả), **equity** (công bằng), **economic well-being** (phúc lợi kinh tế), **sustainability** (tính bền vững), **change** (sự thay đổi), **interdependence** (sự phụ thuộc lẫn nhau), **intervention** (can thiệp). Đề thi Paper 1 thường yêu cầu "đánh giá chính sách dựa trên một khái niệm trung tâm" — hãy tập gọi tên đúng khái niệm, và lý tưởng nhất là nêu **hai** khái niệm liên quan kèm giải thích ngắn để đạt điểm tối đa.

1.3 Positive vs normative economics; economics as a social science

Positive statements are testable, factual claims about what *is*, *was*, or *will be* — in principle verifiable or falsifiable using evidence (e.g. "a $1 rise in the minimum wage reduces teen employment by 2%"). **Normative statements** involve value judgements about what *ought to be*, and typically contain words like "should", "ought", "fair", or "better" (e.g. "the government *should* raise the minimum wage"). Economics is a **social science**: it borrows the methods of the natural sciences — building models, forming hypotheses, testing them against data — but because it studies the choices of free human beings rather than inert matter, its predictions are typically probabilistic and context-dependent rather than as precise as, say, physics.

Khái niệm cốt lõi

Economic **models** (e.g. the demand curve, the PPC, the AD–AS model) simplify reality using the *ceteris paribus* (*"all else held constant"*) assumption, isolating the relationship between two variables of interest. This is a necessary simplification, not a flaw: models are judged by their *usefulness* in explaining and predicting real-world patterns, not by whether every assumption is literally true.

Positive or normative? — three statements

Classify each statement as positive or normative.

1. "Raising the corporate tax rate from 20% to 25% would reduce business investment by approximately 3%."
2. "The corporate tax rate should be raised to fund public healthcare."
3. "Unemployment in the country fell from 6.2% to 5.4% over the last year."

Answers: (1) **Positive** — a testable, quantified claim about cause and effect. (2) **Normative** — contains "should" and rests on a value judgement about the relative importance of tax revenue, healthcare funding, and investment incentives. (3) **Positive** — a factual claim verifiable using labour-force survey data, even though it says nothing about whether this change is good or bad.

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Câu **thực chứng (positive)** có thể kiểm chứng bằng dữ liệu — đúng/sai rõ ràng, không phụ thuộc quan điểm cá nhân. Câu **chuẩn tắc (normative)** chứa phán đoán giá trị ("nên", "cần", "công bằng", "tốt hơn") và phụ thuộc vào hệ giá trị của người nói. Lưu ý: một câu có số liệu vẫn có thể là chuẩn tắc nếu nó gắn với đề xuất chính sách dựa trên giá trị (ví dụ câu 2 ở ví dụ trên vẫn là chuẩn tắc dù nói về thuế — điểm mấu chốt là từ "nên"/"should" và mục đích chính sách). Đề thi hay yêu cầu phân biệt hai loại câu này khi phân tích một đoạn trích báo chí (stimulus material).

1.4 Factors of production and the circular flow of income

1.4.1 The four factors of production

Producing any good or service requires combining scarce inputs, grouped into four **factors of production**, each earning a characteristic reward:

Factor	Definition / examples	Reward
Land	Natural resources: soil, minerals, water, forests, the site itself	Rent
Labour	The physical and mental human effort used in production	Wages
Capital	Manufactured/produced means of production: machinery, tools, factories, infrastructure	Interest
Entrepreneurship	The organisation of the other three factors, combined with risk-taking and innovation	Profit

Identifying factors of production

A small independent bakery uses a rented shopfront, two commercial ovens, three paid staff, and is run by its founder, who took out a loan to start the business and keeps whatever is left over after all costs are paid. Identify the factor of production represented by each element, and its corresponding reward.

Shopfront (site): land → rent paid to the landlord. **Ovens:** capital → implicit return/interest on the capital invested. **Three paid staff:** labour → wages. **Founder organising the business and bearing risk:** entrepreneurship → profit (the residual after rent, wages, and interest on borrowed capital are paid) — profit is therefore the reward that is *not* guaranteed, since it can be negative if revenue fails to cover costs.

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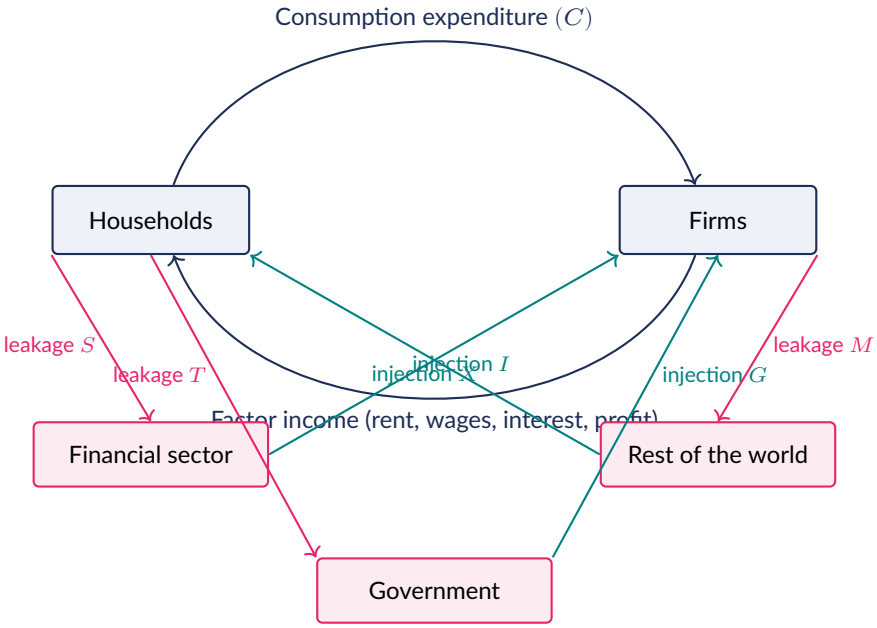
Bốn yếu tố sản xuất: **đất đai** (land — tài nguyên thiên nhiên, hưởng **tiền thuê**/rent), **lao động** (labour — công sức con người, hưởng **tiền lương**/wages), **vốn** (capital — máy móc, nhà xưởng do con người tạo ra, hưởng **tiền lãi**/interest), **năng lực kinh doanh** (entrepreneurship — tổ chức, chấp nhận rủi ro, hưởng **lợi nhuận**/profit). Lợi nhuận là phần thưởng **không chắc chắn** — có thể âm nếu doanh thu không đủ bù chi phí, khác với tiền lương/tiền thuê/tiền lãi thường được cam kết trước.

1.4.2 The circular flow of income

The **circular flow of income** models how money, goods, and factors of production move continuously between **households** (who own the factors of production and consume output) and **firms** (who hire factors and produce output). In the factor market, households supply land, labour, capital, and enterprise to firms in exchange for rent, wages, interest, and profit; in the product/goods market, firms supply goods and services to households in exchange for consumption expenditure. In this simple two-sector model, all income earned by households is eventually spent on domestic output, so national income, national output, and national expenditure are, in principle, all equal.

Real economies also include three further sectors that add **leakages** (withdrawals of income from the circular flow) and **injections** (additions of spending into the circular flow):

Sector	Leakage (withdrawal)	Injection
Financial sector	Household **savings** (S)	**Investment** by firms (I)
Government	**Taxes** (T)	**Government spending** (G)
Rest of the world	**Import** spending (M)	**Export** revenue (X)



The circular flow of income with three additional sectors. Leakages (S, T, M, pink) withdraw income from the household–firm loop; injections (I, G, X, teal) add new spending into it.

The economy is in a stable **equilibrium level of national income** when total injections equal total leakages: $I+G+X=S+T+M$. If injections exceed leakages, national income tends to **rise** (an expansion); if leakages exceed injections, national income tends to **fall** (a contraction). This simple balancing condition is the foundation of the **multiplier** analysis developed at HL in Unit 3.

Comparing injections and leakages

In a given year, an economy records: household savings $S = \$40$bn, taxes $T = \$60$bn, import spending $M = \$50$bn; and investment $I = \$55$bn, government spending $G = \$65$bn, export revenue $X = \$45$bn. Determine whether national income is likely to expand or contract.

$$\text{Total leakages} = S + T + M = 40 + 60 + 50 = \$150\text{bn}.$$

$$\text{Total injections} = I + G + X = 55 + 65 + 45 = \$165\text{bn}.$$

Since injections ($165bn) exceed leakages ($150bn) by $15bn, aggregate spending is greater than the amount being withdrawn from the flow, so national income is likely to **expand** (rise) — more money enters firms as new orders than households/government/importers withdraw as savings, tax, and import spending.

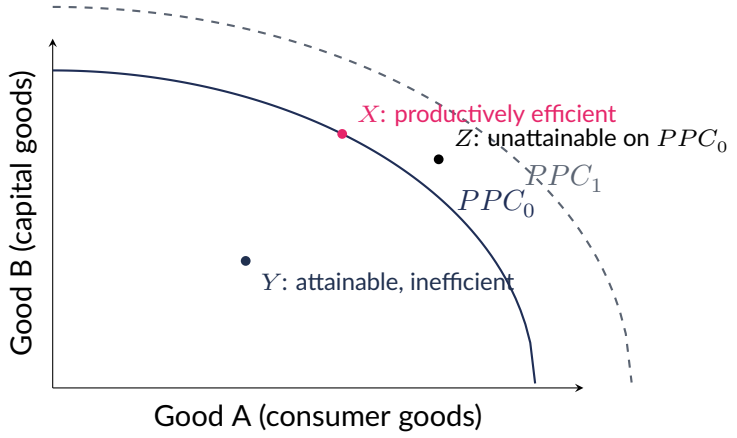
VN **GIẢI THÍCH TIẾNG VIỆT**

Vòng luân chuyển thu nhập mô tả dòng tiền và hàng hoá giữa **hộ gia đình** (chủ sở hữu yếu tố sản xuất) và **doanh nghiệp** (người sản xuất). Ba khu vực bổ sung — tài chính, chính phủ, và nước ngoài — tạo ra **rò rỉ** (leakages: S tiết kiệm, T thuế, M nhập khẩu) và **bơm vào** (injections: I đầu tư, G chi tiêu chính phủ, X xuất khẩu). Nền kinh tế ổn định khi tổng bơm vào bằng tổng rò rỉ; nếu bơm vào $>$ rò rỉ, thu nhập quốc dân có xu hướng **tăng** — đây là nền tảng cho lý thuyết số nhân (multiplier) ở Unit 3 (HL).

1.5 The production possibilities curve (PPC)

1.5.1 Definition, shape, and efficiency

The **production possibilities curve** (PPC, also called the production possibilities frontier) models scarcity, choice, and opportunity cost for an economy that can produce only two goods (or two categories of goods) with a fixed quantity of resources and a fixed level of technology. Every point *on* the curve is **productively efficient**: all resources are fully employed and used in their best possible combination, so more of one good can only be produced by producing less of the other. Points *inside* the curve are **attainable but inefficient** — resources are unemployed, underemployed, or badly allocated, so output of *both* goods could rise simultaneously by reallocating or fully employing resources. Points *outside* the curve are currently **unattainable** with existing resources and technology.



X is productively efficient (on PPC_0); Y is attainable but inefficient (idle/misallocated resources); Z is unattainable on PPC_0 but becomes attainable after **change** — outward growth to PPC_1.

Classifying points relative to a PPC

An economy's straight-line PPC satisfies $X + 2Y = 100$ (where X and Y are quantities of two goods). Classify the points $(30, 30)$, $(40, 30)$, and $(60, 30)$.

At $(30, 30)$: $X + 2Y = 30 + 60 = 90 < 100$ — **inside** the PPC, attainable but **inefficient**.
At $(40, 30)$: $X + 2Y = 40 + 60 = 100$ — exactly **on** the PPC, **productively efficient**.
At $(60, 30)$: $X + 2Y = 60 + 60 = 120 > 100$ — **outside** the PPC, currently **unattainable**.

VN **GIẢI THÍCH TIẾNG VIỆT**

Với PPC đường thẳng, một điểm nằm **trong** đường (tổng nhỏ hơn giới hạn) là đạt được nhưng **kém hiệu quả**; nằm **trên** đường (đúng bằng giới hạn) là **hiệu quả sản xuất**; nằm **ngoài** đường (vượt giới hạn) là **không thể đạt được** với nguồn lực và công nghệ hiện tại. Đề thi thường cho phương trình PPC và yêu cầu xếp loại một điểm cụ thể — chỉ cần thay số vào phương trình và so sánh với giới hạn.

1.5.2 The law of increasing opportunity cost

The PPC is normally drawn **concave** (bowed outward, away from the origin) rather than as a straight line, because most resources are not perfectly substitutable between the two goods. As an economy produces more and more of Good A, it must draw in resources that are progressively *less* suited to producing A (and better suited to producing B), so each additional unit of A costs *increasingly more* units of B forgone. This is the **law of increasing opportunity cost**, and it is the reason the PPC bows outward rather than being a straight line.

Increasing opportunity cost from a PPC schedule

An economy's maximum attainable combinations of Good X and Good Y are given below.

X	0	1	2	3	4
Y (max)	20	19	17	14	10

Calculate the opportunity cost (in units of Y) of each additional unit of X, and comment on the pattern.

$X: 0 \to 1$: Y falls $20 \to 19$, cost $= 1$. $X: 1 \to 2$: Y falls $19 \to 17$, cost $= 2$. $X: 2 \to 3$: Y falls $17 \to 14$, cost $= 3$. $X: 3 \to 4$: Y falls $14 \to 10$, cost $= 4$.

The opportunity cost of each additional unit of X **rises steadily** ($1, 2, 3, 4$ units of Y) — this is the law of increasing opportunity cost, and it is exactly what makes the PPC bow outward (concave) rather than being a straight line.

VN **GIẢI THÍCH TIẾNG VIỆT**

PPC lồi ra ngoài (concave khi nhìn từ gốc toạ độ) vì nguồn lực không hoán đổi hoàn hảo giữa hai loại hàng hoá — khi sản xuất càng nhiều một loại hàng, nền kinh tế buộc phải dùng cả những nguồn lực **kém phù hợp** hơn cho loại hàng đó, khiến chi phí cơ hội của mỗi đơn vị tăng thêm ngày càng **tăng dần**. Đây gọi là luật chi phí cơ hội tăng dần (law of increasing opportunity cost).

1.5.3 Straight-line PPCs and constant opportunity cost

When resources *are* equally well-suited to producing either good (a simplifying assumption often used in numeric problems), the PPC is a **straight line** and the opportunity cost of each extra unit of one good, in terms of the other, is **constant** — given simply by the (constant) slope of the line.

Straight-line PPC — constant opportunity cost

An economy can produce a maximum of 80 tonnes of Rice or 40 tonnes of Steel (or any linear combination between). If output moves from 30 tonnes of Rice to 50 tonnes of Rice, find the opportunity cost of the additional Rice.

Trade-off ratio $= \dfrac{40}{80} = 0.5$ tonnes of Steel per tonne of Rice (constant along a straight-line PPC).

Opportunity cost of the extra $(50 - 30) = 20$ tonnes of Rice $= 20 \times 0.5 = 10$ tonnes of Steel.

Opportunity cost of a resource-allocation decision

A factory has 100 machine-hours available per day. Producing one unit of Product A requires 4 machine-hours; producing one unit of Product B requires 5 machine-hours (the factory can produce any mix, but is limited to a total of 100 hours). If the factory devotes all its capacity to producing 15 units of Product A, what is the opportunity cost, in units of Product B, of that decision?

Hours used by 15 units of A: $15 \times 4 = 60$ hours.

Those same 60 hours could instead have produced $\dfrac{60}{5} = 12$ units of B.

Opportunity cost of producing the 15 units of A $= 12$ units of B forgone.

VN **GIẢI THÍCH TIẾNG VIỆT**

Với PPC đường thẳng, tỉ lệ đánh đổi (trade-off ratio) là **không đổi** — chỉ cần lấy sản lượng tối đa của hàng B chia cho sản lượng tối đa của hàng A để ra "giá" của 1 đơn vị A tính theo B, rồi nhân với số lượng thay đổi. Với bài toán phân bổ nguồn lực (máy giờ, lao động...), luôn quy đổi qua "đơn vị nguồn lực dùng chung" (giờ máy) trước khi so sánh chi phí cơ hội giữa hai sản phẩm.

1.5.4 Shifts of the PPC: economic growth and its causes

A movement *along* a fixed PPC (e.g. from X to a different point still on PPC_0) simply reallocates existing resources between the two goods and involves an opportunity cost. A shift of the *entire curve outward* represents **economic growth**: the economy's productive potential itself has increased, previously unattainable points become attainable, and — crucially — this is not "free": it requires **change** through one or more of the following:

- An increase in the **quantity** of factors of production (e.g. population/labour force growth, new capital investment, discovery of natural resources, land reclamation).
- An increase in the **quality** of factors of production (e.g. education and training raising labour productivity, technological improvement raising the productivity of capital).
- **Technological progress** that allows more output from the same resources.

A curve can also shift *inward* — e.g. after a natural disaster, war, or the depletion of a non-renewable resource base.

Quantifying an outward PPC shift

An economy's original PPC allows a maximum of 100 units of Good A (with none of Good B) or 50 units of Good B (with none of Good A). After several years of investment in new capital equipment, the maximum attainable output rises to 130 units of Good A or 65 units of Good B (with the trade-off ratio between them unchanged). By what percentage has the economy's productive capacity grown, and is this a movement along the PPC or a shift of the PPC?

$$\%\text{ growth} = \frac{130-100}{100} \times 100\% = 30\% \quad (\text{consistently, } \tfrac{65-50}{50} \times 100\% = 30\% \text{ too}).$$

Because *both* maximum intercepts rose by the same 30%, this is a proportional **outward shift of the whole PPC** (economic growth from more/better capital) — not a movement along a fixed curve, which would only reallocate a *fixed* maximum output between the two goods.

VN **GIẢI THÍCH TIẾNG VIỆT**

Di chuyển **dọc theo** một PPC cố định chỉ là phân bổ lại nguồn lực hiện có (có chi phí cơ hội, không làm tăng năng lực sản xuất tổng thể). **Dịch chuyển toàn bộ đường PPC ra ngoài** mới thể hiện **tăng trưởng kinh tế** thật — do tăng số lượng nguồn lực, tăng chất lượng nguồn lực (giáo dục, y tế), hoặc tiến bộ công nghệ. Đây chính là khái niệm trung tâm **change** (sự thay đổi) áp dụng vào PPC.

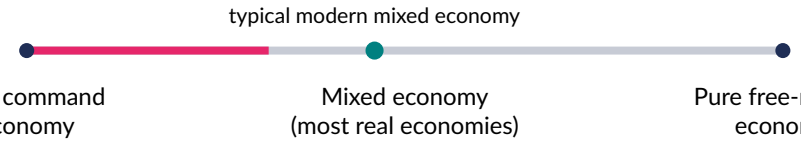
(!) Lỗi thường gặp: Do not confuse **growth** (an outward shift of the PPC — more can be produced of *both* goods) with a simple **movement to a different point** on an unchanged PPC (which trades off one good for the other with no change in total productive capacity). Also, "efficiency" refers to being *on* the curve, not to how far out the curve itself sits — a small, resource-poor economy operating exactly on its (small) PPC is fully efficient even though a larger economy's PPC allows far greater output.

1.6 Economic systems and the role of markets

Societies must answer the three central questions (what/how/for whom) through some organising mechanism — an **economic system**. Three broad types are studied, though almost every real-world economy is a blend of the first two:

Khái niệm cốt lõi

- **Free market economy**: resources are allocated almost entirely through the **price mechanism** — the interaction of privately-owned firms and households responding to price signals, with minimal government involvement. Advantages: efficient allocation via price signals, strong profit incentives for innovation, wide consumer choice. Disadvantages: no guarantee of equity, under-provision of public goods, potential for significant market failure (Unit 2).
- **Planned (command) economy**: the state owns most resources and makes centralised decisions about what, how, and for whom to produce, largely bypassing market prices. Advantages: can direct resources toward strategic priorities and pursue equity goals directly; can, in principle, avoid certain market failures. Disadvantages: lacks the price mechanism's information/incentive signals, prone to shortages/surpluses from planning errors, weaker incentives for innovation and effort, and it removes consumer choice.
- **Mixed economy**: the overwhelming majority of real economies — markets allocate most resources, while government **intervention** (taxation, regulation, public provision of goods such as defence, education, and healthcare, and redistribution) pursues efficiency, equity, and economic well-being simultaneously. Economies differ enormously in *where* they sit on the market–planning spectrum.



The spectrum of economic systems: virtually all real-world economies sit somewhere between the two theoretical extremes, combining markets with government intervention.

Comparing systems: a resource-allocation scenario

A country must decide how to allocate a newly-discovered mineral deposit between export sale (raising government revenue) and domestic industrial use (supporting local manufacturing jobs). Contrast, briefly, how a purely free-market system versus a purely planned system would approach this decision.

Under a **free-market** approach, the deposit would typically be allocated to whichever use domestic and foreign buyers are willing to pay the most for — the price mechanism would direct the mineral toward its highest-value use as revealed by market prices, whether that is export or domestic industry, with little direct government role beyond enforcing property rights.
Under a **planned** approach, a central authority would decide the split based on national strategic priorities (e.g. building up a domestic manufacturing base, self-sufficiency, or specific development goals), regardless of which use the market price signals would have favoured — potentially sacrificing some short-run efficiency in exchange for a use of the resource perceived to be in the long-run national interest.

VN **GIẢI THÍCH TIẾNG VIỆT**

Kinh tế thị trường tự do (free market) phân bổ nguồn lực chủ yếu qua **giá cả**; kinh tế kế hoạch hoá (command/planned) phân bổ qua quyết định tập trung của nhà nước; kinh tế hỗn hợp (mixed) — gần như mọi nền kinh tế thực tế — kết hợp cả hai. Không có hệ thống nào "hoàn hảo": thị trường hiệu quả nhưng không đảm bảo **equity**; kế hoạch hoá có thể theo đuổi mục tiêu công bằng/chiến lược nhưng thiếu tín hiệu giá và động lực đổi mới, dễ gây thiếu hụt/dư thừa do sai lệch trong kế hoạch.

(!) Lỗi thường gặp: Do not write "free markets are always more efficient" as if it were a settled positive fact — whether a market-based or more interventionist approach is "better" in a given case is ultimately a *normative* judgement about how to weigh **efficiency** against **equity** and other central concepts. The strongest exam answers acknowledge this trade-off explicitly rather than asserting one system is simply "correct".

1.7 Free, economic, renewable, and non-renewable resources

1.7.1 Free goods vs. economic goods

Not every useful thing is scarce. A **free good** (e.g. sunlight, ocean air in most locations) has no opportunity cost of provision — there is enough for everyone to consume as much as they want without reducing what is available to anyone else, so it commands no market price. An **economic good** is scarce relative to demand: producing or providing more of it requires giving up something else (an opportunity cost), so it commands a price in a market economy. The overwhelming majority of goods studied in economics are economic goods; free goods are the rare exception, and — importantly — a good can *shift category* over time: clean drinking water was treated as an effectively free good in many regions historically, but has become an economic good (requiring treatment, transport, and increasingly competing uses) in many water-stressed parts of the world today, a direct illustration of the central concept of **change**.

VN **GIẢI THÍCH TIẾNG VIỆT**

Hàng hoá tự do (free good — ví dụ ánh nắng mặt trời) không khan hiếm, không có chi phí cơ hội, nên không có giá trên thị trường. **Hàng hoá kinh tế** (economic good) khan hiếm so với nhu cầu, có chi phí cơ hội, nên được định giá. Một hàng hoá có thể **chuyển loại** theo thời gian — ví dụ nước sạch từng được xem gần như miễn phí ở nhiều nơi, nay đã trở thành hàng hoá kinh tế do khan hiếm và cạnh tranh sử dụng ngày càng tăng.

1.7.2 Renewable and non-renewable resources

Renewable resources (e.g. forests, fish stocks, solar/wind energy) can regenerate naturally over time; if harvested at or below their natural regeneration rate, they can, in principle, support production indefinitely. **Non-renewable resources** (e.g. oil, coal, most minerals) exist in a fixed stock and cannot regenerate on any human-relevant timescale — every unit extracted and used today is permanently unavailable to future generations. This distinction is central to evaluating whether a given growth path (an outward-shifting PPC) is genuinely **sustainable**.

Renewable resource use within, and beyond, its regeneration rate

A fishery's stock naturally regenerates by 8,000 tonnes per year if left undisturbed. In Year 1, the fishing fleet harvests 6,000 tonnes; in Year 2, growing demand pushes the harvest up to 11,000 tonnes. Explain the difference in sustainability between the two years.

In **Year 1**, the harvest (6,000 tonnes) is *below* the natural regeneration rate (8,000 tonnes), so

the total fish stock is still growing overall even after harvesting — this level of use is **sustainable** indefinitely, holding the regeneration rate constant. In **Year 2**, the harvest (11,000 tonnes) *exceeds* the regeneration rate (8,000 tonnes) by 3,000 tonnes, so the total stock **shrinks** by 3,000 tonnes that year; if this pattern continues, the stock will keep shrinking, potentially reducing future regeneration capacity itself (since a smaller breeding stock regenerates less) — an unsustainable path that could eventually collapse the fishery entirely, illustrating both **sustainability** and, if the fishery is open to multiple fleets/countries, the **tragedy of the commons** (Unit 2).

VN **GIẢI THÍCH TIẾNG VIỆT**

Tài nguyên **có thể tái tạo** (renewable — rừng, cá, năng lượng mặt trời/gió) có thể phục hồi tự nhiên theo thời gian; nếu khai thác ở mức **bằng hoặc thấp hơn** tốc độ tái tạo tự nhiên, có thể duy trì sản xuất vô thời hạn. Tài nguyên **không thể tái tạo** (non-renewable — dầu mỏ, than đá, khoáng sản) có trữ lượng cố định, mỗi đơn vị khai thác hôm nay là mất đi vĩnh viễn cho thế hệ sau. Đây là nền tảng để đánh giá một con đường tăng trưởng (PPC dịch ra ngoài) có thực sự **bền vững** hay không.

1.8 Factor mobility

Factor mobility is the ease with which factors of production can move between different uses. **Occupational mobility** is how easily labour can switch between different *types* of job (constrained by skills, qualifications, and retraining time/cost). **Geographic mobility** is how easily labour (or capital) can move between different *locations* (constrained by housing costs, family ties, language, and — internationally — immigration policy). Low factor mobility slows how quickly an economy can reallocate resources in response to **change** (e.g. a declining industry releasing workers who cannot easily retrain or relocate into a growing industry), which is one reason structural unemployment (Unit 3) can persist for a long time even when new jobs exist elsewhere in the economy.

Factor mobility and structural adjustment

A coal-mining region loses 5,000 jobs as mines close, while a technology hub 300 km away is simultaneously creating 5,000 new software-engineering jobs. Explain, in terms of factor mobility, why this need not resolve into full re-employment quickly, and suggest one government policy response.

Even though the *number* of jobs lost matches the number created, the former miners face both low **occupational mobility** (mining skills do not transfer directly to software engineering without substantial retraining) and potentially low **geographic mobility** (relocating 300 km involves housing costs, uprooting family/community ties, and possibly higher cost of living in the tech hub) — so the two figures do *not* imply the unemployed miners will simply fill the new vacancies. A relevant policy response is **interventionist supply-side policy** (Unit 3): government-funded retraining programmes (raising occupational mobility) and/or relocation assistance or regional infrastructure investment that brings new industries closer to affected communities (reducing the geographic-mobility barrier), rather than assuming the labour market will clear this mismatch on its own.

VN **GIẢI THÍCH TIẾNG VIỆT**

Tính linh hoạt của yếu tố sản xuất (factor mobility): **linh hoạt nghề nghiệp** (occupational mobility — chuyển đổi loại công việc, giới hạn bởi kỹ năng) và **linh hoạt địa lý** (geographic mobility — chuyển đổi vị trí, giới hạn bởi chi phí nhà ở, gia đình). Linh hoạt thấp khiến nền kinh tế phản ứng chậm với **sự thay đổi** — đây là lý do thất nghiệp cơ cấu (structural unemployment) có thể

kéo dài ngay cả khi có việc làm mới ở nơi khác trong nền kinh tế.

1.9 Synthesis: applying the nine central concepts

Strong exam answers rarely rely on just one central concept — they typically weave together two or three, and show how they interact or trade off against each other.

A synthesis case study: a national carbon tax

A government introduces a nationwide carbon tax on fossil-fuel electricity generation, using the revenue to fund free public transport. Analyse this policy using *as many* of the nine central concepts as genuinely apply.

Scarcity/Choice: the atmosphere's capacity to safely absorb carbon emissions is a scarce resource; the tax forces firms and consumers to make explicit choices reflecting that scarcity, which an unpriced market would otherwise ignore. **Intervention:** the tax is a direct government intervention correcting a market failure (Unit 2 will show this formally as a negative production externality). **Efficiency:** by raising the private cost of carbon-intensive electricity toward its true social cost, the tax should move the market closer to the allocatively efficient outcome. **Equity:** the effects may be regressive if carbon-intensive energy is a larger share of a poorer household's budget — but if the revenue funds free public transport (of disproportionate benefit to lower-income households without cars), the *overall* package could be equity-*improving*, not worsening. **Sustainability:** this is the policy's core purpose — reducing carbon emissions to protect the ability of future generations to meet their own needs. **Change:** the tax is explicitly designed to *change* firm and household behaviour, and successful implementation would represent structural change in the energy mix over time. **Interdependence:** because carbon emissions cross borders (global climate effects), this policy's benefits are not confined to the country enacting it, meaning free-rider incentives exist internationally too — a country acting alone bears the full domestic cost of the tax while sharing the global climate benefit with all other countries, whether or not they act. **Economic well-being:** the policy trades off narrower economic activity/output in the carbon-intensive sector against broader well-being gains (cleaner air, climate stability, better public transport access).

This kind of multi-concept, connected analysis — not simply listing definitions — is what separates a strong evaluative answer from a purely descriptive one.

VN **GIẢI THÍCH TIẾNG VIỆT**

Bài phân tích điểm cao thường không chỉ dùng **một** khái niệm trung tâm mà kết hợp **hai đến ba** khái niệm, đồng thời chỉ ra chúng tương tác hoặc đánh đổi với nhau như thế nào (ví dụ: chính sách tốt cho **sustainability** nhưng có thể ảnh hưởng **equity** nếu không thiết kế cẩn thận). Đây là kỹ năng "đánh giá" (evaluate) mà đề thi Paper 1 luôn yêu cầu ở phần điểm cao nhất.

1.10 Comparing economic systems in depth

Building on Section 1.6, a fuller comparison of economic systems should weigh *multiple* central concepts simultaneously, since no single system dominates on every criterion.

Criterion	Free market	Planned/command	Mixed
Resource allocation	Price mechanism	Central planning	Mostly prices, with intervention
Efficiency (typical)	High (competitive pressure)	Often low (no price signals)	Variable, depends on intervention design
Equity (typical)	Not guaranteed	Directly targeted, but often poorly matched to actual need	Actively managed via taxation/transfers
Public goods/externalities	Under-provided/mismanaged without intervention	Can be centrally provided	Addressed through targeted intervention
Innovation incentive	Strong (profit motive)	Weak (no competitive pressure, planners bear little personal risk)	Generally strong, tempered by regulation

Evaluating a real-world policy mix

A mixed economy currently relies almost entirely on free-market provision of healthcare. A proposal is made to introduce a universal, tax-funded public healthcare system alongside the existing private option. Using the comparison table above, outline the strongest argument *for* and *against* the proposal.

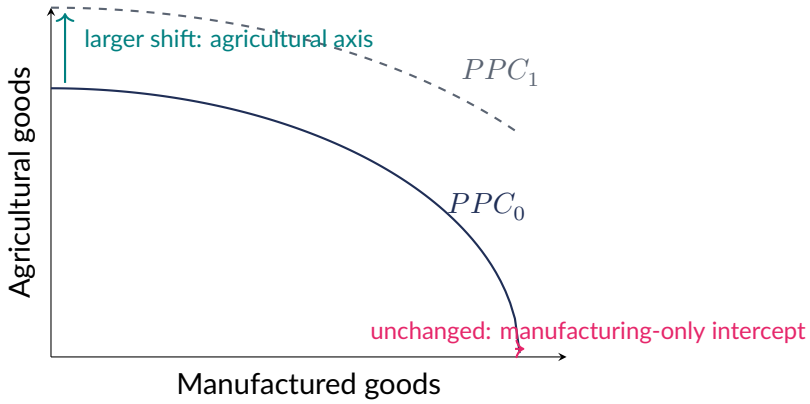
Strongest argument for: healthcare has significant **positive consumption externalities** (Unit 2 — e.g. vaccination, treatment of infectious disease) and is widely viewed as a **merit good** where ability to pay should not determine access; purely private provision under-provides it relative to the social optimum and risks poor **equity** outcomes (low-income households priced out of essential care). A universal public option directly targets both the efficiency (under-provision) and equity concerns.
Strongest argument against: public provision funded by general taxation removes some of the direct price signal and competitive pressure that drives **efficiency** and innovation in a private system (e.g. incentives to minimise costs or develop new treatments/technologies), and requires ongoing tax revenue — an **opportunity cost** against other government priorities.
A balanced answer concludes that the *appropriate* mix is a normative question depending on how heavily a society weighs the market's efficiency/innovation advantages against the equity and market-failure case for intervention — exactly the trade-off the mixed-economy model exists to manage.

VN **GIẢI THÍCH TIẾNG VIỆT**

So sánh đầy đủ giữa các hệ thống kinh tế cần cân nhắc **nhiều** khái niệm cùng lúc — không hệ thống nào vượt trội ở mọi tiêu chí. Thị trường tự do mạnh về **hiệu quả** và **đổi mới** nhưng yếu về **công bằng** và cung cấp hàng hoá công/xử lý ngoại tác; kế hoạch hoá mạnh về nhắm mục tiêu công bằng trực tiếp nhưng yếu về hiệu quả và động lực đổi mới; kinh tế hỗn hợp cố gắng kết hợp ưu điểm của cả hai — mức độ can thiệp "vừa đủ" luôn là câu hỏi **chuẩn tắc** tuỳ theo giá trị mỗi xã hội coi trọng.

1.11 Asymmetric shifts of the PPC

Not every episode of **change** affects an economy's productive capacity *evenly*. Because the two axes of a PPC represent two different categories of output, an improvement that is specific to *one* sector (e.g. a new irrigation technology that only raises agricultural productivity) shifts the PPC **asymmetrically** — the intercept on that axis moves outward by more than the intercept on the other axis (which may not move at all).



An asymmetric outward shift: a farming-specific technology (e.g. improved irrigation) raises the maximum *agricultural*-goods intercept substantially, while the maximum *manufactured*-goods intercept (achievable using only non-agricultural resources) is barely affected.

Reading an asymmetric PPC shift

An economy's original PPC has intercepts of 100 units of Manufactured goods (with zero Agricultural goods) or 50 units of Agricultural goods (with zero Manufactured goods). After a major agricultural technology breakthrough (e.g. drought-resistant crop strains) that only affects farming productivity, the new PPC has intercepts of 100 units of Manufactured goods or 80 units of Agricultural goods. Describe what type of change occurred, and identify one point that was previously unattainable but is now attainable.

The **Manufactured-goods intercept is unchanged** (100 in both cases) but the **Agricultural-goods intercept has risen** from 50 to 80 (a 60% increase) — this is an **asymmetric** outward shift, reflecting a change specific to one sector's productivity rather than an economy-wide improvement in general resources. A point such as $(20$ Manufactured$,\ 65$ Agricultural$)$ — well beyond the original maximum Agricultural output of 50 — would have been **unattainable** on the original PPC but is plausibly attainable on the new one (depending on the exact new PPC shape), illustrating how sector-specific technological change expands *some*, but not necessarily all, production possibilities.

GIẢI THÍCH TIẾNG VIỆT

VN

Không phải mọi sự thay đổi năng lực sản xuất đều tác động **đều** lên cả hai trục của PPC. Một cải tiến chỉ áp dụng cho **một ngành** (ví dụ công nghệ tưới tiêu chỉ giúp nông nghiệp) sẽ làm PPC dịch chuyển **không đối xứng** — trục liên quan dịch ra xa hơn nhiều so với trục còn lại (có thể gần như không đổi). Cần phân biệt dịch chuyển **đều** (do cải thiện nguồn lực chung, ví dụ giáo dục/y tế toàn dân) với dịch chuyển **không đối xứng** (do công nghệ/đầu tư đặc thù một ngành) khi phân tích đề bài.

Bài tập luyện tập

An economy's PPC has intercepts of 60 Steel (0 Textiles) or 90 Textiles (0 Steel). A new textile-manufacturing technology raises the Textiles-only intercept to 150, with the Steel-only intercept unchanged. Describe this shift and calculate the percentage increase in maximum Textiles output.

(A) Symmetric shift; 40% increase

(B) Asymmetric shift; 40% increase

(C) Asymmetric shift; 66.7% increase

(D) Symmetric shift; 66.7% increase

Lời giải chi tiết

Steel intercept unchanged (60 both times); Textiles intercept rises from 90 to 150 — an **asymmetric** shift (sector-specific technology). $\%\Delta = \frac{150-90}{90} \times 100\% \approx 66.7\%$. **(C)**.

Bài tập luyện tập

Distinguish between a *symmetric* and an *asymmetric* outward shift of the PPC, and give one real-world cause of each. (Short response.)

Lời giải chi tiết

A **symmetric** shift raises the maximum attainable output of *both* goods by a similar proportion — typically caused by an economy-wide improvement applicable to production of anything, such as a general rise in the labour force, improved nationwide education/health (raising labour productivity broadly), or a general-purpose technology (e.g. more reliable electricity supply). An **asymmetric** shift raises the maximum attainable output of *one* good by much more than the other — typically caused by a sector-specific improvement, such as a new crop technology (benefiting agriculture only) or a new manufacturing process (benefiting industrial output only), with little or no effect on the other sector's maximum output.

1.12 Time as a scarce resource

Time is among the most universally scarce resources: every individual has exactly 24 hours per day, and time spent on one activity cannot be spent on another — making the opportunity cost of time a recurring, practical application of Unit 1's core ideas.

The opportunity cost of time

A qualified surgeon earns $400/hour in professional practice. She spends 3 hours personally repainting her home office instead of hiring a professional painter who would charge $40/hour (also taking 3 hours). Calculate the true economic cost of the surgeon painting the office herself, including the opportunity cost of her time, and compare it to simply hiring the painter.

Opportunity cost of the surgeon's own time $= 3 \times \$400 = \$1{,}200$ (the income she forgoes by not working those 3 hours instead).
Cost of hiring the professional painter $= 3 \times \$40 = \$120$.
Even though the surgeon pays $0 in direct cash by painting it herself, the **true economic cost** of her choice is $1,200 (her forgone earnings) — far higher than simply paying the $120 to hire the painter and continuing to work her own $400/hour job during those 3 hours. This is why, from a purely economic standpoint, specialising in one's own highest-value activity and paying others (with a lower opportunity cost of time for that specific task) to perform lower-value tasks is often the economically efficient choice — the same underlying logic as comparative advantage (developed fully in Unit 4).

VN **GIẢI THÍCH TIẾNG VIỆT**

Thời gian là nguồn lực khan hiếm phổ quát nhất: ai cũng chỉ có đúng 24 giờ/ngày. Chi phí cơ hội của thời gian thường bị bỏ qua khi chỉ tính "chi phí bằng tiền" — ví dụ trên cho thấy dù tự sơn nhà không tốn tiền mặt, chi phí cơ hội thực sự (thu nhập bị bỏ lỡ) có thể **cao hơn nhiều** so với việc thuê người khác làm và tiếp tục công việc có giá trị cao hơn của chính mình. Đây cũng chính là logic nền tảng của **lợi thế so sánh** (comparative advantage) sẽ học ở Unit 4: nên chuyên môn hoá vào hoạt động có chi phí cơ hội thấp nhất của bản thân.

Bài tập luyện tập

A freelance graphic designer earns \$60/hour. She spends 4 hours doing her own household accounting instead of hiring a bookkeeper who would charge \$25/hour and take the same 4 hours. Calculate the opportunity cost of her choice and state whether it was the economically efficient decision.

Lời giải chi tiết

Opportunity cost of her own time $= 4 \times \$60 = \$240$. Cost of hiring the bookkeeper $= 4 \times \$25 = \$100$. Since her opportunity cost (\$240) far exceeds the cost of hiring the bookkeeper (\$100), doing the accounting herself was **not** the economically efficient decision — she would have been \$140 better off (in opportunity-cost terms) hiring the bookkeeper and spending those 4 hours on her own higher-value design work instead.

1.13 Diminishing marginal utility and consumer choice

1.13.1 Total utility and marginal utility

When a consumer consumes successive units of a good, each unit contributes to her overall satisfaction. **Total utility** (TU) is the total satisfaction a consumer derives from consuming a given quantity of a good. **Marginal utility** (MU) is the *additional* satisfaction gained from consuming one more unit of the good, holding consumption of all other goods constant:

$$MU_n = TU_n - TU_{n-1}.$$

The **law of diminishing marginal utility** states that, as a consumer consumes successive additional units of a good (holding consumption of other goods constant), the additional (marginal) satisfaction gained from each extra unit eventually **falls**. This does not mean the good becomes unpleasant — only that each further unit adds *less* to total satisfaction than the unit before it did.

VN **GIẢI THÍCH TIẾNG VIỆT**

Tổng lợi ích (total utility, TU) là tổng mức độ thoả mãn từ việc tiêu dùng một lượng hàng hoá nhất định. **Lợi ích biên** (marginal utility, MU) là mức độ thoả mãn **tăng thêm** khi tiêu dùng thêm một đơn vị hàng hoá, với điều kiện tiêu dùng các hàng hoá khác không đổi: $MU_n = TU_n - TU_{n-1}$. **Quy luật lợi ích biên giảm dần** (law of diminishing marginal utility) phát biểu rằng lợi ích biên từ mỗi đơn vị tiêu dùng thêm cuối cùng sẽ **giảm dần** — không có nghĩa là hàng hoá trở nên khó chịu, chỉ là mỗi đơn vị thêm vào đóng góp **ít hơn** cho tổng lợi ích so với đơn vị trước đó.

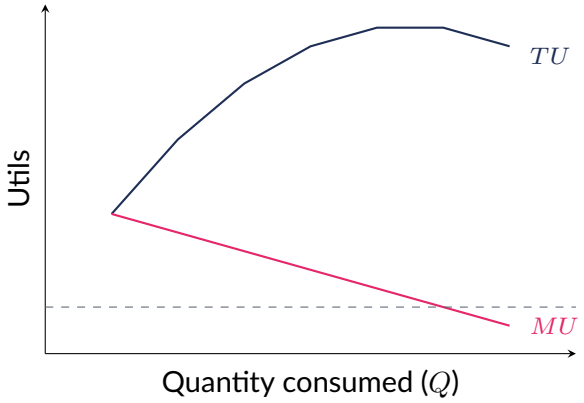
1.13.2 The TU/MU schedule and diagram

Consider a consumer eating successive ice-cream cones in one sitting. Her total and marginal utility (measured in an artificial unit, *utils*) are:

Q (cones)	1	2	3	4	5	6	7
TU (utils)	20	36	48	56	60	60	56
MU (utils)	20	16	12	8	4	0	-4

Each MU entry is simply the change in TU: e.g. $MU_2 = 36 - 20 = 16$, $MU_6 = 60 - 60 = 0$, and $MU_7 = 56 - 60 = -4$. Notice that TU keeps **rising** for as long as MU is positive (cones 1 through

5), reaches its **maximum** (60 utils) once MU falls to zero (at $Q = 6$), and then **falls** once MU turns negative (the 7th cone actually reduces total satisfaction — perhaps from over-eating).



Total utility (TU) rises while marginal utility (MU) is positive, reaches its maximum where $MU = 0$ (at $Q = 6$), and falls once MU turns negative (at $Q = 7$).

(!) Lỗi thường gặp: "Diminishing" marginal utility does **not** mean total utility is falling. In the schedule above, MU is already diminishing from the very first unit (it falls from 20 to 16 to 12, and so on) while TU is still **rising** the whole time, right up to $Q = 6$. Total utility only starts to **fall** once marginal utility becomes **negative** (here, at the 7th unit). A common exam error is to treat "diminishing MU" and "falling TU" as the same thing — they are not: one describes the *rate of change* of satisfaction, the other describes its *level*.

VN **GIẢI THÍCH TIẾNG VIỆT**

Bảng số liệu trên cho thấy: MU **giảm dần ngay từ đơn vị đầu tiên** (20 → 16 → 12 →...), nhưng TU vẫn **tăng** liên tục cho đến khi $MU = 0$ (tại $Q = 6$, TU đạt tối đa 60 utils); TU chỉ thực sự **giảm** khi MU trở nên **âm** (đơn vị thứ 7). Lỗi thường gặp: nhầm lẫn "lợi ích biên giảm dần" với "tổng lợi ích giảm" — đây là hai khái niệm hoàn toàn khác nhau.

1.13.3 Consumer equilibrium: the equi-marginal principle

A rational consumer with a fixed budget wants to allocate that budget across all available goods so as to maximise her total utility. The key insight is that she should compare, for each good, the marginal utility *per dollar spent* — not simply the marginal utility of each good in isolation, since goods can have different prices.

A consumer maximises total utility from a fixed budget when the budget is fully spent and the marginal utility per dollar spent is **equalised across all goods purchased** — the **equi-marginal principle** (also called the utility-maximising rule):

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \cdots, \qquad \text{subject to spending exactly the available budget.}$$

If $\frac{MU_x}{P_x} > \frac{MU_y}{P_y}$, the consumer gets more satisfaction per dollar from good X than from good Y, so she should reallocate spending *toward* X and *away from* Y — and keep reallocating until the ratios are equal.

VN **GIẢI THÍCH TIẾNG VIỆT**

Nguyên tắc cân bằng biên (equi-marginal principle): người tiêu dùng duy lý với ngân sách cố định sẽ tối đa hoá tổng lợi ích khi **chi tiêu hết ngân sách** và **lợi ích biên trên mỗi đồng chi tiêu** là **bằng nhau** giữa tất cả các hàng hoá: $\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$. Nếu tỉ lệ này của hàng X lớn hơn hàng Y, người tiêu dùng nên chuyển bớt chi tiêu từ Y sang X để tăng tổng lợi ích, cho đến khi hai tỉ lệ bằng nhau.

Finding the utility-maximising combination

A consumer has \$20 to spend on Good X (price \$2/unit) and Good Y (price \$4/unit). Her marginal utility schedules are shown below.

Q_x	1	2	3	4	5	6
MU_x	20	16	12	8	4	0
MU_x/P_x	10	8	6	4	2	0

Q_y	1	2	3	4	5
MU_y	32	24	16	8	0
MU_y/P_y	8	6	4	2	0

Find the utility-maximising combination of X and Y, and the total utility it delivers.

Check the equi-marginal condition at $Q_x = 4$, $Q_y = 3$:

$$\frac{MU_x}{P_x} = \frac{8}{2} = 4 \qquad \text{and} \qquad \frac{MU_y}{P_y} = \frac{16}{4} = 4.$$

The two ratios are **equal**, so the equi-marginal condition is satisfied. **Check the budget is exactly exhausted:**

$$P_xQ_x + P_yQ_y = 2(4) + 4(3) = 8 + 12 = \$20 \quad \checkmark$$

Both conditions hold, so $(Q_x, Q_y) = (4, 3)$ is the **utility-maximising combination**. Total utility at this combination:

$$TU = TU_x(4) + TU_y(3) = (20 + 16 + 12 + 8) + (32 + 24 + 16) = 56 + 72 = \textbf{128 utils}.$$

The equi-marginal principle guarantees this is the *highest* total utility attainable from any affordable combination of X and Y within the \$20 budget — any other affordable combination would leave the marginal utility per dollar unequal between the two goods, meaning some utility could still be gained by reallocating spending toward whichever good currently offers the higher MU/P.

VN **GIẢI THÍCH TIẾNG VIỆT**

Ở ví dụ trên, tại $Q_x = 4$, $Q_y = 3$: lợi ích biên trên mỗi đồng của hai hàng hoá bằng nhau ($MU_x/P_x = MU_y/P_y = 4$) **và** ngân sách được chi tiêu hết đúng \$20 ($2 \times 4 + 4 \times 3 = 20$). Đây chính là điều kiện cân bằng tiêu dùng — tổng lợi ích tại điểm này (128 utils) là mức **cao nhất** có thể đạt được với ngân sách \$20, vì nguyên tắc cân bằng biên đảm bảo không còn cách phân bổ lại chi tiêu nào giúp tăng thêm tổng lợi ích.

Diminishing marginal utility is, in fact, the deeper microeconomic reason the demand curve slopes downward: as a consumer already holds more units of a good, the marginal utility (and hence marginal dollar value, or willingness-to-pay) of one more unit is lower, so she will only buy an additional unit if its price falls. The demand curve introduced in Unit 2 can be read directly off a consumer's MU schedule (converting utils into a dollar willingness-to-pay), making the law of di-

minishing marginal utility the theoretical foundation beneath the law of demand.

VN **GIẢI THÍCH TIẾNG VIỆT**

Quy luật lợi ích biên giảm dần chính là nền tảng lý thuyết sâu xa giải thích vì sao đường cầu dốc xuống: khi đã tiêu dùng nhiều đơn vị của một hàng hoá, lợi ích biên (và do đó mức sẵn lòng chi trả) của đơn vị tiếp theo càng thấp, nên người tiêu dùng chỉ mua thêm khi giá giảm. Đây là mối liên hệ giữa lý thuyết lợi ích (utility theory) và đường cầu (demand curve) sẽ học ở Unit 2.

1.14 Economic methodology: models, assumptions, and evidence

1.14.1 Building and testing economic models

Economics proceeds much like other sciences: economists construct simplified **models** of reality, built on explicit simplifying **assumptions**, in order to isolate the relationship between the variables that matter most for a given question. As already introduced (Section 1.3), the *ceteris paribus* assumption — holding "all else constant" — is essential here: it allows an economist to study, for example, how price affects quantity demanded *in isolation*, without also having to track simultaneous changes in income, tastes, and the prices of other goods. Building an economic model typically follows a sequence: (1) simplify reality using explicit assumptions; (2) derive a **testable hypothesis** — a specific, falsifiable prediction the model implies (e.g. "a rise in the minimum wage will reduce teenage employment"); (3) gather real-world data; and (4) test the hypothesis against that data, retaining, revising, or rejecting the model depending on how well it explains the evidence.

Khái niệm cốt lõi

A good economic model is judged by its **usefulness** — how well it explains and predicts observable economic behaviour — not by whether its assumptions are perfectly realistic. Every model simplifies; the question is always whether the simplification distorts the specific relationship being studied.

VN **GIẢI THÍCH TIẾNG VIỆT**

Kinh tế học xây dựng **mô hình** (model) dựa trên các **giả định** đơn giản hoá, sử dụng nguyên tắc *ceteris paribus* ("các yếu tố khác không đổi") để cô lập mối quan hệ giữa hai biến số cần nghiên cứu. Quy trình xây dựng mô hình: (1) đơn giản hoá bằng giả định; (2) đưa ra **giả thuyết có thể kiểm chứng** (testable hypothesis); (3) thu thập dữ liệu thực tế; (4) đối chiếu giả thuyết với dữ liệu để giữ lại, điều chỉnh, hoặc bác bỏ mô hình. Một mô hình tốt được đánh giá qua **tính hữu ích** trong việc giải thích/dự đoán thực tế, không phải qua việc mọi giả định có đúng 100% hay không.

1.14.2 Correlation versus causation

When two variables move together over time or across a data set, they are said to be **correlated**. It is tempting to conclude that one variable's movement *causes* the other's — but correlation alone never establishes causation. There are at least three alternative explanations that must always be considered:

- **Reverse causality**: the assumed "effect" may actually be causing the assumed "cause" (the causal arrow runs the opposite way to what is claimed).
- **A confounding (third) variable**: some other factor may independently drive *both* variables, creating a correlation between them with no direct causal link running between the two at all.
- **Coincidence**: with enough variables and enough data, some pairs will appear correlated purely by chance, with no underlying causal or confounding relationship whatsoever.

VN **GIẢI THÍCH TIẾNG VIỆT**

Khi hai biến số **cùng biến động** theo thời gian hoặc giữa các quan sát, chúng được gọi là có **tương quan** (correlation). Tuy nhiên, tương quan **không** chứng minh **quan hệ nhân quả** (causation). Ba khả năng khác luôn cần xem xét: (1) **nhân quả ngược** (reverse causality — chiều tác động thực tế ngược lại); (2) **biến gây nhiễu** (confounding variable — một yếu tố thứ ba tác động độc lập lên cả hai biến); (3) **trùng hợp ngẫu nhiên** (coincidence).

Ice-cream sales and drowning incidents

A researcher observes that, across many countries and months, ice-cream sales and drowning incidents are strongly positively correlated. Explain why this does *not* mean ice-cream sales cause drownings, and identify the likely confounding variable.

There is no plausible direct mechanism by which buying ice cream would cause a person to drown. Instead, both variables are independently driven by a third factor: **hot weather**. When the weather is hot, more people go swimming (raising the number of drowning incidents, purely through greater exposure to water) *and*, separately, more people buy ice cream to cool down. Hot weather is therefore the **confounding variable** — it drives both series upward at the same time of year, creating a strong positive correlation between ice-cream sales and drownings even though **neither causes the other**.

VN **GIẢI THÍCH TIẾNG VIỆT**

Doanh số kem và số vụ đuối nước có tương quan dương mạnh, nhưng **không phải** kem gây ra đuối nước. **Biến gây nhiễu** ở đây là **thời tiết nóng**: trời nóng khiến nhiều người đi bơi hơn (làm tăng số vụ đuối nước) **và** khiến nhiều người mua kem hơn — hai hiện tượng cùng tăng vì cùng chịu tác động của thời tiết, chứ không phải cái này gây ra cái kia.

Interest rates and unemployment — an economic example

A country raises its policy interest rate, and in the same year the unemployment rate rises. A politician claims: "raising interest rates caused the unemployment increase." Explain one alternative explanation consistent with the same data.

It is entirely possible that a separate **negative demand shock** — for example, a global recession, a collapse in export demand, or a financial crisis — occurred in that same year and was the actual cause of *both* events: the central bank may have raised rates in response to inflationary pressure that itself stemmed from the same shock (or, in other cases, central banks raise rates for reasons unrelated to the labour market entirely), while the shock *separately* and directly reduced firms' output and hiring, raising unemployment. If so, the interest-rate rise and the unemployment rise would be correlated (both triggered by the same underlying shock) without the rate rise being the (sole, or even primary) **cause** of the unemployment increase. A single year's co-movement of two variables can never, by itself, establish causation — much stronger evidence is needed, such as comparing similar economies that did and did not raise rates, examining a longer time series, or statistically controlling for other shocks affecting both variables.

VN **GIẢI THÍCH TIẾNG VIỆT**

Một ngân hàng trung ương tăng lãi suất, cùng năm đó thất nghiệp tăng — không có nghĩa việc tăng lãi suất **là nguyên nhân duy nhất** gây ra thất nghiệp tăng. Có thể một **cú sốc kinh tế khác** (suy thoái toàn cầu, khủng hoảng tài chính...) đã tác động đồng thời lên cả quyết định tăng lãi suất **và** lên thất nghiệp một cách độc lập. Muốn khẳng định quan hệ nhân quả cần bằng chứng

mạnh hơn nhiều so với sự trùng hợp trong một năm dữ liệu — ví dụ so sánh các nền kinh tế tương tự, dùng chuỗi thời gian dài hơn, hoặc kiểm soát các yếu tố gây nhiễu khác.

(!) Lỗi thường gặp: On stimulus-material questions, do **not** write "X causes Y" purely because a data extract or graph shows the two moving together (or one trend following another in time). Examiners specifically reward candidates who consider **alternative explanations** — a confounding variable, reverse causality, or simple coincidence — before accepting a causal claim at face value. A statement like "unemployment fell the same year the government cut taxes, so the tax cut caused the fall in unemployment" ignores every other policy, global condition, and pre-existing trend that could equally explain the data.

1.15 Applying the central concepts: automation and the future of work

Consider a further synthesis case study, this time built around structural technological change: the large-scale adoption of automation and artificial intelligence (AI) across manufacturing, logistics, and even white-collar tasks such as basic data analysis and customer service.

A synthesis case study: automation and the labour market

Across many industries, firms increasingly replace routine manual and cognitive tasks with automated machinery, software, and AI systems, substantially raising output per worker while reducing the number of workers needed to produce a given level of output. Analyse this trend using as many of the nine central concepts as genuinely apply.

Scarcity/Choice: labour, capital, and time remain scarce even as automation changes *which* combination of factors is most productive; firms and workers alike face new choices — firms choose how quickly to adopt new technology, workers choose whether and how to retrain — each with a real opportunity cost. **Efficiency:** automation typically raises **productive efficiency** (more output from the same or fewer resources) and can shift an economy's PPC outward, since the same workforce, combined with better capital, can now produce more of everything. **Equity:** the gains from automation are not evenly shared — firm owners and highly-skilled workers who design/maintain automated systems often capture most of the productivity gains, while displaced routine workers may face falling wages or unemployment, widening income inequality unless deliberately addressed. **Economic well-being:** well-being effects run in *both* directions — cheaper, more abundant goods and services raise material living standards broadly, while job loss and income insecurity for displaced workers can reduce well-being sharply for that specific group, even as aggregate output rises. **Sustainability:** whether these employment effects are sustainable for society depends on whether displaced workers can be re-integrated into new roles over time — a workforce permanently locked out of employment represents a long-run social cost, not just a short-run transition. **Change:** this is a textbook illustration of structural economic change — the pattern of employment across occupations and sectors shifts as technology evolves, exactly as it did historically with mechanised agriculture and industrial-era manufacturing. **Interdependence:** the effects spread well beyond the firms directly adopting automation — suppliers, local communities dependent on a factory's wage income, and even competing firms in other countries (who may need to automate simply to remain competitive) are all affected by decisions made elsewhere. **Intervention:** governments face pressure to respond — through retraining/upskilling programmes (raising occupational mobility, Section 1.8), strengthened social safety nets (unemployment insurance, income support) for displaced workers, or even policies directly affecting the pace of automation (e.g. taxation of automated capital, discussed controversially in some countries) — each involving further efficiency/equity trade-offs of its own.

As with the carbon-tax case study, the strongest evaluative answers connect these concepts to each other explicitly (e.g. noting that the efficiency gains from automation are precisely what create the equity challenge requiring intervention) rather than listing them as isolated observations.

VN **GIẢI THÍCH TIẾNG VIỆT**

Tự động hoá/AI làm tăng **hiệu quả sản xuất** (nhiều đầu ra hơn với ít lao động hơn) nhưng đồng thời tạo ra căng thẳng với **công bằng** — lợi ích thường tập trung vào chủ doanh nghiệp và lao động tay nghề cao, trong khi lao động phổ thông/lặp lại có nguy cơ mất việc hoặc giảm lương. Câu hỏi **chuẩn tắc** then chốt là chính phủ nên phản ứng thế nào: đào tạo lại (retraining) để tăng **linh hoạt nghề nghiệp**, mở rộng an sinh xã hội cho người bị mất việc, hay can thiệp trực tiếp vào tốc độ tự động hoá — mỗi lựa chọn đều có đánh đổi riêng giữa tăng trưởng/hiệu quả và bảo vệ người lao động bị ảnh hưởng.

1.16 Practice problems

Bài tập luyện tập

Which of the following best describes the fundamental cause of the central economic problem?

(A) Governments intervene too much in free markets

(B) Resources are finite while human wants are unlimited

(C) Firms seek to maximise profit

(D) Consumers are not always rational

Lời giải chi tiết

The central economic problem exists because resources (land, labour, capital, entrepreneurship) are **scarce** relative to human wants, which are effectively unlimited — this is true regardless of the economic system, government policy, firm behaviour, or the degree of consumer rationality. **(B)**.

Bài tập luyện tập

A country's straight-line PPC allows a maximum of 200 tonnes of Wheat or 50 cars. If the country currently produces 120 tonnes of Wheat, how many cars can it also produce (on the PPC), and what is the opportunity cost of producing 10 more tonnes of Wheat?

(A) 30 cars; 2.5 cars

(B) 50 cars; 4 cars

(C) 20 cars; 2.5 cars

(D) 30 cars; 4 cars

Lời giải chi tiết

Trade-off ratio $= 50/200 = 0.25$ cars per tonne of Wheat, so Cars $= 50 - 0.25 \times$ Wheat. At 120 tonnes of Wheat: Cars $= 50 - 0.25(120) = 50 - 30 = 20$. Opportunity cost of 10 more tonnes of Wheat $= 10 \times 0.25 = 2.5$ cars. **(C)**: 20 cars; 2.5 cars.

Bài tập luyện tập

A government-owned firm produces at a point strictly inside its industry's PPC due to chronic overstaffing. This point is best described as:

(A) Productively efficient
(B) Allocatively efficient
(C) Productively inefficient
(D) Unattainable

Lời giải chi tiết

A point inside the PPC means resources are not being used to their full potential (overstaffing wastes labour productivity), so output of at least one good could rise without using more resources — this is **productive inefficiency**. **(C)**.

Bài tập luyện tập

"Inflation fell from 6.2% to 5.4% last quarter." vs. "The central bank should cut interest rates to keep unemployment low." Classify each statement and explain why the distinction matters for policy debate. (Short response, 3–4 sentences.)

Lời giải chi tiết

The first is a **positive** statement — a factual, testable claim about what happened, verifiable using price-index data. The second is a **normative** statement — it recommends what the central bank *should* do, resting on a value judgement about how much weight to give unemployment relative to other objectives (e.g. inflation). The distinction matters because economists can reach consensus on positive claims through evidence, but normative policy debates cannot be resolved by data alone — they require weighing trade-offs between central concepts such as **efficiency** and **equity**.

Bài tập luyện tập

Explain, using the central concepts of **change** and **sustainability**, why a PPC that expands due to over-extraction of a non-renewable resource might not represent genuine long-run economic development. (Short response.)

Lời giải chi tiết

An outward shift of the PPC (**change**) shows a rise in current *productive potential*, but if that growth is driven by depleting a non-renewable resource (e.g. drawing down an oil reserve faster than any substitute is developed), future PPCs may shrink once the resource is exhausted. This growth path is not **sustainable** — it borrows productive capacity from future generations, so current higher output does not necessarily raise long-run **economic well-being**. Genuine development requires growth that can be maintained without compromising the ability of future generations to meet their own needs.

Bài tập luyện tập

A PPC schedule shows: at $X = 5$, maximum $Y = 40$; at $X = 6$, maximum $Y = 37$; at $X = 7$, maximum $Y = 32$. What is the opportunity cost (in Y) of the 7th unit of X, and what economic law does the pattern of costs illustrate?

(A) 3 units of Y; constant opportunity cost
(B) 5 units of Y; increasing opportunity cost
(C) 5 units of Y; the law of demand
(D) 3 units of Y; decreasing opportunity cost

Lời giải chi tiết

Moving from $X = 6$ to $X = 7$: Y falls from 37 to 32, so the opportunity cost of the 7th unit of X is $37 - 32 = 5$ units of Y (compare to the 6th unit, whose cost was $40 - 37 = 3$ units of Y — the cost is rising). This rising pattern illustrates the **law of increasing opportunity cost**. **(B)**.

Bài tập luyện tập

Which of the following is *not* one of the nine IB Economics central concepts?

(A) Efficiency
(B) Interdependence
(C) Elasticity
(D) Sustainability

Lời giải chi tiết

The nine central concepts are: scarcity, choice, efficiency, equity, economic well-being, sustainability, change, interdependence, and intervention. **Elasticity** is an important microeconomic *tool* (studied in Unit 2) but is not itself one of the nine central concepts. **(C)**.

Bài tập luyện tập

A worker who owns and operates her own food truck earns \$4,000 profit this month after paying for ingredients, a loan repayment on the truck (capital), and the market rent for her pitch (land). Which factor of production earns which reward in this scenario? (Short response.)

Lời giải chi tiết

Land (the market pitch) earns **rent**. **Capital** (the food truck, financed by a loan) earns **interest** (the loan repayment reflects the cost of capital). **Labour** — her own physical/mental effort running the truck — would normally earn a **wage**, though as a sole owner-operator this is often bundled into the residual. **Entrepreneurship** — organising the business, bearing the risk of running it — earns **profit**, here the \$4,000 left over after all other costs (rent, capital cost, and any explicit wage) are covered.

Bài tập luyện tập

In a given year: $S = \$25$bn, $T = \$70$bn, $M = \$85$bn; $I = \$40$bn, $G = \$75$bn, $X = \$60$bn. Is national income likely to expand, contract, or stay the same? Show your working.

(A) Expand, by \$5bn
(B) Contract, by \$5bn
(C) Expand, by \$45bn
(D) Stay exactly the same

Lời giải chi tiết

Total leakages $= S + T + M = 25 + 70 + 85 = \$180$bn. Total injections $= I + G + X = 40 + 75 + 60 = \$175$bn. Leakages exceed injections by $180 - 175 = \$5$bn, so national income is likely to **contract** by (a multiple related to) \$5bn — more is being withdrawn from the circular flow than is being injected into it. **(B)**.

Bài tập luyện tập

Explain *one* advantage and *one* disadvantage of a planned (command) economy relative to a free-market economy, using at least one named central concept in each part. (Short response.)

Lời giải chi tiết

Advantage: a planned economy can directly target **equity** — the state can allocate housing, healthcare, and education according to need rather than ability to pay, potentially achieving a more even distribution of economic well-being than an unregulated market would produce on its own.
Disadvantage: without a functioning price mechanism, planners lack the decentralised information that market prices normally convey about relative scarcity, so **efficiency** tends to suffer — resources are more easily misallocated (chronic shortages of some goods, surpluses of others) than in a system where prices continuously signal where resources are most valued.

Bài tập luyện tập

A firm's marginal benefit of extra advertising spending is $MB = 60 - 3Q$ and its marginal cost is $MC = 15 + 2Q$, where Q is thousands of dollars spent. Find the profit-maximising level of advertising spending.

(A) $Q^* = 9$
(B) $Q^* = 12$
(C) $Q^* = 15$
(D) $Q^* = 45$

Lời giải chi tiết

Set $MB = MC$: $60 - 3Q = 15 + 2Q \implies 45 = 5Q \implies Q^* = 9$. Check: $MB = 60 - 27 = 33$; $MC = 15 + 18 = 33$ ✓. **(A)**.

Bài tập luyện tập

A city's marginal benefit of extra streetlights is $MB = 120 - 4Q$ and marginal cost is $MC = 20 + 6Q$. Calculate the optimal number of streetlights and the marginal benefit/cost at that quantity.

Lời giải chi tiết

$120 - 4Q = 20 + 6Q \implies 100 = 10Q \implies Q^* = 10$. At $Q^* = 10$: $MB = 120 - 40 = 80$; $MC = 20 + 60 = 80$ ✓. The city should install exactly 10 streetlights; installing fewer forgoes net benefit ($MB > MC$), installing more wastes resources ($MC > MB$).

Bài tập luyện tập

Explain, with an example, the difference between "bounded rationality" and the standard rational-agent assumption used in most basic economic models. (Short response.)

Lời giải chi tiết

The standard rational-agent assumption holds that decision-makers have stable preferences, accurately weigh all relevant costs and benefits, and choose the option that maximises their own welfare. **Bounded rationality** recognises that real decision-makers face limits on informa-

tion, time, and cognitive processing, and systematically rely on mental shortcuts (heuristics) or are influenced by framing/emotion — for example, a smoker may fully know the health costs of smoking (satisfying the "information" requirement of rationality) yet continue smoking because of present bias (over-weighting the immediate pleasure relative to the delayed health cost) — a systematic departure from the standard rational, forward-looking-optimiser assumption.

Bài tập luyện tập

A factory has 120 machine-hours per day. Product P needs 3 hours/unit; Product Q needs 6 hours/unit. If the factory currently produces 20 units of P, what is the opportunity cost, in units of Q, of that production?

(A) 6 units of Q
(B) 10 units of Q
(C) 20 units of Q
(D) 40 units of Q

Lời giải chi tiết

Hours used by 20 units of P: $20 \times 3 = 60$ hours. Those 60 hours could instead produce $60/6 = 10$ units of Q. Opportunity cost = **10 units of Q**. **(B)**.

Bài tập luyện tập

State which of the nine central concepts is most directly illustrated by each scenario: (a) a government builds a new public hospital rather than leaving healthcare entirely to private insurance markets; (b) two neighbouring countries' fishing industries both decline after one country over-fishes a shared ocean stock; (c) a nation's real GDP per capita triples over 40 years of steady growth. (Short response — one concept for each.)

Lời giải chi tiết

(a) **Intervention** — the government is directly acting to influence how healthcare is allocated rather than leaving the outcome purely to private markets. (b) **Interdependence** (and arguably **sustainability**, since the shared, over-exploited resource threatens the future of both fishing industries) — one country's resource-use decisions directly affect another's outcomes. (c) **Change** — a sustained rise in productive capacity/output over time is the clearest illustration of the "change" concept applied to long-run economic growth.

Bài tập luyện tập

Explain why a point exactly *on* a country's PPC does not necessarily represent the "best" point for that country to produce at, even though it is productively efficient. (Short response.)

Lời giải chi tiết

Productive efficiency (being on the PPC) only tells us that resources are fully and efficiently employed — it says nothing about *which particular combination* of the two goods is most desirable for society. That question is one of **allocative efficiency** (are resources devoted to producing the combination of goods that society values most, e.g. reflecting consumer preferences) and involves **normative** judgements (e.g. how much priority to give consumer goods vs. capital goods for future growth, or private goods vs. publicly-provided goods) — a country

could be fully productively efficient while still producing a mix of goods that is not allocatively ideal or that neglects long-run **sustainability**.

Bài tập luyện tập

A national statistics office reports the following annual figures: $S = \$52$bn, $T = \$95$bn, $M = \$110$bn, $I = \$60$bn, $G = \$90$bn, $X = \$100$bn. Calculate total leakages, total injections, and state the direction of change in national income implied.

Lời giải chi tiết

Total leakages $= S+T+M = 52+95+110 = \$257$bn. Total injections $= I+G+X = 60+90+100 = \$250$bn. Leakages exceed injections by $257-250 = \$7$bn, so national income is likely to **contract slightly** — more income is being withdrawn from the circular flow (via saving, taxation, and import spending) than is being newly injected (via investment, government spending, and export revenue).

Bài tập luyện tập

Diagram-drawing prompt. Draw and fully label a production possibilities curve for "Healthcare" (vertical axis) and "Education" (horizontal axis). On your diagram, mark and label: (i) a point that is productively efficient, (ii) a point that is attainable but productively inefficient, (iii) a point that is currently unattainable, and (iv) show, with a second curve, the effect of a nationwide improvement in workforce training (applicable to producing both goods).

Lời giải chi tiết

A correct diagram has axes labelled *Healthcare* (vertical) and *Education* (horizontal), with a concave curve PPC_0 bowed outward from the origin (reflecting increasing opportunity cost). Point (i) sits exactly *on* PPC_0. Point (ii) sits strictly *inside* PPC_0 (below/left of the curve at that combination). Point (iii) sits strictly *outside* PPC_0. Because a nationwide improvement in workforce training raises the productivity of labour used in *both* sectors, part (iv) should show an entirely new curve PPC_1 shifted **outward** (further from the origin) at (approximately) every point — not merely a movement along PPC_0 — with PPC_1 clearly drawn everywhere outside PPC_0, and the previously unattainable point (iii) should now lie on or inside PPC_1.

Bài tập luyện tập

Paper 1-style extended response. "A government is deciding whether to fund a large public afforestation (tree-planting) programme using tax revenue, instead of leaving forest land available for private commercial sale." Using at least three named central concepts, evaluate this policy decision. (Extended response — outline the key points a full-mark answer should contain.)

Lời giải chi tiết

A strong answer should: (1) identify **intervention** — the government is directly overriding what a private land market would otherwise allocate the land to; (2) identify **sustainability** — forests provide long-run environmental benefits (carbon absorption, biodiversity, flood control) that a private market, focused on near-term commercial returns, would tend to under-value, so intervention can correct this bias toward the present; (3) identify **efficiency**, specifically ad-

dressing the **positive (production) externality** of forests (formally covered in Unit 2) — private landowners do not capture the full social benefit of carbon absorption, so a purely private market would tend to under-provide forest land relative to the socially optimal amount; (4) weigh **opportunity cost** — the tax revenue funding afforestation could have funded other programmes (e.g. healthcare, education), and the land itself has an opportunity cost in forgone commercial/agricultural use; (5) a full-mark answer reaches a **normative conclusion** (e.g. that intervention is justified *given* the scale of the externality and the weight placed on long-run sustainability versus short-run commercial value) rather than simply describing the concepts without synthesis.

Bài tập luyện tập

A consumer has \$50 to spend and derives satisfaction from two goods, Cinema tickets (\$10 each) and Books (\$5 each). If she buys 3 cinema tickets, what is the maximum number of books she can still buy, and what is the opportunity cost (in books) of buying one more cinema ticket beyond that?

(A) 4 books; 2 books
(B) 5 books; 2 books
(C) 4 books; 1 book
(D) 5 books; 1 book

Lời giải chi tiết

Spending on 3 cinema tickets $= 3 \times \$10 = \$30$. Remaining budget $= \$50 - \$30 = \$20$, which buys $\$20/\$5 = 4$ books. A 4th cinema ticket costs \$10 more, which would otherwise have bought $\$10/\$5 = 2$ books — opportunity cost of the extra ticket = **2 books**. **(A)**.

Bài tập luyện tập

Distinguish between "growth" (a movement of the PPC) and "development" using an example, and explain why the distinction matters when evaluating a country's progress. (Short response — this previews Unit 4's fuller treatment.)

Lời giải chi tiết

Growth refers narrowly to a rise in the quantity of goods and services produced (an outward shift of the PPC, or a rise in real GDP). **Development** is broader, encompassing rising **economic well-being** — health, education, environmental quality, and freedom — alongside output. For example, a country's PPC/real GDP could expand rapidly through resource extraction while life expectancy stagnates and pollution worsens: growth without meaningful development. The distinction matters because policies aimed purely at maximising output growth may not raise, and could even reduce, broader living standards and **sustainability** — a full evaluation of a country's progress must look beyond the PPC/GDP alone.

Bài tập luyện tập

A government must choose between spending its limited budget on (a) subsidising university tuition or (b) subsidising small business loans. Using the concept of **opportunity cost**, explain what determines the "correct" choice from a purely economic standpoint. (Short response.)

Lời giải chi tiết

From a purely economic standpoint, the "correct" choice is not determined by which option sounds more appealing, but by comparing the **marginal benefit** of each option (e.g. the future productivity/earnings gains and social spillovers from more graduates, versus the job creation and innovation gains from more small businesses) against its **opportunity cost** (what is given up by not funding the alternative, given the fixed budget). If the marginal benefit per dollar spent is higher for university tuition subsidies than for small-business loans, resources should flow there (and vice versa) — the central economic problem never disappears simply because a decision-maker is a government rather than a household or firm; it still faces scarcity and must weigh opportunity costs at the margin.

Bài tập luyện tập

Two students debate: Student A says, "The government should ban plastic bags because they harm the environment." Student B says, "A ban on plastic bags would reduce measured plastic waste by roughly 40% based on similar bans in other cities." Identify which statement is positive and which is normative, and explain what additional type of statement would be needed to fully justify Student A's policy conclusion using Student B's type of evidence.

Lời giải chi tiết

Student B's statement is **positive** (a testable, evidence-based prediction). Student A's statement is **normative** (it asserts what the government *should* do, based on a value judgement that environmental harm outweighs any costs of the ban, e.g. cost/inconvenience to consumers and retailers). To fully justify a policy conclusion, one typically needs to combine **positive evidence** (such as Student B's prediction of the ban's actual effect) with an explicit **normative judgement** about how to weigh the resulting costs and benefits (e.g. environmental protection vs. consumer convenience and business costs) — positive evidence alone can never, by itself, prove a normative policy conclusion.

Bài tập luyện tập

A nation's PPC for Agricultural goods (Y-axis) and Manufactured goods (X-axis) is given by $Y = \sqrt{400 - X^2}$ (for $0 \leq X \leq 20$). Determine whether the point $(12, 16)$ is on, inside, or outside this PPC.

Lời giải chi tiết

At $X = 12$: $Y_{\text{max}} = \sqrt{400 - 144} = \sqrt{256} = 16$. Since the point $(12, 16)$ gives exactly $Y = 16 = Y_{\text{max}}$, the point lies **exactly on the PPC** — it is productively efficient. (Compare: if the question instead asked about $(12, 10)$, since $10 < 16$, that point would lie *inside* the PPC and be attainable but inefficient; a point such as $(12, 20)$, since $20 > 16$, would lie *outside* and be currently unattainable.)

Bài tập luyện tập

Classify each as a free good or an economic good: (a) fresh air on a remote mountain trail; (b) bottled mineral water in a supermarket; (c) a public park bench.

Lời giải chi tiết

(a) **Free good** — plentiful relative to demand at that specific remote location, no opportunity cost to breathe it, no market price. (b) **Economic good** — bottling, purifying, and transporting water uses scarce resources with a real opportunity cost, hence a market price. (c) **Economic good**, even though it appears "free" to the user at the point of use — public resources (land, materials, maintenance labour) were used to build and maintain it, and those resources had alternative uses (an opportunity cost was incurred by society, even if not charged directly to the individual user).

Bài tập luyện tập

A national fish stock regenerates naturally by 5,000 tonnes/year. The fishing industry harvests 4,200 tonnes in Year 1 and 6,800 tonnes in Year 2. In which year is the harvest sustainable, and by how much does the stock change in the unsustainable year?

(A) Year 1 sustainable; Year 2 stock falls by 1,800 tonnes

(B) Year 2 sustainable; Year 1 stock falls by 800 tonnes

(C) Both years sustainable

(D) Neither year sustainable

Lời giải chi tiết

Year 1: harvest (4,200) $<$ regeneration (5,000) $\Rightarrow$ **sustainable**; stock actually grows by $5000 - 4200 = 800$ tonnes. Year 2: harvest (6,800) $>$ regeneration (5,000) $\Rightarrow$ **unsustainable**; stock falls by $6800 - 5000 = 1{,}800$ tonnes. **(A)**.

Bài tập luyện tập

Explain, using the concept of **factor mobility**, why a national unemployment rate of exactly 5% and an identical number of job vacancies (also representing 5% of the labour force) does not necessarily mean the labour market is functioning efficiently. (Short response.)

Lời giải chi tiết

Matching totals do not guarantee the unemployed can actually fill the vacancies: **occupational mobility** may be low if the unemployed lack the specific skills/qualifications the vacancies require (e.g. unemployed retail workers vs. vacancies for data analysts), and **geographic mobility** may be low if the vacancies are concentrated in different regions from where the unemployed live (housing costs, family ties, or immigration/relocation barriers). Without addressing these mobility barriers directly (e.g. through retraining or relocation support), the coincidence of equal totals can mask a persistent **structural** mismatch rather than a healthy, efficiently-clearing labour market.

Bài tập luyện tập

A government subsidises solar panel installation for households. State *three* different central concepts this policy could be analysed through, with a one-sentence justification for each.

Lời giải chi tiết

Intervention: the subsidy is a deliberate government action correcting how the market would otherwise price solar adoption. **Sustainability:** the policy directly supports a shift toward renewable energy, protecting future generations' access to a stable climate and energy resources. **Change:** the subsidy is designed to accelerate structural change in the energy mix faster than an unsubsidised market would achieve on its own. (A strong answer could also justify **efficiency** — correcting the positive externality of reduced carbon emissions from wider renewable adoption — or **equity**, if the subsidy design specifically targets lower-income households who could not otherwise afford the upfront cost.)

Bài tập luyện tập

Using the systems-comparison table (Section 1.10), explain why a mixed economy is normally considered a compromise rather than an optimum — i.e. why economists do not simply describe the "ideal" amount of intervention as a fixed, universally correct number. (Short response.)

Lời giải chi tiết

The "ideal" amount of government intervention in a mixed economy depends on *normative* judgements — how heavily a society weighs **efficiency** (favouring less intervention, more market freedom) against **equity** and correcting market failures (favouring more intervention) — and these judgements legitimately differ between societies, and over time within the same society as circumstances (technology, demographics, global conditions) change. Because there is no single, objectively "correct" weighting of efficiency against equity that applies to every country in every era, there is no universal optimal intervention level — only ongoing, context-specific, and inherently normative trade-offs, which is precisely why mixed economies differ so much from one another in practice (compare, for example, the very different tax-and-spending levels typical of different real-world mixed economies).

Bài tập luyện tập

A remote island nation has a PPC for Fish and Coconuts given by $F + 1.5C = 90$. It currently produces at $(F, C) = (30, 30)$. A cyclone destroys 20% of its productive capacity (assume the entire PPC shrinks proportionally). Find the new PPC equation and determine whether $(30, 30)$ remains attainable.

Lời giải chi tiết

A 20% reduction in productive capacity shrinks the maximum intercepts of the PPC by 20%: new maximum Fish $= 90 \times 0.8 = 72$; new maximum Coconuts (at $F = 0$): original max $C = 90/1.5 = 60$, new max $= 60 \times 0.8 = 48$. New PPC equation (same trade-off ratio, smaller scale): $F + 1.5C = 72$.
Check $(30, 30)$ against the new PPC: $30 + 1.5(30) = 30 + 45 = 75 > 72$ — the point now lies **outside** the new PPC and is **no longer attainable**; the economy would be forced to reduce output of at least one good below its pre-cyclone level.

Bài tập luyện tập

Distinguish between "occupational mobility" and "geographic mobility" using a specific example of a worker for whom one is high and the other is low. (Short response.)

Lời giải chi tiết

A software developer who can work remotely from anywhere with an internet connection typically has **high geographic mobility** (location barely matters for the job) but potentially **low occupational mobility** if their skills are highly specialised in one programming ecosystem and do not transfer easily to, say, a career in skilled healthcare work, which would require years of retraining. Conversely, a general-purpose construction labourer may have relatively **high occupational mobility** across different construction-related roles, but **low geographic mobility** if family, housing, or community ties make relocating to a different region impractical even when local construction demand dries up.

Bài tập luyện tập

Paper 1-style extended response. "A country is debating whether to nationalise (bring into full state/government ownership) its previously private electricity generation industry." Using the systems-comparison framework and at least three named central concepts, evaluate this proposal.

Lời giải chi tiết

A strong answer should: (1) note that electricity generation may have **natural monopoly** characteristics (very large fixed infrastructure costs), so private ownership without careful regulation risks **allocative inefficiency** (Unit 2) — a case for **intervention**, though nationalisation is only one possible response (price-cap regulation of a private monopoly is another); (2) weigh **efficiency**: private, profit-driven ownership can bring stronger cost-discipline and innovation incentives, while state ownership removes competitive/profit pressure but can directly prioritise strategic/equity goals (e.g. guaranteed universal access, price stability) that a private monopoly might not; (3) address **equity/economic well-being**: nationalisation could enable below-market pricing for essential electricity access, especially benefiting lower-income households, but requires ongoing public funding — an **opportunity cost** against other government spending priorities; (4) note **sustainability**: state ownership could allow the government to direct investment more explicitly toward renewable generation than a private profit-maximiser might otherwise choose, but could equally be slower to adopt new technology without competitive pressure; (5) a complete answer reaches a **normative** conclusion, e.g. recommending regulation of a private monopoly (capturing some efficiency benefits of private ownership while directly constraining prices) as a middle-ground alternative to full nationalisation, rather than treating the choice as strictly binary.

Bài tập luyện tập

A retiree with substantial savings spends 6 hours per week volunteering at a free community clinic instead of a paid consulting role that would pay \$80/hour. Using the concept of opportunity cost, explain whether volunteering is "costless" from an economic standpoint even though no money changes hands.

Lời giải chi tiết

Volunteering is **not** costless in economic terms, even though the retiree pays no cash and receives no cash: the **opportunity cost** of the 6 weekly hours is the $6 \times \$80 = \$480$ in consulting income forgone. Economics defines cost in terms of forgone alternatives, not just cash outlays — the retiree is implicitly "paying" \$480/week (in forgone income) for the value of volunteering, which may well be a rational and worthwhile choice if the retiree places sufficiently high value

on the clinic's work, but it is inaccurate to describe the choice as having zero economic cost.

Bài tập luyện tập

A government must choose between building a new hospital (using scarce construction resources) or a new university campus with the same resources. Using *two* named central concepts, explain what determines the "right" choice from an economic perspective, and why reasonable people might disagree.

Lời giải chi tiết

The relevant central concepts are **choice** (the scarce construction resources force a genuine trade-off — building one directly means *not* building the other with those same resources, illustrated by a two-good PPC where "Hospitals" and "Universities" are the two axes) and **opportunity cost** (the true cost of choosing the hospital is the university campus forgone, and vice versa — not simply the construction budget spent). Reasonable people can disagree because comparing the marginal benefit of a hospital (health outcomes) against a university (education/skills, longer-run economic growth) ultimately requires a **normative** judgement about which is more valuable to society at this particular time — economics can clarify the trade-off and its opportunity cost precisely, but it cannot, by itself, determine which value judgement is "correct".

Bài tập luyện tập

Diagram-drawing prompt. Sketch the "spectrum of economic systems" diagram (a horizontal line from pure command economy to pure free-market economy). Mark a point close to, but not exactly at, the free-market end, and justify in one sentence why most real-world mixed economies would be placed somewhere on this spectrum rather than at either extreme.

Lời giải chi tiết

A correct sketch shows a horizontal line with "Pure command economy" labelled at the far left end and "Pure free-market economy" labelled at the far right end, with a marked point positioned clearly *between* the two ends (closer to the free-market end, but not touching it). Justification: almost every real-world economy relies primarily on markets and prices to allocate most resources (placing it toward the free-market end) while still using government **intervention** for public goods, correcting market failures, and pursuing **equity** goals (preventing it from ever reaching the pure, zero-intervention free-market extreme) — the exact position on the spectrum reflects how much intervention a specific country's policy choices involve.

Bài tập luyện tập

A consumer's total utility from successive units of a good is: $TU_1 = 15$, $TU_2 = 27$, $TU_3 = 36$, $TU_4 = 42$, $TU_5 = 42$. Calculate the marginal utility of the 4th and 5th units, and identify the quantity at which total utility first reaches its maximum.

(A) $MU_4 = 6$, $MU_5 = 0$; TU first reaches its maximum at $Q = 4$

(B) $MU_4 = 9$, $MU_5 = 6$; TU first reaches its maximum at $Q = 3$

(C) $MU_4 = 6$, $MU_5 = 0$; TU first reaches its maximum at $Q = 5$

(D) $MU_4 = 0$, $MU_5 = -6$; TU first reaches its maximum at $Q = 4$

Lời giải chi tiết

$MU_4 = TU_4 - TU_3 = 42 - 36 = 6$. $MU_5 = TU_5 - TU_4 = 42 - 42 = 0$. Total utility rises through $Q = 1, 2, 3, 4$ (each $MU > 0$) and reaches its maximum value of 42 utils **at** $Q = 4$; the 5th unit adds nothing more ($MU_5 = 0$), so TU stays at 42 rather than rising further — the maximum is first reached at $Q = 4$, not $Q = 5$. **(A)**.

Bài tập luyện tập

A consumer has \$30 to spend on Good M (price \$3/unit) and Good N (price \$6/unit). Her marginal utility schedules are: MU_m at $Q_m = 1$–6: $30, 24, 18, 12, 6, 0$; MU_n at $Q_n = 1$–4: $48, 36, 24, 12$. Find the utility-maximising combination of M and N (i.e. the combination satisfying the equi-marginal condition while exactly exhausting the budget), and compute the total utility it delivers.

Lời giải chi tiết

MU_m/P_m (dividing by 3): $10, 8, 6, 4, 2, 0$ for $Q_m = 1$–6. MU_n/P_n (dividing by 6): $8, 6, 4, 2$ for $Q_n = 1$–4.
At $Q_m = 4$: $MU_m/P_m = 12/3 = 4$. At $Q_n = 3$: $MU_n/P_n = 24/6 = 4$. The two ratios are **equal**.
Budget check: $P_mQ_m + P_nQ_n = 3(4) + 6(3) = 12 + 18 = \$30$ — exactly exhausted.
So $(Q_m, Q_n) = (4, 3)$ is the utility-maximising combination. Total utility $= TU_m(4) + TU_n(3) = (30 + 24 + 18 + 12) + (48 + 36 + 24) = 84 + 108 =$ **192 utils**.

Bài tập luyện tập

A consumer's marginal utility from consuming successive units of a good is positive at every unit consumed so far, but falls with each additional unit. Which of the following must be true?

(A) Total utility is falling.

(B) Total utility is rising, but at a decreasing rate.

(C) Total utility is constant.

(D) Marginal utility must already be negative for some units consumed.

Lời giải chi tiết

As long as marginal utility remains **positive** (even if it is falling from one unit to the next), each additional unit still adds *something* to total utility, so total utility keeps **rising** — just by smaller and smaller increments as MU diminishes. Total utility only falls once MU becomes **negative**, which has not happened here. **(B)**.

Bài tập luyện tập

A study finds that, across many cities, the number of fire engines dispatched to a fire and the dollar value of damage caused by that fire are strongly positively correlated. A newspaper reports: "sending more fire engines causes more fire damage — cut the fire brigade's budget." Identify the flaw in this reasoning and state the likely confounding variable.

Lời giải chi tiết

The reasoning confuses correlation with causation. The likely **confounding variable** is the **size/severity of the fire itself**: a larger, more dangerous fire independently causes both (i) a

bigger emergency response (more fire engines dispatched) *and* (ii) more damage (because the fire is bigger). The number of engines dispatched does not *cause* the damage — if anything, sending more engines to a larger fire likely *reduces* the damage relative to sending too few. Cutting the fire brigade's budget based on this correlation would be a serious policy error, since it ignores the confounding role of fire severity.

Bài tập luyện tập

Which of the following best explains why a strong positive correlation between two variables does not, by itself, establish that one variable causes the other?

(A) Correlation coefficients cannot be meaningfully calculated using economic data.

(B) There may be reverse causality, a confounding third variable, or pure coincidence linking the two variables.

(C) Governments always intervene whenever two variables become correlated.

(D) Positive correlations are inherently less reliable than negative correlations.

Lời giải chi tiết

Two variables can move together for reasons other than one directly causing the other: the causal arrow could run in **reverse** to what is assumed, a **confounding** third variable could independently drive both, or the correlation could simply be **coincidental**, especially in large data sets with many variables. None of the other options describe a valid general reason. **(B)**.

Bài tập luyện tập

An economy's straight-line PPC allows a maximum of 150 units of Good J (with zero Good K) or 75 units of Good K (with zero Good J). If the economy currently produces 90 units of J, how many units of K can it also produce, and what is the opportunity cost (in units of K) of increasing J output from 90 to 120 units?

(A) $K = 30$; opportunity cost $= 15$ units of K

(B) $K = 15$; opportunity cost $= 30$ units of K

(C) $K = 45$; opportunity cost $= 7.5$ units of K

(D) $K = 30$; opportunity cost $= 7.5$ units of K

Lời giải chi tiết

Trade-off ratio $= 75/150 = 0.5$ units of K per unit of J, so $K = 75 - 0.5J$. At $J = 90$: $K = 75 - 0.5(90) = 75 - 45 = 30$. At $J = 120$: $K = 75 - 0.5(120) = 75 - 60 = 15$. Increasing J from 90 to 120 (30 more units of J) reduces K from 30 to 15 — an opportunity cost of $30 - 15 = 15$ units of K (equivalently, $30 \times 0.5 = 15$). **(A)**.

Bài tập luyện tập

An economy's straight-line PPC satisfies $2A + 3B = 180$ (where A and B are quantities of two goods). Classify the points $(20, 40)$, $(30, 40)$, and $(70, 20)$.

Lời giải chi tiết

At $(20, 40)$: $2(20) + 3(40) = 40 + 120 = 160 < 180$ — **inside** the PPC, attainable but **inefficient**.
At $(30, 40)$: $2(30) + 3(40) = 60 + 120 = 180$ — exactly **on** the PPC, **productively efficient**.
At $(70, 20)$: $2(70) + 3(20) = 140 + 60 = 200 > 180$ — **outside** the PPC, currently **unattainable**.

Bài tập luyện tập

A farm has 200 labour-hours available per week. Growing one tonne of Corn requires 8 labour-hours; growing one tonne of Soybeans requires 5 labour-hours (the farm can grow any mix, limited to 200 hours total). If the farm devotes its entire capacity to growing 20 tonnes of Corn, what is the opportunity cost, in tonnes of Soybeans, of that decision?

(A) 32 tonnes of Soybeans
(B) 25 tonnes of Soybeans
(C) 40 tonnes of Soybeans
(D) 16 tonnes of Soybeans

Lời giải chi tiết

Hours used by 20 tonnes of Corn: $20 \times 8 = 160$ hours. Those same 160 hours could instead have grown $160/5 = 32$ tonnes of Soybeans. **Opportunity cost $= 32$ tonnes of Soybeans forgone. (A)**.

Bài tập luyện tập

In a given year, an economy records: $S = \$45$bn, $T = \$80$bn, $M = \$95$bn; and $I = \$50$bn, $G = \$85$bn, $X = \$90$bn. Determine whether national income is likely to expand, contract, or stay the same, and by how much.

(A) Expand by \$5bn
(B) Contract by \$5bn
(C) Expand by \$45bn
(D) Stay exactly the same

Lời giải chi tiết

Total leakages $= S + T + M = 45 + 80 + 95 = \$220$bn. Total injections $= I + G + X = 50 + 85 + 90 = \$225$bn. Injections exceed leakages by $225 - 220 = \$5$bn, so national income is likely to **expand** by (a multiple related to) \$5bn. **(A)**.

Bài tập luyện tập

A national statistics office reports: $S = \$38$bn, $T = \$102$bn, $M = \$77$bn; $I = \$65$bn, $G = \$99$bn, $X = \$60$bn. Calculate total leakages, total injections, and state the direction of change in national income implied.

Lời giải chi tiết

Total leakages $= S + T + M = 38 + 102 + 77 = \$217$bn. Total injections $= I + G + X = 65 + 99 + 60 = \$224$bn. Injections exceed leakages by $224 - 217 = \$7$bn, so national income is likely to **expand** — more is being newly injected into the circular flow (via investment, government spending, and export revenue) than is being withdrawn (via saving, taxation, and import spending).

Bài tập luyện tập

An automobile assembly-line worker is laid off when her factory closes, while a nearby city is simultaneously hiring renewable-energy technicians, a role requiring 6 months of specialised certification. Using the concepts of occupational and geographic mobility, explain two reasons the assembly-line worker might not immediately move into one of the new roles.

Lời giải chi tiết

Occupational mobility: assembly-line skills do not directly transfer to renewable-energy technician work, which requires specific technical certification — the worker faces a real time cost (6 months) and possibly a direct financial cost of retraining before she is even eligible for the new role, so she cannot simply switch overnight. **Geographic mobility:** even though the new jobs are "nearby," relocating or commuting may still involve housing costs, changes to family/school arrangements, or transport costs that are not trivial, especially for a worker who has just lost her income — low mobility on either dimension means the number of job losses and job openings matching exactly does not guarantee smooth, immediate re-employment.

Bài tập luyện tập

A national government invests heavily in rural broadband internet infrastructure, funded partly by new taxes targeted at high-income urban earners. State *two* central concepts most directly illustrated by this policy, with a one-sentence justification for each.

Lời giải chi tiết

Intervention: the government is directly funding and directing infrastructure investment rather than leaving broadband provision purely to private, profit-driven providers (who may under-provide it in sparsely-populated, less profitable rural areas). **Equity:** the policy redistributes resources from higher-income urban taxpayers toward improving opportunity/access for rural households and businesses, addressing an existing gap in access to a service increasingly essential for education, employment, and business participation. (A strong answer could also justify **economic well-being**, since better rural connectivity can raise living standards beyond what is captured by income or output measures alone.)

Bài tập luyện tập

A multinational company's supply-chain disruption in one country raises production costs for firms in several other countries that rely on components sourced from it. Which central concept is most directly illustrated?

(A) Scarcity
(B) Interdependence
(C) Equity
(D) Intervention

Lời giải chi tiết

This scenario shows how economic agents and countries are linked through trade and supply chains, so that a disruption in one place has consequences elsewhere — the defining feature of **interdependence**. While scarcity of components is involved, the concept being tested by the cross-border transmission of the disruption is specifically interdependence. **(B)**.

Bài tập luyện tập

Contrast how a purely planned economy and a purely free-market economy would each respond to a sudden nationwide shortage of a key medicine. (Short response.)

Lời giải chi tiết

Under a **planned** approach, a central authority would directly allocate the limited medicine supply according to a defined priority (e.g. clinical need, hospital rankings) and could redirect production resources (factories, labour) toward manufacturing more of it by administrative order — potentially responding to the specific shortage quickly, but risking a slower or less well-informed judgement of where the medicine is needed most, since it bypasses the price mechanism's decentralised information. Under a **free-market** approach, the price of the medicine would rise sharply in response to the shortage, which both incentivises firms to increase production/supply (chasing higher profit) and rations existing supply toward those most willing (and able) to pay — raising **efficiency** concerns around speed of response versus serious **equity** concerns, since low-income patients could be priced out of an essential medicine. In practice, most mixed economies respond with a blend: allowing prices to rise somewhat to incentivise extra supply, while directly intervening (price caps, subsidies, released government stockpiles, or prioritised allocation to hospitals) to protect access for those most in need.

Bài tập luyện tập

An online retailer replaces 200 warehouse workers with a fully automated robotic sorting system, cutting operating costs by 30% while increasing order-processing speed. Using at least three named central concepts, evaluate this decision from the perspective of the retailer, the displaced workers, and society as a whole. (Extended response — outline the key points a full-mark answer should contain.)

Lời giải chi tiết

A strong answer should: (1) identify **efficiency** — the retailer achieves higher productive efficiency (more/faster output at lower cost per unit), which can benefit consumers through lower prices and the firm through higher profit; (2) identify **equity** — the 200 displaced workers bear a concentrated cost (lost income) while the gains (lower costs, faster service) are spread thinly across many consumers and shareholders, a classic case where efficiency gains and their distribution diverge; (3) discuss **factor mobility** — whether the displaced workers can be re-employed depends on their **occupational mobility** (can warehouse skills transfer to other roles without extensive retraining?) and **geographic mobility** (are alternative jobs available locally?); (4) identify **change** — this is a clear instance of structural, technology-driven change in the retail/logistics sector; (5) identify **intervention** as a possible response — government-funded retraining or unemployment support could offset the equity cost without reversing the efficiency gain; a full-mark answer reaches a **normative** conclusion (e.g. that the decision is efficient for the firm and consumers but requires accompanying policy intervention to be equitable for displaced workers) rather than treating the outcome as unambiguously "good" or "bad".

Bài tập luyện tập

Which of the following government responses to widespread automation would most directly address a loss of *occupational mobility* among displaced workers?

(A) Cutting corporate tax rates to encourage further investment in automation

(B) Funding large-scale vocational retraining and requalification programmes for displaced workers

(C) Raising tariffs on imported robotics equipment

(D) Reducing the minimum wage to make human labour cheaper than automation

Lời giải chi tiết

Occupational mobility is limited by workers lacking the skills/qualifications needed for new types of jobs. Government-funded **retraining and requalification programmes** directly raise workers' ability to move into different occupations, addressing the mobility barrier at its source. The other options either encourage more automation (worsening the immediate displacement problem), only indirectly affect the pace of automation (tariffs), or address the wage cost of labour rather than workers' ability to move into new roles (minimum wage). **(B)**.

Bài tập luyện tập

A farmer's straight-line PPC allows a maximum of 100 tonnes of Corn (0 Cotton) or 40 tonnes of Cotton (0 Corn). If he currently produces 60 tonnes of Corn, how many tonnes of Cotton can he also produce, and what is the opportunity cost (in Cotton) of increasing Corn output from 60 to 80 tonnes?

(A) 16 tonnes; 8 tonnes

(B) 24 tonnes; 8 tonnes

(C) 16 tonnes; 4 tonnes

(D) 24 tonnes; 4 tonnes

Lời giải chi tiết

Trade-off ratio $= 40/100 = 0.4$ tonnes of Cotton per tonne of Corn, so Cotton $= 40 - 0.4 \times$ Corn. At Corn $= 60$: Cotton $= 40 - 0.4(60) = 40 - 24 = 16$ tonnes. Opportunity cost of the extra $80 - 60 = 20$ tonnes of Corn $= 20 \times 0.4 = 8$ tonnes of Cotton. **(A)**.

Bài tập luyện tập

A firm's marginal benefit of extra quality-control inspections is $MB = 50 - 2Q$ and marginal cost is $MC = 10 + 3Q$, where Q is inspections per week. Find the optimal number of inspections.

(A) 5

(B) 8

(C) 10

(D) 12

Lời giải chi tiết

Set $MB = MC$: $50 - 2Q = 10 + 3Q \implies 40 = 5Q \implies Q^* = 8$. Check: $MB = 50 - 16 = 34$; $MC = 10 + 24 = 34$ ✓. **(B)**.

Bài tập luyện tập

A consumer currently spends her full budget on Good X and Good Y such that $MU_x/P_x = 6$ and $MU_y/P_y = 9$. Explain which direction she should reallocate her spending to raise her total utility, and why. (Short response.)

Lời giải chi tiết

Since $MU_y/P_y = 9$ exceeds $MU_x/P_x = 6$, each dollar spent on Y currently buys **more** marginal utility than a dollar spent on X. She should reallocate spending **away from X and toward Y** (buy less X, more Y) until the two ratios are equalised — at that point, by the equi-marginal principle, no further reallocation can raise her total utility.

Bài tập luyện tập

A consumer's total utility from successive slices of pizza is: $Q = 1$: $TU = 15$; $Q = 2$: $TU = 27$; $Q = 3$: $TU = 35$; $Q = 4$: $TU = 39$. Compute the marginal utility of each slice and state whether the law of diminishing marginal utility holds.

Lời giải chi tiết

$MU_1 = 15$; $MU_2 = 27 - 15 = 12$; $MU_3 = 35 - 27 = 8$; $MU_4 = 39 - 35 = 4$. The sequence $15, 12, 8, 4$ is strictly **falling** from the very first slice, so the law of diminishing marginal utility holds throughout this schedule.

Bài tập luyện tập

In a given year: $S = \$30$bn, $T = \$50$bn, $M = \$40$bn; $I = \$35$bn, $G = \$55$bn, $X = \$45$bn. Determine whether national income will expand or contract, and by how much.

(A) Expand, by \$15bn
(B) Contract, by \$15bn
(C) Expand, by \$135bn
(D) No change

Lời giải chi tiết

Total leakages $= S + T + M = 30 + 50 + 40 = \$120$bn. Total injections $= I + G + X = 35 + 55 + 45 = \$135$bn. Injections exceed leakages by $135 - 120 = \$15$bn, so national income is likely to **expand**. **(A)**.

Bài tập luyện tập

A city government builds and operates a network of free public libraries, funded by local taxation, rather than leaving book access purely to private bookshops and paid subscription services. State *two* central concepts most directly illustrated, with justification. (Short response.)

Lời giải chi tiết

Intervention: the government directly provides a service, overriding what a purely private market would supply on its own. **Economic well-being / equity:** free access to books and information raises broad living standards and specifically benefits those who could not otherwise afford private access, addressing an equity concern in access to knowledge and education.

Bài tập luyện tập

An economy's PPC has intercepts of 80 units of Good A (0 Good B) or 40 units of Good B (0 Good A). After broad improvements in education and infrastructure, the new intercepts are 96 units of Good A or 48 units of Good B. Classify the shift and calculate the percentage growth in maximum Good A output.

(A) Symmetric; 20%
(B) Asymmetric; 20%
(C) Symmetric; 26.7%
(D) Asymmetric; 26.7%

Lời giải chi tiết

Good A intercept: $\frac{96-80}{80} \times 100\% = 20\%$. Good B intercept: $\frac{48-40}{40} \times 100\% = 20\%$ — both axes grew by the **same** proportion, so this is a **symmetric** outward shift (an economy-wide improvement, not a sector-specific one). **(A)**.

Bài tập luyện tập

Classify each as a free good or an economic good, with reasoning: (a) seawater at a remote, uncrowded beach; (b) desalinated, bottled drinking water sold in a shop. (Short response.)

Lời giải chi tiết

(a) **Free good** — abundant relative to demand at that specific location, no opportunity cost to use it, and no market price. (b) **Economic good** — desalination, bottling, and distribution use scarce resources (energy, labour, capital) with a real opportunity cost, so it commands a market price.

Bài tập luyện tập

A hospital nurse wants to retrain as a data analyst after her ward is automated. Explain, using the concept of occupational mobility, one specific barrier she might face, and one policy that could reduce that barrier. (Short response.)

Lời giải chi tiết

Barrier: clinical nursing skills do not directly transfer to data-analysis skills (statistics, programming), so her **occupational mobility** is low without substantial retraining — a skills mismatch. **Policy:** government- or employer-funded retraining/requalification programmes (e.g. subsidised data-analytics courses) would directly raise her occupational mobility by building the specific skills the new role requires.

Bài tập luyện tập

Across many countries, nations with more mobile phones per capita tend to have higher GDP per capita. Explain why this correlation should not automatically be read as "mobile phones cause economic growth". (Short response.)

Lời giải chi tiết

The correlation could instead (or additionally) reflect **reverse causality** — richer countries can more easily afford widespread mobile-phone ownership, so higher GDP per capita could be causing higher phone ownership rather than the other way round. There could also be a **confounding variable** (e.g. overall institutional quality, infrastructure investment, or education levels) driving both higher incomes and higher phone adoption simultaneously. A single cross-country correlation, without controlling for these alternative explanations, cannot by itself establish that phones cause growth.

Ôn tập nhanh — Unit 1: (1) chi phí cơ hội = giá trị của phương án **tốt nhất** bị bỏ qua, không phải mọi thứ bị bỏ qua; (2) luôn gọi đúng tên **central concept** khi phân tích một tình huống/chính sách; (3) trên PPC — trong đường = kém hiệu quả, trên đường = hiệu quả sản xuất, ngoài đường = không thể đạt được; PPC lồi ra vì luật chi phí cơ hội tăng dần; PPC dịch ra ngoài = tăng trưởng thật (không phải di chuyển dọc theo đường); (4) $I + G + X$ so với $S + T + M$ quyết định thu nhập quốc dân tăng hay giảm; (5) không có hệ thống kinh tế nào tối ưu tuyệt đối — luôn có đánh đổi giữa **efficiency** và **equity**.

IB DIPLOMA PROGRAMME • Unit 2

Microeconomics

Mục tiêu Unit: Cầu và cung, cân bằng thị trường và cơ chế giá, thặng dư tiêu dùng/sản xuất; các loại độ co giãn (PED, YED, XED, PES) và tính toán; can thiệp của chính phủ (thuế, trợ cấp, kiểm soát giá); thất bại thị trường (ngoại tác, hàng hoá công, thông tin bất cân xứng — HL); và (HL) lý thuyết doanh nghiệp: chi phí, doanh thu, tối đa hoá lợi nhuận, và các cấu trúc thị trường.

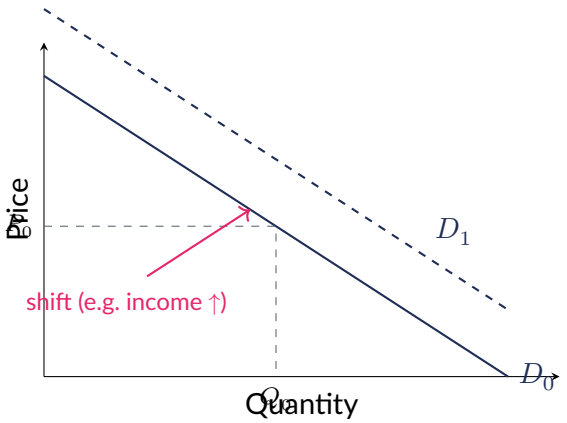
2.1 Demand

2.1.1 The law of demand and the demand curve

Demand is the quantity of a good or service that consumers are *willing and able* to buy at each possible price, over a given period of time, holding all other influences constant (*ceteris paribus*). The **law of demand** states that price and quantity demanded are inversely related: as price rises, quantity demanded falls, and vice versa — giving the demand curve its characteristic downward slope. Two effects explain this: the **substitution effect** (as a good becomes relatively more expensive, consumers switch to substitutes) and the **income effect** (a price rise reduces the real purchasing power of a given income, so consumers can afford less of the good, other things equal).

A **movement along** a fixed demand curve is caused only by a change in the good's *own price*. A **shift of the entire curve** is caused by a change in any *non-price determinant of demand*:

- Income (for a **normal good**, higher income shifts demand right; for an **inferior good**, higher income shifts demand left).
- Tastes and preferences (advertising, fashion, health information).
- Prices of related goods: **substitutes** (a rise in a substitute's price shifts this good's demand right) and **complements** (a rise in a complement's price shifts this good's demand left).
- Expectations of future prices or income.
- Population size/composition of the market.



A rise in a non-price determinant (e.g. consumer income, for a normal good) shifts the whole demand curve from D_0 to D_1 — more is demanded at *every* price, not just at the original price.

VN **GIẢI THÍCH TIẾNG VIỆT**

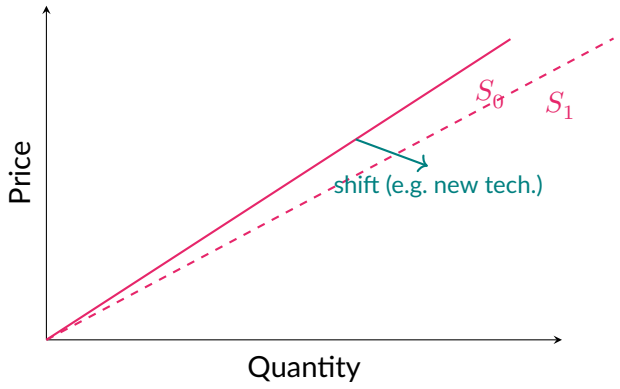
Luật cầu: giá và lượng cầu tỉ lệ nghịch ⇒ đường cầu dốc xuống, do **hiệu ứng thay thế** (hàng hoá đắt hơn khiến người mua chuyển sang hàng thay thế) và **hiệu ứng thu nhập** (giá tăng làm giảm sức mua thực tế). Thay đổi **giá** của chính hàng hoá đó gây **di chuyển dọc theo** đường cầu (movement); thay đổi các yếu tố khác (thu nhập, thị hiếu, giá hàng liên quan, kỳ vọng, dân số) gây **dịch chuyển** cả đường cầu (shift). Đây là một trong những lỗi phổ biến nhất trên đề thi — luôn phân biệt rõ "di chuyển" và "dịch chuyển".

2.2 Supply

Supply is the quantity of a good or service that firms are willing and able to sell at each possible price, over a given period. The **law of supply** gives an upward-sloping curve: at higher prices, producing and selling additional units becomes more profitable at the margin, so firms are willing to supply more.

Non-price determinants that **shift** the supply curve:

- Costs of factors of production (wages, rents, interest rates, raw material prices) — higher costs shift supply **left** (up).
- Technology — improved technology shifts supply **right** (down), lowering the cost of each unit produced.
- Government intervention: **indirect taxes** shift supply left; **subsidies** shift supply right (Section 2.6).
- Prices of other goods a firm could produce with the same resources.
- Number of firms in the market (entry shifts market supply right; exit shifts it left).
- Expectations of future prices.
- Weather/random shocks (particularly relevant for agricultural supply).



An improvement in production technology lowers costs at every output level, shifting supply from S_0 to S_1 — more is supplied at *every* price.

VN **GIẢI THÍCH TIẾNG VIỆT**

Luật cung: giá và lượng cung tỉ lệ thuận ⇒ đường cung dốc lên. Thay đổi giá của chính hàng hoá ⇒ **di chuyển dọc theo** đường cung; thay đổi các yếu tố khác (chi phí đầu vào, công nghệ, thuế/trợ cấp, số doanh nghiệp, thời tiết) ⇒ **dịch chuyển** cả đường cung. Công nghệ tốt hơn hoặc chi phí đầu vào rẻ hơn luôn dịch cung sang **phải** (cung nhiều hơn ở mọi mức giá).

2.3 Market equilibrium, the price mechanism, and surplus

2.3.1 Equilibrium and the functions of the price mechanism

Market equilibrium occurs at the price where quantity demanded exactly equals quantity supplied — there is no shortage, no surplus, and no tendency for price to change further. The **price mechanism** — the free interaction of demand and supply — performs three essential functions:

Khái niệm cốt lõi

- **Signalling function:** prices convey information about relative scarcity/abundance to both consumers and producers without any central coordination.
- **Incentive function:** prices reward and penalise behaviour — a higher price incentivises firms to supply more and consumers to consume less (and vice versa).
- **Rationing function:** because resources are scarce, prices allocate limited output to those consumers most willing and able to pay for it.

These three functions are how a decentralised market economy solves the central economic problem (what/how/for whom) without any single agency directing resources — the clearest expression of the central concept of **efficiency** operating through markets.

Solving for market equilibrium

A market is described by $Q_d = 200 - 5P$ and $Q_s = -40 + 10P$. Find the equilibrium price and quantity.

Set $Q_d = Q_s$:

$$200 - 5P = -40 + 10P \implies 240 = 15P \implies P^* = 16.$$

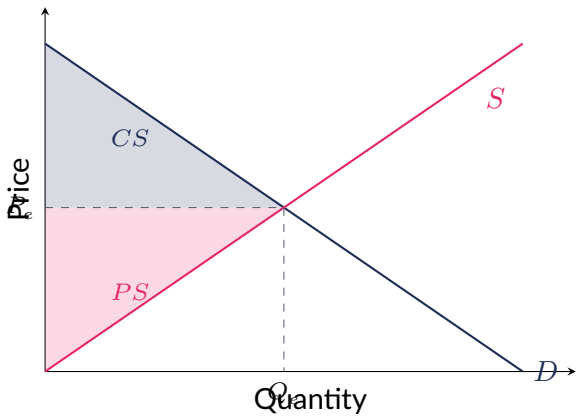
$$Q^* = 200 - 5(16) = 200 - 80 = 120. \quad \text{(check: } Q_s = -40 + 10(16) = -40 + 160 = 120. \checkmark)$$

VN **GIẢI THÍCH TIẾNG VIỆT**

Cân bằng thị trường là mức giá mà lượng cầu bằng lượng cung. Khi đề cho Q_d và Q_s theo dạng hàm của P, chỉ cần đặt $Q_d = Q_s$ và giải phương trình bậc nhất để tìm P^*, sau đó thay ngược lại để tìm Q^* — luôn kiểm tra bằng cách thay vào *cả hai* phương trình để chắc chắn không tính nhầm.

2.3.2 Consumer surplus and producer surplus

Consumer surplus is the difference between what consumers are *willing* to pay (shown by the height of the demand curve) and what they *actually* pay (the market price) — the area between the demand curve and the price line, up to the equilibrium quantity. **Producer surplus** is the difference between the price producers *actually receive* and the minimum price at which they were willing to supply (shown by the height of the supply curve) — the area between the price line and the supply curve. Together, consumer surplus + producer surplus = **total (community/social) surplus**, a standard measure of the welfare a market generates.



Consumer surplus (CS, above price line, below demand) and producer surplus (PS, below price line, above supply) at equilibrium.

Calculating consumer and producer surplus

$D: P = 20 - Q$, $S: P = 2 + Q$. Find equilibrium, then consumer surplus and producer surplus.

Equilibrium: $20 - Q = 2 + Q \implies 18 = 2Q \implies Q_e = 9,\ P_e = 11$.

$$CS = \tfrac{1}{2} \times Q_e \times (P_{\text{intercept}} - P_e) = \tfrac{1}{2} \times 9 \times (20 - 11) = \tfrac{1}{2} \times 9 \times 9 = 40.5.$$

$$PS = \tfrac{1}{2} \times Q_e \times (P_e - P_{\text{intercept}}) = \tfrac{1}{2} \times 9 \times (11 - 2) = \tfrac{1}{2} \times 9 \times 9 = 40.5.$$

Total surplus $= 40.5 + 40.5 = 81$. (Each surplus is the area of a right-angled triangle: $\frac{1}{2} \times$ base $\times$ height.)

VN **GIẢI THÍCH TIẾNG VIỆT**

Thặng dư tiêu dùng (CS) và thặng dư sản xuất (PS) đều là diện tích tam giác vuông: $\frac{1}{2} \times$đáy$\times$chiều cao, với đáy luôn là Q_e. CS đo phần "lợi" người tiêu dùng nhận được (sẵn sàng trả nhiều hơn giá thị trường); PS đo phần "lợi" người sản xuất nhận được (bán được giá cao hơn mức tối thiểu họ chấp nhận). Tổng $CS + PS$ là thước đo phúc lợi xã hội tại điểm cân bằng — sẽ giảm đi (tổn thất phúc lợi) bất cứ khi nào có thất bại thị trường hoặc can thiệp làm lượng giao dịch lệch khỏi Q_e.

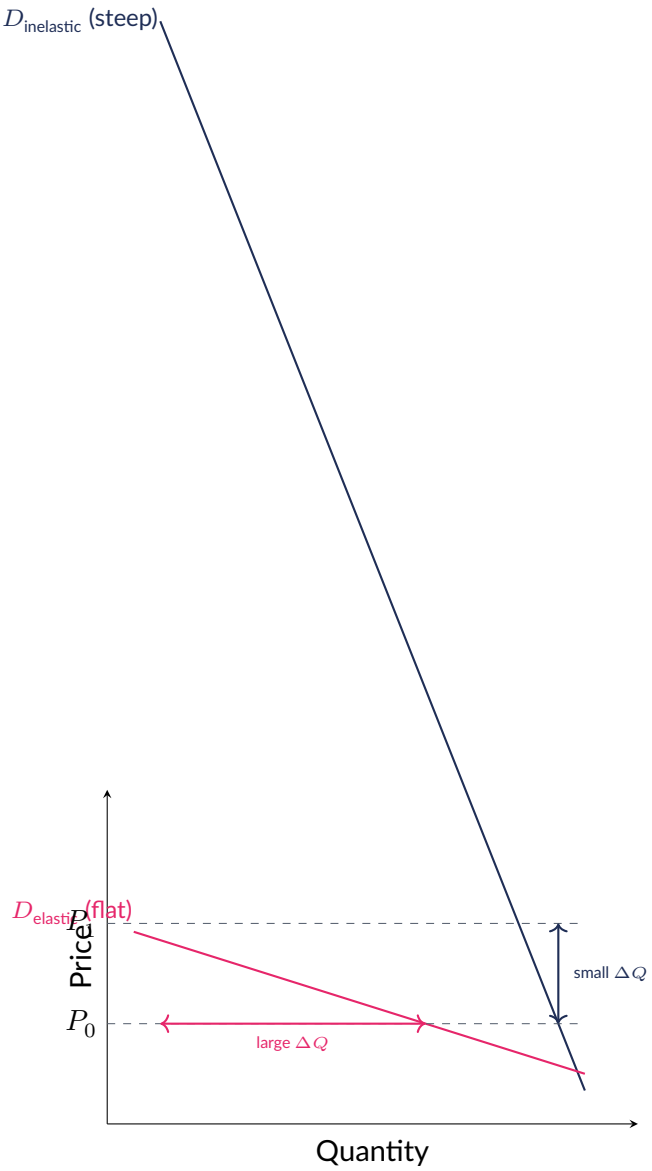
2.4 Elasticity

2.4.1 Price elasticity of demand (PED)

Price elasticity of demand measures how responsive quantity demanded is to a change in the good's own price.

$$PED = \frac{\%\Delta Q_d}{\%\Delta P}$$

PED is always negative (or zero) because of the law of demand, but economists conventionally compare its **absolute value**: $|PED| > 1$ — **relatively elastic**; $|PED| < 1$ — **relatively inelastic**; $|PED| = 1$ — **unitary elastic**; $|PED| = 0$ — **perfectly inelastic** (vertical); $|PED| = \infty$ — **perfectly elastic** (horizontal). Determinants: number/closeness of substitutes (more substitutes $\Rightarrow$ more elastic), proportion of income spent on the good, degree of necessity (necessities are less elastic than luxuries), and time horizon (demand becomes more elastic the longer consumers have to adjust).



The same price fall from P_1 to P_0 produces only a small quantity response on the steep (inelastic) curve, but a large quantity response on the flat (elastic) curve.

PED and total revenue

Price rises from \$10 to \$12 (a 20% increase) and quantity demanded falls from 100 to 90 units (a 10% decrease).

$$PED = \frac{-10\%}{+20\%} = -0.5 \implies |PED| < 1 \text{ (relatively inelastic)}.$$

$TR_0 = 10 \times 100 = \$1000$. $TR_1 = 12 \times 90 = \$1080$. Because demand is inelastic, the price rise *increases* total revenue.

PED and total revenue — the general rule:

- If demand is **inelastic** ($|PED| < 1$): a price rise *increases* TR; a price fall *decreases* TR.
- If demand is **elastic** ($|PED| > 1$): a price rise *decreases* TR; a price fall *increases* TR.
- If demand is **unitary elastic** ($|PED| = 1$): TR is unchanged (maximised) by a small price change.

The midpoint (arc) elasticity method

Given $Q_d = 200 - 5P$, price rises from \$20 to \$24. Using the midpoint (arc) formula — which avoids the ambiguity of choosing a base value — find PED.

Q at \$20: $200 - 100 = 100$. Q at \$24: $200 - 120 = 80$.

$$\%\Delta Q = \frac{80 - 100}{(100 + 80)/2} = \frac{-20}{90} \approx -22.2\%, \qquad \%\Delta P = \frac{24 - 20}{(20 + 24)/2} = \frac{4}{22} \approx 18.2\%.$$

$$PED = \frac{-22.2\%}{18.2\%} \approx -1.22 \quad \text{(relatively elastic)}.$$

VN **GIẢI THÍCH TIẾNG VIỆT**

PED luôn mang dấu âm — người ta thường chỉ so sánh **giá trị tuyệt đối**. Đường cầu càng **dốc** (steep) thì càng **kém co giãn** (inelastic); càng **thoải** (flat) thì càng **co giãn** (elastic). Quy tắc doanh thu: cầu **kém co giãn** ⇒ tăng giá làm **tăng** TR; cầu **co giãn** ⇒ tăng giá làm **giảm** TR. Phương pháp **điểm giữa** (midpoint/arc) dùng trung bình của hai giá trị đầu-cuối làm mẫu số, tránh việc kết quả phụ thuộc vào việc chọn điểm đầu hay điểm cuối làm gốc.

2.4.2 Income elasticity of demand (YED)

Income elasticity of demand measures the responsiveness of quantity demanded to a change in consumer income.

$$YED = \frac{\%\Delta Q_d}{\%\Delta Y}$$

$YED > 1$: **income-elastic / luxury good**. $0 < YED < 1$: **income-inelastic / necessity**. $YED < 0$: **inferior good** (demand falls as income rises). $YED > 0$ generally: **normal good**.

Calculating YED

Average household income rises from \$40,000 to \$44,000 per year (a 10% increase), and quantity demanded of a good rises from 200 to 224 units (a 12% increase).

$$YED = \frac{+12\%}{+10\%} = 1.2.$$

Since $YED > 1$, this is a **luxury (income-elastic) good** — demand rises *proportionally more* than income.

VN **GIẢI THÍCH TIẾNG VIỆT**

$YED > 1$ là hàng xa xỉ (luxury) — cầu tăng nhanh hơn thu nhập; $0 < YED < 1$ là hàng thiết yếu (necessity) — cầu vẫn tăng nhưng chậm hơn thu nhập; $YED < 0$ là hàng thứ cấp (inferior good) — cầu **giảm** khi thu nhập tăng (ví dụ: mì ăn liền, xe buýt, khi thu nhập tăng người ta

chuyển sang hàng "tốt hơn"). YED rất quan trọng để dự báo cơ cấu ngành khi một quốc gia tăng trưởng — ngành có YED cao sẽ tăng trưởng nhanh hơn GDP.

2.4.3 Cross elasticity of demand (XED)

Cross elasticity of demand measures how the quantity demanded of one good (A) responds to a change in the price of *another* good (B).

$$XED = \frac{\%\Delta Q_{d,A}}{\%\Delta P_B}$$

$XED > 0$: A and B are **substitutes** (a rise in P_B raises demand for A). $XED < 0$: A and B are **complements** (a rise in P_B lowers demand for A). The larger $|XED|$, the closer/stronger the substitute or complement relationship.

Calculating XED

The price of butter rises by 10%. As a result, quantity demanded of margarine (a substitute) rises by 4%.

$$XED = \frac{+4\%}{+10\%} = +0.4.$$

Since $XED > 0$, butter and margarine are **substitutes** — but the relatively small magnitude (0.4) suggests they are not extremely close substitutes for these consumers (compare to, say, two nearly identical store-brand products, which would have XED much closer to $+1$ or higher).

VN **GIẢI THÍCH TIẾNG VIỆT**

$XED > 0$: hai hàng hoá là **hàng thay thế** (substitutes) — ví dụ bơ và margarine, Coca-Cola và Pepsi. $XED < 0$: hai hàng hoá là **hàng bổ sung** (complements) — ví dụ máy in và mực in, xe hơi và xăng. Giá trị tuyệt đối của XED càng lớn thì mối quan hệ thay thế/bổ sung càng chặt.

2.4.4 Price elasticity of supply (PES)

Price elasticity of supply measures the responsiveness of quantity supplied to a change in a good's own price.

$$PES = \frac{\%\Delta Q_s}{\%\Delta P}$$

PES is normally positive (law of supply). Determinants: spare production capacity, ease of storing output/stock, mobility of factors of production between uses, time period (supply is more elastic in the long run, as firms can fully adjust capital and entry/exit), and — for agriculture/extractive industries — the length of the production period and dependence on natural conditions.

Calculating PES

The price of a manufactured good rises by 15%, and quantity supplied rises by 9%.

$$PES = \frac{+9\%}{+15\%} = 0.6.$$

Since $PES < 1$, supply is **relatively inelastic** — perhaps because firms are already close to full capacity and cannot quickly expand production even at higher prices.

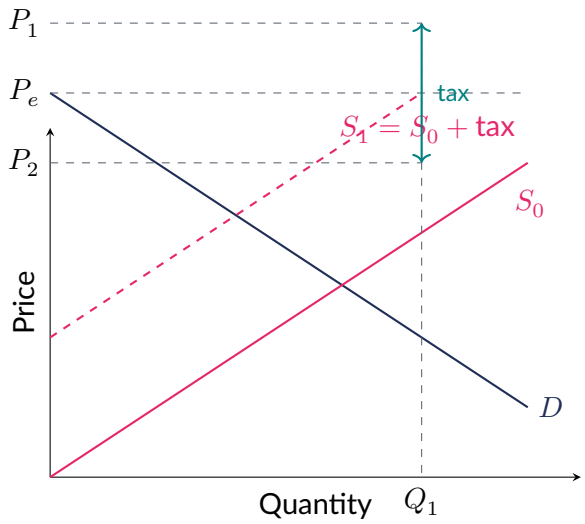
VN **GIẢI THÍCH TIẾNG VIỆT**

PES đo mức nhạy cảm của lượng cung theo giá. Cung thường **co giãn hơn trong dài hạn** vì doanh nghiệp có thời gian mở rộng nhà máy, tuyển thêm lao động, hoặc doanh nghiệp mới gia nhập ngành. Hàng hoá dễ lưu trữ hoặc còn dư công suất sản xuất thường có PES cao hơn; nông sản theo mùa vụ, tài nguyên khai thác có nguồn cung hạn chế thường có PES thấp trong ngắn hạn.

2.5 Government intervention in markets

2.5.1 Indirect taxes

An **indirect tax** is a tax on spending, collected from producers but usually passed on, at least partly, to consumers through a higher price. A **specific tax** is a fixed amount per unit (e.g. $2 per litre); an **ad valorem tax** is a percentage of the price (e.g. 10% VAT), which — unlike a specific tax — causes the vertical gap between S_0 and the taxed curve S_1 to widen as price rises. Either way, an indirect tax shifts supply **up/left**, raising the price consumers pay and lowering the (net-of-tax) price producers keep.



A specific tax of \$4/unit on $D: P = 11 - Q$, $S_0: P = Q$ (pre-tax $P_e = Q_e = 5.5$; here relabelled for clarity as $P_e = 11$-scale figure): the taxed curve S_1 lies above S_0 by the tax amount; consumer price rises to P_1, producer keeps $P_2 = P_1 -$ tax, and quantity falls to Q_1.

Tax incidence and deadweight loss

$D: P = 20 - Q$, $S_0: P = 2 + Q$. A specific tax of \$4/unit is imposed.

Pre-tax equilibrium: $20 - Q = 2 + Q \implies Q_e = 9,\ P_e = 11$.
Taxed supply: $S_1: P = 2 + 4 + Q = 6 + Q$. New equilibrium: $20 - Q = 6 + Q \implies 14 = 2Q \implies Q_1 = 7$.
Consumer price $P_1 = 20 - 7 = 13$. Producer keeps $P_2 = P_1 - \text{tax} = 13 - 4 = 9$ (check: S_0 at $Q = 7$ gives $P = 2 + 7 = 9$ ✓)

$$\text{Consumer burden} = P_1 - P_e = 13 - 11 = 2, \qquad \text{Producer burden} = P_e - P_2 = 11 - 9 = 2.$$

Tax revenue $= \text{tax} \times Q_1 = 4 \times 7 = \$28$, split \$14 from consumers / \$14 from producers (equal split here because D and S have equal-magnitude slopes).

$$\text{Deadweight loss} = \tfrac{1}{2} \times (Q_e - Q_1) \times \text{tax} = \tfrac{1}{2} \times (9 - 7) \times 4 = \$4.$$

This \$4 deadweight loss is surplus that existed at $Q_e = 9$ but disappears once the tax shrinks trade to $Q_1 = 7$ — trade in those two "lost" units would have created mutual benefit, but the tax makes them no longer worthwhile.

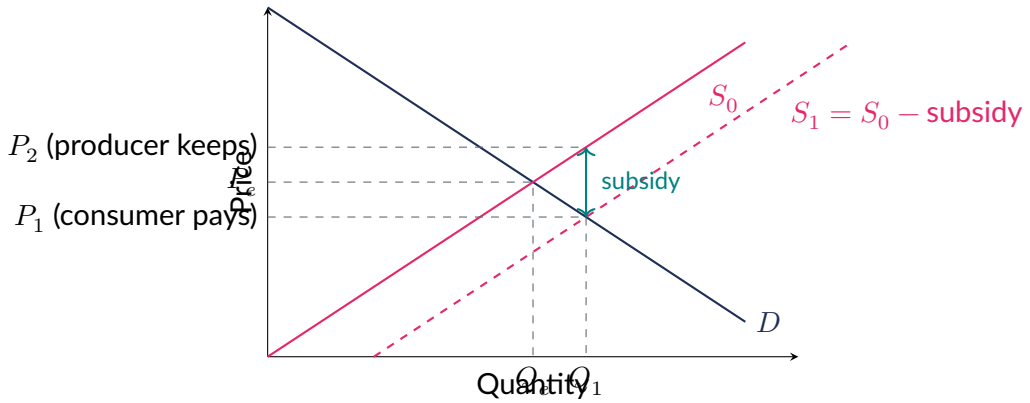
Tax incidence rule: the side of the market with the *more inelastic* (relatively less responsive) curve bears the *larger* share of a tax, because that side can least reduce its quantity in response to the price change and so has the least ability to avoid the tax.

VN **GIẢI THÍCH TIẾNG VIỆT**

Thuế gián thu (indirect tax) làm dịch đường cung lên/sang trái, khiến người mua trả giá cao hơn và người bán nhận giá thấp hơn. Ai chịu **gánh nặng thuế** (tax incidence) nhiều hơn phụ thuộc vào **độ co giãn**: bên nào **kém co giãn hơn** (khó điều chỉnh lượng hơn) sẽ chịu phần lớn hơn của thuế. **Tổn thất phúc lợi ròng** (deadweight loss) là phần thặng dư xã hội mất đi vì lượng giao dịch giảm xuống dưới mức hiệu quả Q_e — công thức là diện tích tam giác $\frac{1}{2} \times \Delta Q \times$ thuế.

2.5.2 Subsidies

A **subsidy** is a payment from the government to producers (per unit, or as a lump sum), which shifts supply **down/right** — the reverse of a tax — lowering the price consumers pay and raising the effective price producers receive, while increasing the equilibrium quantity.



A \$2/unit subsidy on $D: P = 10 - Q$, $S_0: P = Q$: pre-subsidy $P_e = Q_e = 5$; consumer price falls to $P_1 = 4$, producer receives $P_2 = 6$, quantity rises to $Q_1 = 6$; the gain is split \$1/\$1 (equal slopes).

[HL ONLY] Subsidy incidence with unequal elasticities

$Q_d = 100 - 4P$, $Q_s = -20 + 6P$. A \$5/unit subsidy is granted to producers. Find the pre- and post-subsidy equilibria, the split of the subsidy's benefit, and explain the split using elasticity.

Pre-subsidy equilibrium: $100 - 4P = -20 + 6P \implies 120 = 10P \implies P_e = 12,\ Q_e = 100 - 48 = 52$.

Elasticities at this point: $PED = \frac{dQ_d}{dP} \times \frac{P}{Q} = (-4) \times \frac{12}{52} \approx -0.92$ (inelastic). $PES = \frac{dQ_s}{dP} \times \frac{P}{Q} = (6) \times \frac{12}{52} \approx 1.38$ (elastic). Demand is **more inelastic** than supply.

New supply curve (firms need \$5 less at each quantity, so at any market price P_m they now supply as much as they would previously have supplied at $P_m + 5$): $Q_s^{\text{new}}(P_m) = -20 + 6(P_m + 5) = 10 + 6P_m$.

New equilibrium: $100 - 4P_m = 10 + 6P_m \implies 90 = 10P_m \implies P_m = 9,\ Q_1 = 100 - 36 = 64$.

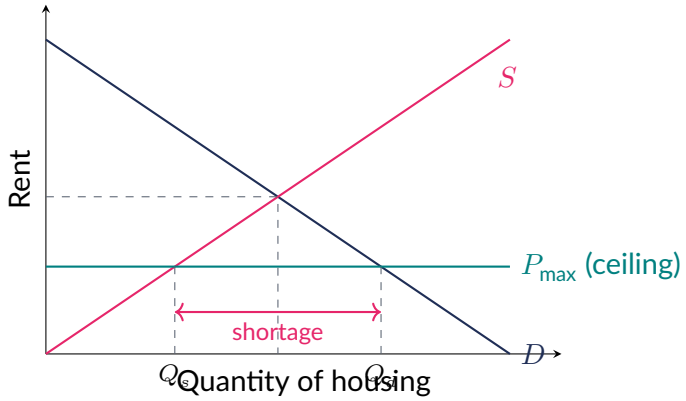
Consumer price falls from \$12 to \$9: consumers gain **\$3** per unit. Producer receives $P_m + 5 = 9 + 5 = 14$, up from \$12: producers gain **\$2** per unit ($\$3 + \$2 = \$5$ ✓, the full subsidy). Because demand was the *more inelastic* side, **consumers** capture the larger share of the subsidy's benefit — the mirror image of the tax-incidence rule.

VN **GIẢI THÍCH TIẾNG VIỆT**

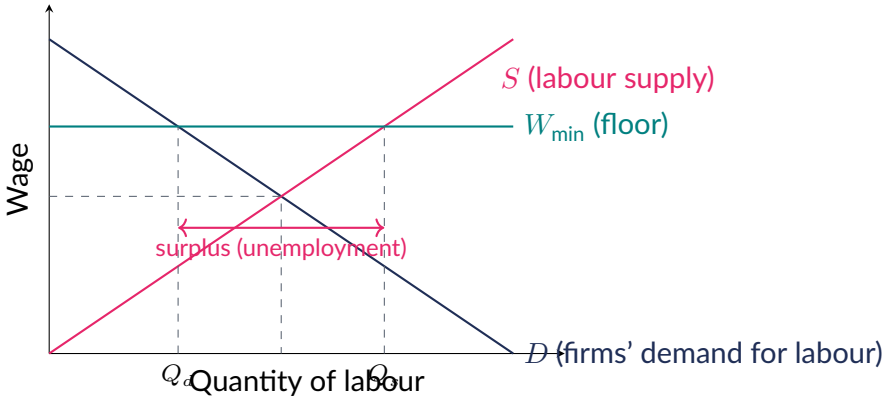
Trợ cấp (subsidy) làm dịch đường cung xuống/sang phải, giá người mua trả giảm, giá người bán nhận tăng, lượng giao dịch tăng. Phần lợi ích của trợ cấp cũng chia theo quy tắc độ co giãn: bên nào **kém co giãn hơn** sẽ nhận phần **lớn hơn** của lợi ích trợ cấp — giống hệt quy tắc gánh thuế nhưng áp dụng cho lợi ích thay vì gánh nặng.

2.5.3 Price controls: ceilings and floors

A **price ceiling** (maximum price) set *below* equilibrium — e.g. rent controls, price caps on essential medicines — creates a persistent **shortage**, since $Q_d > Q_s$ at that price; because the price cannot rise to clear the market, non-price rationing (queues, waiting lists, black markets) often emerges instead. A **price floor** (minimum price) set *above* equilibrium — e.g. a minimum wage, or an agricultural support price — creates a persistent **surplus**, since $Q_s > Q_d$; governments sometimes address agricultural surpluses through a **buffer stock scheme** (buying and storing the excess to prevent the price collapsing, then releasing stock in years of low supply to prevent price spikes).



Price ceiling below equilibrium: $Q_s < Q_d$ at P_{max}, a persistent **shortage**.



A minimum wage set above the equilibrium wage: $Q_s > Q_d$, a persistent **surplus** of labour — i.e. unemployment among those willing to work at W_{min} but not hired.

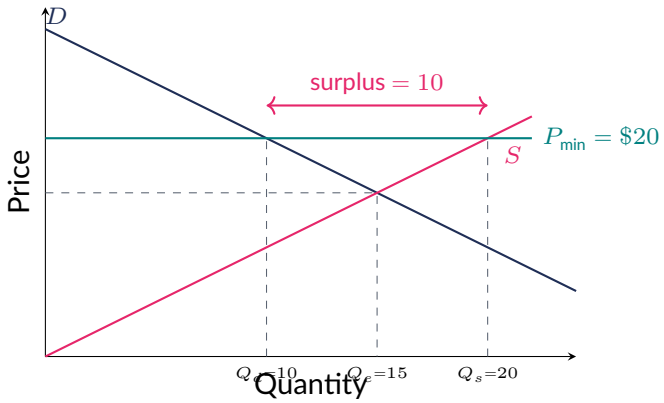
Quantifying a price ceiling and a price floor

Ceiling: $Q_d = 200 - 4P$, $Q_s = -40 + 6P$. Equilibrium: $200 - 4P = -40 + 6P \implies 240 = 10P \implies P_e = 24$, $Q_e = 104$. A price ceiling is set at $P_{\text{max}} = 18$: $Q_d = 200 - 72 = 128$; $Q_s = -40 + 108 = 68$. **Shortage** $= 128 - 68 = 60$ units.

Floor (minimum wage): $Q_d = 1000 - 20W$, $Q_s = -200 + 30W$. Equilibrium: $1000 - 20W = -200 + 30W \implies 1200 = 50W \implies W_e = 24$, $Q_e = 520$. A minimum wage is set at $W_{\text{min}} = 30$: $Q_d = 1000 - 600 = 400$; $Q_s = -200 + 900 = 700$. **Surplus** (unemployment) $= 700 - 400 = 300$ workers.

VN **GIẢI THÍCH TIẾNG VIỆT**

Trần giá (*price ceiling*) đặt **dưới** giá cân bằng ⇒ **thiếu hụt** (shortage) vì $Q_d > Q_s$ — ví dụ kiểm soát giá thuê nhà, giá thuốc thiết yếu; do giá không được tăng để cân bằng thị trường, thường xuất hiện cơ chế phân phối phi giá cả (xếp hàng, danh sách chờ, chợ đen). Sàn giá (*price floor*) đặt **trên** giá cân bằng ⇒ **dư thừa** (surplus) — ví dụ lương tối thiểu (dư thừa lao động = thất nghiệp), giá sàn nông sản (dư thừa nông sản, chính phủ có thể áp dụng **chương trình dự trữ đệm** — buffer stock — mua vào lúc dư thừa, bán ra lúc thiếu hụt để ổn định giá).



The buffer stock market from the worked example below: at the floor price $P_{\text{min}} = \$20$ (above $P_e = \$15$), quantity supplied (20) exceeds quantity demanded (10), a surplus of 10 units that the buffer stock authority buys up to defend the floor.

Buffer stock scheme for an agricultural market

A market for an agricultural commodity is described by $D: P = 30 - Q$ and $S: P = Q$. The government sets a minimum (floor) price of \$20 to support farmers and commits to buying up any resulting surplus as part of a **buffer stock scheme**. Find the free-market equilibrium, the surplus at the floor price, and the cost of the government's purchase.

Free-market equilibrium: $30 - Q = Q \implies 30 = 2Q \implies Q_e = 15,\ P_e = 15$.
At the floor price $P = \$20$ (above $P_e = 15$, as a price floor must be): $Q_d = 30 - 20 = 10$; $Q_s = 20$ (from $S: P = Q$, at $P = 20$, $Q_s = 20$).

$$\text{Surplus} = Q_s - Q_d = 20 - 10 = 10 \text{ units}.$$

To maintain the \$20 floor, the buffer stock authority must buy the entire 10-unit surplus at \$20/unit:

$$\text{Cost to government} = 10 \times \$20 = \$200.$$

The government then **stores** this 10-unit stock. In a future year of poor harvest (supply shifts left, and price would otherwise spike well above \$20), the authority can **release** the stored

stock back onto the market, adding to supply and preventing the price spike — stabilising price for both consumers (who avoid a price spike) and producers (who avoid a price collapse in surplus years), taking the two years together. This benefit is not free, however: the scheme carries an ongoing **storage/financing cost** (warehousing, insurance, interest on the funds tied up in unsold stock) for as long as the stock is held, and — because this example concerns a perishable agricultural good — a real risk of **spoilage**, meaning some of the \$200 spent buying the surplus may ultimately be wasted rather than recovered when the stock is later resold.

VN **GIẢI THÍCH TIẾNG VIỆT**

Chương trình dự trữ đệm (buffer stock scheme) cho nông sản: khi chính phủ đặt **giá sàn** trên giá cân bằng, lượng cung vượt lượng cầu (dư thừa) — trong ví dụ trên, dư thừa $= 10$ đơn vị, chính phủ phải chi $10 \times \$20 = \$200$ để mua hết phần dư thừa này và **lưu kho**. Vào năm mất mùa (cung giảm, giá có nguy cơ tăng vọt), chính phủ **bán ra** lượng dự trữ này để giữ giá ổn định — có lợi cho cả người tiêu dùng (tránh giá tăng vọt) lẫn người sản xuất (tránh giá sụp đổ khi được mùa). Tuy nhiên, chương trình này tốn **chi phí lưu kho/tài chính** liên tục, và với nông sản dễ hư hỏng, còn có rủi ro **hao hụt/hư hỏng** hàng dự trữ — một phần chi phí \$200 bỏ ra ban đầu có thể không thu hồi lại được.

Buffer stock schemes work best for **storable** commodities (e.g. grains, minerals) whose price is subject to large year-to-year supply volatility (e.g. weather-dependent harvests) — precisely the conditions under which the price-stabilising benefit is largest relative to the storage cost. They are far less suited to genuinely **perishable** goods (e.g. fresh fruit, dairy), where a large share of any stored surplus may simply spoil before it can be released, or to goods whose **price volatility is low** to begin with, where the stabilisation benefit would not be worth the ongoing administrative and storage cost. Historical examples include international commodity agreements covering goods such as tin, coffee, and cocoa, alongside national grain reserves still maintained by many governments today — though several such schemes have run into difficulty once accumulated stocks grew too large for the available financing to sustain, a practical illustration of the storage-cost limits described above.

Releasing the buffer stock in a poor-harvest year

Continuing the same market: the following year, a poor harvest shifts private supply to S' : $P = Q + 14$ (farmers now need \$14 more per unit at each quantity, reflecting the harvest shock), while demand is unchanged, $D : P = 30 - Q$. Find what the free-market price would be *without* any intervention, then find how many units of the government's stored stock must be **released** to hold price at the original \$20 target, and how much of the original 10-unit stockpile remains afterward.

Without intervention: $30 - Q = Q + 14 \implies 16 = 2Q \implies Q = 8,\ P = 30 - 8 = \$22$ — the harvest shock alone would push the price *above* the \$20 target.
Holding price at the \$20 target: at $P = 20$, private farmers (using S') are willing to supply only $20 = Q + 14 \implies Q = 6$. But quantity demanded at $P = 20$ is $Q_d = 30 - 20 = 10$.

$$\text{Shortfall to be filled from the stockpile} = Q_d - Q_{\text{private}} = 10 - 6 = 4 \text{ units.}$$

The buffer stock authority releases 4 units from storage, raising total quantity available at \$20 to $6 + 4 = 10$, exactly matching demand and holding the price at the \$20 target instead of letting it spike to \$22. Since only 10 units were stored in the earlier surplus year, $10 - 4 = 6$ units remain in reserve — this two-year sequence (buying 10 units in the surplus year, then

releasing 4 of them in the shortage year) is exactly how a buffer stock scheme smooths price for both consumers and producers over time, at the cost of financing and storing the stock in between.

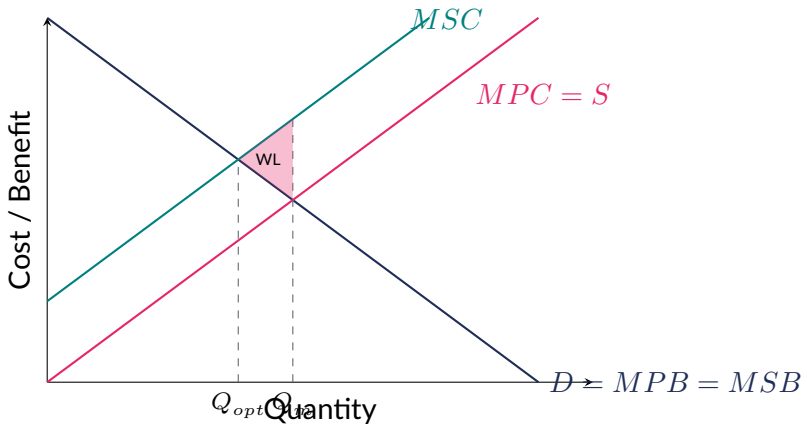
VN **GIẢI THÍCH TIẾNG VIỆT**

Ở năm mất mùa, cung tư nhân giảm (đường cung dịch lên) khiến giá có nguy cơ tăng vượt mức mục tiêu (ở đây là \$22 thay vì mục tiêu \$20). Chính phủ **bán ra** một phần kho dự trữ (4 trong số 10 đơn vị đã mua ở năm dư thừa trước đó) để bù đắp phần thiếu hụt, giữ giá ở đúng mức mục tiêu \$20 — còn lại 6 đơn vị trong kho cho các năm sau. Đây là minh hoạ đầy đủ cả hai chiều của chương trình dự trữ đệm: **mua vào** khi dư thừa và **bán ra** khi thiếu hụt, giúp ổn định giá cho cả người mua lẫn người bán qua nhiều năm.

2.6 Market failure

2.6.1 Externalities: negative production

Market failure occurs whenever the free market fails to allocate resources efficiently — typically because the price paid/received by private agents (**private cost/benefit**) diverges from the true cost/benefit to **society** (**social cost/benefit**). An **externality** is a cost or benefit imposed on a third party who is not part of the original transaction. A **negative externality of production** (e.g. factory pollution) means marginal social cost (MSC) exceeds marginal private cost ($MPC = S$); the market over-produces at Q_m relative to the socially optimal Q_{opt} (where $MSB = MSC$), creating a welfare loss.



Negative production externality: the market produces Q_m (where $D = MPC$) instead of the socially optimal Q_{opt} (where $D = MSC$). The shaded triangle is the welfare loss from over-production.

Quantifying a negative production externality

$MPC = S:\ P = Q$. $MSC:\ P = Q + 6$ (a constant external cost of \$6/unit, e.g. pollution damage). $D = MSB:\ P = 24 - Q$. Find the market quantity, the socially optimal quantity, and the resulting welfare loss.

Market equilibrium (where $D = MPC$): $24 - Q = Q \implies Q_m = 12,\ P = 12$.
Social optimum (where $D = MSC$): $24 - Q = Q + 6 \implies 18 = 2Q \implies Q_{opt} = 9$.
At $Q_m = 12$: $MSC = 12 + 6 = 18$; $MSB = 24 - 12 = 12$. Gap $= MSC - MSB = 18 - 12 = 6$.

$$\text{Welfare loss} = \tfrac{1}{2} \times (Q_m - Q_{opt}) \times (\text{gap at } Q_m) = \tfrac{1}{2} \times (12 - 9) \times 6 = \$9.$$

The market over-produces by $Q_m - Q_{opt} = 3$ units, each imposing an unpriced external cost

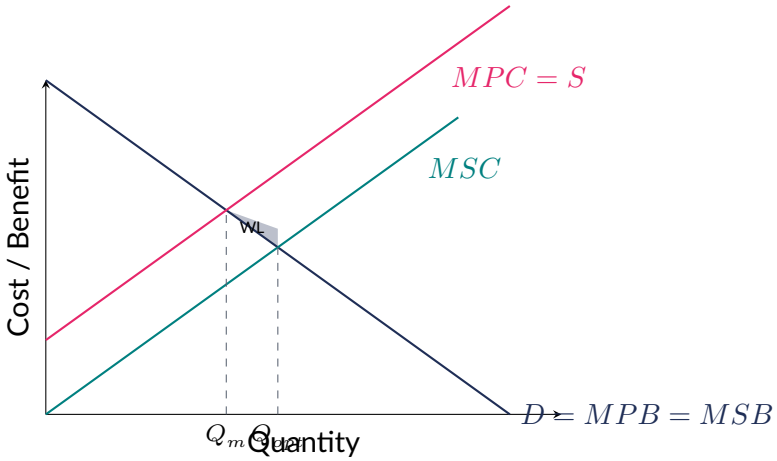
— the shaded welfare-loss triangle.

VN **GIẢI THÍCH TIẾNG VIỆT**

Ngoại tác tiêu cực trong sản xuất (negative production externality): chi phí xã hội biên MSC lớn hơn chi phí tư nhân biên MPC (vì có chi phí ngoại tác không được tính vào giá — ví dụ ô nhiễm) $\Rightarrow$ thị trường tự do sản xuất **quá nhiều** ($Q_m > Q_{opt}$), gây tổn thất phúc lợi (welfare loss) — diện tích tam giác giữa MSC và MSB trong khoảng từ Q_{opt} đến Q_m.

2.6.2 Externalities: positive production, and consumption externalities

A **positive externality of production** (e.g. staff training that raises productivity at other firms when workers later move jobs, or R&D with spillover benefits) means $MSC < MPC$ — the market **under**-produces relative to Q_{opt}.



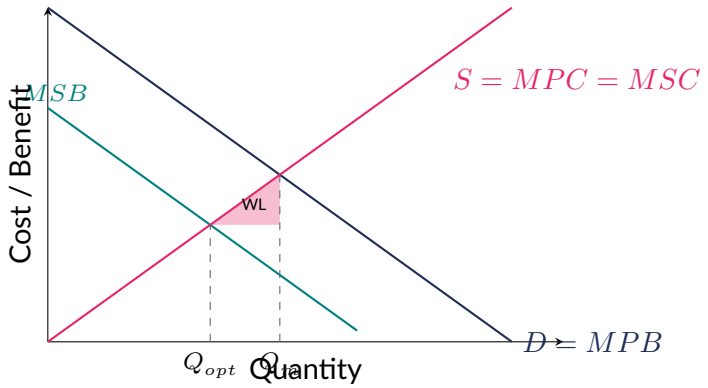
Positive production externality: $MSC < MPC$, so the market under-produces ($Q_m < Q_{opt}$). The shaded triangle is the forgone (unrealised) welfare from under-production.

Under-provision from a positive production externality

$MPC = S:\ P = Q + 10$. $MSC:\ P = Q + 4$ (the externality lowers social cost by \$6/unit, e.g. external productivity spillovers from staff training). $D = MPB = MSB:\ P = 20 - Q$.

Market equilibrium ($D = MPC$): $20 - Q = Q + 10 \implies 10 = 2Q \implies Q_m = 5$.
Social optimum ($D = MSC$): $20 - Q = Q + 4 \implies 16 = 2Q \implies Q_{opt} = 8$.
Since $Q_{opt} = 8 > Q_m = 5$, the market **under-provides** training relative to the socially optimal level — consistent with a positive production externality, and the standard justification for government subsidies to training/R&D.

A **negative externality of consumption** (e.g. cigarette smoking, harming bystanders through second-hand smoke) means $MSB < MPB$ — private benefit overstates the true social benefit, and the market **over**-consumes (a **demerit good**). A **positive externality of consumption** (e.g. education, vaccination) means $MSB > MPB$ — the market **under**-consumes relative to the social optimum (a **merit good**).



Negative consumption externality (demerit good): $MSB < MPB$, so the market over-consumes ($Q_m > Q_{opt}$).

Over-consumption of a demerit good

$D = MPB:\ P = 20 - Q$. $MSB:\ P = 14 - Q$ (consumption imposes a \$6/unit external cost on others, e.g. second-hand smoke and public healthcare costs). $S = MPC = MSC:\ P = Q$.

Market equilibrium ($D = S$): $20 - Q = Q \implies Q_m = 10,\ P = 10$.
Social optimum ($MSB = MSC$): $14 - Q = Q \implies Q_{opt} = 7$.
$Q_m = 10 > Q_{opt} = 7$: the market **over-consumes** by 3 units — consistent with a negative consumption externality.

Under-consumption of a merit good, with welfare loss

$D = MPB:\ P = 16 - Q$. $MSB:\ P = 22 - Q$ (consumption generates a \$6/unit external benefit, e.g. vaccination reducing disease transmission to others). $S = MPC = MSC:\ P = Q$.

Market equilibrium ($D = S$): $16 - Q = Q \implies Q_m = 8,\ P = 8$.
Social optimum ($MSB = MSC$): $22 - Q = Q \implies Q_{opt} = 11$.
At $Q_m = 8$: $MSB = 22 - 8 = 14$; $MSC = 8$. Gap $= 6$.

$$\text{Welfare loss} = \tfrac{1}{2} \times (Q_{opt} - Q_m) \times (\text{gap at } Q_m) = \tfrac{1}{2} \times (11 - 8) \times 6 = \$9.$$

The market **under-consumes** by 3 units relative to Q_{opt}, losing \$9 of potential social surplus — the standard justification for subsidising or mandating vaccination.

VN GIẢI THÍCH TIẾNG VIỆT

Ngoại tác trong tiêu dùng: nếu $MSB < MPB$ (ví dụ hút thuốc gây hại người xung quanh) ⇒ **tiêu dùng quá nhiều** — gọi là **hàng hoá gây hại** (demerit good). Nếu $MSB > MPB$ (ví dụ giáo dục, tiêm chủng có lợi cho cả xã hội) ⇒ **tiêu dùng quá ít** — gọi là **hàng hoá thiết yếu về mặt xã hội** (merit good). Bốn dạng ngoại tác (sản xuất/tiêu dùng × tích cực/tiêu cực) đều có chung logic: khi giá tư nhân không phản ánh đúng chi phí/lợi ích xã hội, lượng thị trường sẽ lệch khỏi mức tối ưu Q_{opt}, gây tổn thất phúc lợi.

Correcting externalities

Government responses include: **indirect (Pigouvian) taxes** on negative externalities (shifting MPC up toward MSC); **subsidies** for positive externalities (shifting MPC down toward MSC, or directly lowering the price consumers pay for merit goods); **regulation/legislation** (bans, minimum standards, advertising restrictions); **tradable permits** (capping total pollution

and letting firms trade the right to pollute, so abatement happens where it is cheapest); **direct provision** (government supplies the good directly, common for merit goods and public goods); and **education/advertising campaigns** that shift the demand curve itself by changing perceived private benefit.

(!) Lỗi thường gặp: Do not simply state "the government should tax pollution" without addressing the practical difficulty of setting the *correct* tax: regulators rarely know the true monetary value of an externality, so a tax set too low leaves some over-production; a tax set too high causes under-production and an unnecessary new deadweight loss. This is a common evaluation point examiners reward.

2.6.3 Public goods, common-pool resources, and asymmetric information

Public goods (e.g. national defence, street lighting, flood defences) are **non-excludable** (impossible/impractical to stop anyone from consuming them once provided) and **non-rivalrous** (one person's consumption does not reduce what is available to others). These two properties together create the **free-rider problem**: because no one can be forced to pay for something they cannot be excluded from, private firms have no profitable way to supply public goods, so free markets provide **none** of them — a complete market failure requiring government (direct provision or funding via general taxation).

	Excludable	**Non-excludable**
Rivalrous	Private good (e.g. a sandwich)	Common-pool resource (e.g. an ocean fishery)
Non-rivalrous	Quasi-public / club good (e.g. cable TV, a toll road)	Pure public good (e.g. national defence)

Common-pool (common-access) resources are rivalrous but non-excludable — anyone can access them, but one person's use depletes what is left for everyone else (e.g. fisheries, groundwater, the atmosphere's capacity to absorb carbon). Because no individual user bears the full future cost of their own over-use, these resources are prone to the **tragedy of the commons**: rational individual behaviour leads to collective over-exploitation, directly threatening **sustainability**.

[HL ONLY] Asymmetric information

Asymmetric information exists when one party to a transaction has more/better information than the other, distorting the efficient outcome. Two classic cases: **adverse selection** — before a transaction, the informed party's private information affects who chooses to participate (e.g. in a health-insurance market, people who know they are higher-risk are more likely to buy insurance, pushing average costs — and premiums — up, potentially driving lower-risk customers out of the market entirely); **moral hazard** — after a transaction, the informed party changes their behaviour because they no longer bear the full consequences of risk (e.g. a driver with comprehensive insurance may drive less carefully, since the insurer bears most of the cost of an accident). Both distort resource allocation away from the competitive-market ideal, and both are a separate category of market failure from externalities and public goods.

VN GIẢI THÍCH TIẾNG VIỆT

Hàng hoá công (public goods) có tính **không loại trừ** (non-excludable — không thể ngăn ai đó sử dụng) và **không cạnh tranh** (non-rivalrous — người này dùng không làm giảm phần người khác) ⇒ vấn đề "kẻ ăn theo" (free rider) khiến thị trường tư nhân **không cung cấp** loại hàng

này. Tài nguyên chung (common-pool resources) có tính cạnh tranh nhưng không loại trừ ⇒ dễ bị khai thác quá mức — "bi kịch của tài sản chung" (tragedy of the commons) — đe doạ **sustainability**. Thông tin bất cân xứng (HL): **lựa chọn ngược** (adverse selection — xảy ra trước giao dịch) và **rủi ro đạo đức** (moral hazard — xảy ra sau giao dịch) đều làm thị trường phân bổ nguồn lực kém hiệu quả.

2.7 [HL ONLY] Theory of the firm: costs of production

2.7.1 Production in the short run: total, marginal, and average product

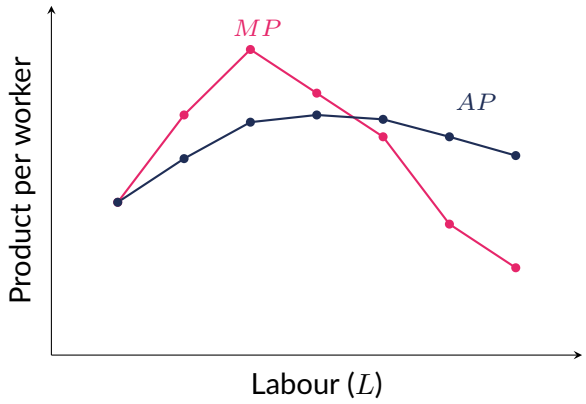
In the **short run**, at least one factor of production (typically capital, K) is fixed while a variable factor (typically labour, L) can be adjusted. **Total product** (TP) is the total output produced by a given quantity of the variable factor. **Marginal product** (MP) is the extra output produced by one additional unit of the variable factor, $MP(L) = TP(L) - TP(L-1)$. **Average product** (AP) is output per unit of the variable factor, $AP(L) = TP(L)/L$.

The **law of diminishing (marginal) returns** states that, as successive units of a variable factor are added to a fixed factor in the short run, a point is eventually reached beyond which the marginal product of the variable factor falls. This is a short-run law only: it holds because each additional worker has progressively *less* of the fixed factor (machinery, floor space) to work with — not because later workers are somehow less skilled than earlier ones.

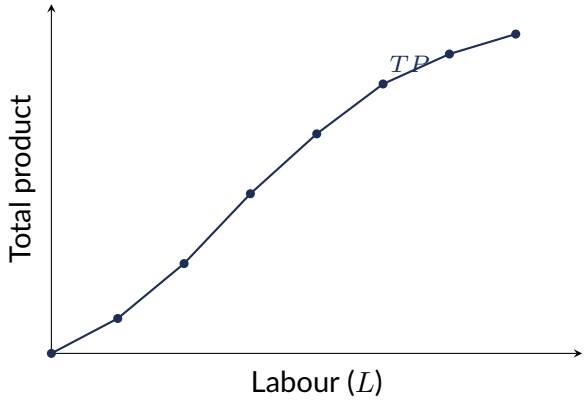
L	0	1	2	3	4	5	6	7
TP	0	7	18	32	44	54	60	64
MP	–	7	11	14	12	10	6	4
AP	–	7.00	9.00	10.67	11.00	10.80	10.00	9.14

MP is calculated as the change in TP: e.g. $MP(2) = TP(2) - TP(1) = 18 - 7 = 11$; $MP(4) = TP(4) - TP(3) = 44 - 32 = 12$. AP is calculated as TP/L: e.g. $AP(3) = 32/3 \approx 10.67$; $AP(5) = 54/5 = 10.80$.

MP **rises** for the first three workers ($7 \to 11 \to 14$) — **increasing marginal returns**, as a small workforce initially benefits from specialisation and fuller use of the fixed capital. MP then **falls** steadily from the 4th worker onward ($12 \to 10 \to 6 \to 4$) — the **law of diminishing marginal returns** has set in, since each additional worker now shares the same fixed quantity of capital with more colleagues. Notice that AP **rises** for as long as MP exceeds it (pulling the average up) and **peaks** at $L = 4$ ($AP = 11.00$), right around the point where MP falls to, and then below, the level of AP. In a smooth, continuous version of these curves, MP crosses AP *exactly* at the maximum point of AP — the same marginal/average relationship used for AC and MC in the next subsection.



MP and AP plotted directly from the schedule above: MP rises then falls, crossing AP close to AP's maximum at $L = 4$.



The total product (TP) curve plotted from the same schedule: its slope at each point *is* marginal product, so TP rises most steeply where MP is largest ($L = 3$), and continues rising — just more slowly — once diminishing marginal returns set in from $L = 4$ onward.

Economists sometimes describe short-run production in **three stages**, defined by the behaviour of MP and AP: **Stage I** — $MP > AP$, so AP is still rising (increasing marginal returns dominate); a profit-maximising firm would never stop hiring within Stage I, since each extra worker still raises average productivity. **Stage II** — $MP < AP$ but $MP > 0$, so AP is falling yet TP is still rising (diminishing but positive marginal returns); virtually all real-world short-run production decisions are made within Stage II. **Stage III** — $MP < 0$, so TP itself is falling (hiring an extra worker actually reduces total output, e.g. from overcrowding); no rational, profit-maximising firm would ever hire into Stage III, since it could produce the same or more output with *fewer* workers and lower cost.

(!) Lỗi thường gặp: "Diminishing marginal returns" does **not** mean output is falling. Throughout Stage II, MP is falling but still **positive**, so TP continues to **rise** (just at a decreasing rate) — in the schedule above, TP keeps climbing from 32 to 64 even as MP falls from 14 down to 4. Only in Stage III, once MP turns **negative**, does TP actually fall. Examiners frequently penalise scripts that treat "diminishing returns" as a synonym for "falling output".

Stage III: negative marginal product

Suppose the same firm keeps hiring beyond $L = 7$: $TP(8) = 64$ and $TP(9) = 60$ (overcrowding on the factory floor now gets in the way of production). Compute $MP(8)$ and $MP(9)$, and explain why a profit-maximising firm would never choose to operate at $L = 9$.

$MP(8) = TP(8) - TP(7) = 64 - 64 = 0$. $MP(9) = TP(9) - TP(8) = 60 - 64 = -4$.
Since $MP(9) < 0$, hiring a 9th worker actually **reduces** total output (from 64 to 60) — this is **Stage III**. A profit-maximising firm would never operate here: it could produce the *same or more* output (64 units, using only 7 or 8 workers) while paying *less* in wages, so hiring a 9th worker can only raise cost while never raising — and here actually lowering — revenue. Rational firms always stop hiring at or before the point where $MP = 0$ (the boundary between Stage II and Stage III).

VN **GIẢI THÍCH TIẾNG VIỆT**

Sản xuất ngắn hạn có thể chia thành **ba giai đoạn**: **Giai đoạn I** ($MP > AP$, AP đang tăng) — doanh nghiệp luôn nên thuê thêm lao động trong giai đoạn này; **Giai đoạn II** ($MP < AP$ nhưng $MP > 0$) — AP giảm nhưng TP vẫn tăng, đây là vùng quyết định thực tế của hầu hết doanh nghiệp; **Giai đoạn III** ($MP < 0$) — thuê thêm lao động khiến TP **giảm** (ví dụ do quá đông

người, cản trở lẫn nhau), không doanh nghiệp hợp lý nào chọn hoạt động ở đây. Lưu ý: "hiệu suất giảm dần" (diminishing returns) chỉ có nghĩa MP đang giảm — **không** có nghĩa TP đang giảm; TP chỉ giảm khi bước sang Giai đoạn III ($MP < 0$).

From marginal product to marginal cost

Suppose the wage rate is a constant \$60 per worker, and — in this simple case where labour is the only variable cost — marginal cost equals the wage divided by marginal product: $MC = w/MP$. Using the MP schedule above, compute MC at each level of labour from $L = 1$ to $L = 7$.

L	1	2	3	4	5	6	7
MP	7	11	14	12	10	6	4
$MC = 60/MP$	\$8.57	\$5.45	\$4.29	\$5.00	\$6.00	\$10.00	\$15.00

$MC(1) = 60/7 \approx \$8.57$; $MC(2) = 60/11 \approx \$5.45$; $MC(3) = 60/14 \approx \$4.29$; $MC(4) = 60/12 = \$5.00$; $MC(5) = 60/10 = \$6.00$; $MC(6) = 60/6 = \$10.00$; $MC(7) = 60/4 = \$15.00$. Marginal cost **falls** while MP is rising ($L = 1$ to $L = 3$: \$8.57 → \$5.45 → \$4.29) and **rises** once MP starts falling ($L = 4$ onward: \$5.00 → \$6.00 → \$10.00 → \$15.00). MC is the mirror image of MP — precisely why the short-run MC curve introduced in the next subsection is **U-shaped**: increasing marginal returns to labour make MC fall at low output, and diminishing marginal returns make MC rise at higher output.

VN **GIẢI THÍCH TIẾNG VIỆT**

Tổng sản phẩm (TP) là tổng sản lượng tạo ra bởi một lượng yếu tố biến đổi (lao động) khi kết hợp với một lượng yếu tố cố định (vốn). **Sản phẩm biên** (MP) là sản lượng tăng thêm khi thuê thêm một lao động: $MP(L) = TP(L) - TP(L-1)$. **Sản phẩm bình quân** (AP) là sản lượng trung bình trên mỗi lao động: $AP = TP/L$. **Quy luật hiệu suất giảm dần** (law of diminishing marginal returns): trong ngắn hạn, khi tiếp tục thêm lao động vào một lượng vốn cố định, đến một điểm nào đó MP sẽ giảm dần — vì mỗi lao động mới có ngày càng ít vốn/máy móc để sử dụng, chứ không phải vì lao động sau kém hơn. AP tăng khi $MP > AP$ và đạt đỉnh đúng lúc MP cắt AP từ trên xuống. Mối liên hệ giữa MP và **chi phí biên** MC: vì $MC = w/MP$ (với tiền lương w không đổi), khi MP tăng thì MC giảm, và khi MP giảm (hiệu suất giảm dần) thì MC tăng — đây chính là lý do đường MC ngắn hạn có dạng **chữ U**.

From average product to average variable cost

Using the same wage $w = \$60$ and the AP schedule from the table above, compute average variable cost $AVC = w/AP$ at each level of labour from $L = 1$ to $L = 7$, and state at which L it is minimised.

L	1	2	3	4	5	6	7
AP	7.00	9.00	10.67	11.00	10.80	10.00	9.14
$AVC = 60/AP$	\$8.57	\$6.67	\$5.63	\$5.45	\$5.56	\$6.00	\$6.56

$AVC(1) = 60/7 \approx \$8.57$; $AVC(2) = 60/9 \approx \$6.67$; $AVC(3) = 60/(32/3) = 180/32 = 5.625 \approx \$5.63$; $AVC(4) = 60/11 \approx \$5.45$; $AVC(5) = 60/10.8 \approx \$5.56$; $AVC(6) = 60/10 = \$6.00$; $AVC(7) = 60/(64/7) = 420/64 = 6.5625 \approx \$6.56$. Since AP is **maximised** at $L = 4$ ($AP =$

11.00), and $AVC = w/AP$ is inversely related to AP, AVC is correspondingly **minimised** at $L = 4$ ($5.45) — exactly the same average/marginal logic as $MC = w/MP$, applied one level up. This is precisely why the AVC curve in the next subsection is drawn U-shaped, and why it reaches its minimum at the same output level where MC crosses it from below.

VN **GIẢI THÍCH TIẾNG VIỆT**

Tương tự $MC = w/MP$, ta có $AVC = w/AP$: vì AP đạt **tối đa** tại $L = 4$, nên AVC đạt **tối thiểu** chính tại $L = 4$ — cùng một logic biên/bình quân, áp dụng cho cặp (AP, AVC) giống hệt cặp (MP, MC). Đây là lý do đường AVC ngắn hạn cũng có dạng chữ U, và vì sao MC luôn cắt AVC đúng tại điểm tối thiểu của AVC.

Deriving a full short-run cost schedule from the production data

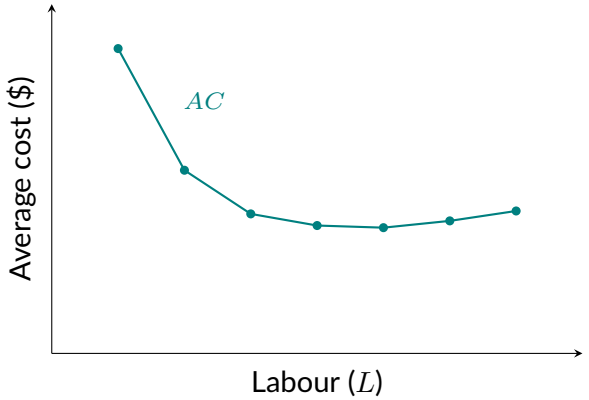
Suppose this firm's total fixed cost is $TFC = \$50$, and the wage remains $w = \$60$ per worker. Using $Q = TP(L)$ from the schedule above and $TVC = wL$, construct the full short-run cost schedule (TC, AC) for $L = 1$ to 7, and identify the output level at which AC is minimised.

L	1	2	3	4	5	6	7
$Q = TP$	7	18	32	44	54	60	64
$TVC = 60L$	60	120	180	240	300	360	420
$TC = 50 + TVC$	110	170	230	290	350	410	470
$AC = TC/Q$	15.71	9.44	7.19	6.59	6.48	6.83	7.34

E.g. at $L = 5$: $TVC = 60 \times 5 = 300$; $TC = 50 + 300 = 350$; $Q = 54$; $AC = 350/54 \approx 6.48$. Reading across the AC row, cost per unit falls from $15.71 down to a minimum of $6.48 at $L = 5$, then rises again. Notice this minimum occurs *one worker later* than the minimum of AVC found in the previous example ($L = 4$): since $AC = AVC + AFC$ and AFC is still falling at $L = 4$, it keeps pulling AC down for one more worker before rising marginal cost finally dominates — exactly the generic relationship (AC minimised to the right of AVC) shown in the short-run cost diagram in the next subsection.

VN **GIẢI THÍCH TIẾNG VIỆT**

Từ chính bảng số liệu sản xuất, ta có thể dựng toàn bộ bảng chi phí ngắn hạn: $TVC = w \times L$ (tiền lương nhân số lao động), $TC = TFC + TVC$, và $AC = TC/Q$. Bảng trên cho thấy AC đạt tối thiểu tại $L = 5$ — trễ hơn một lao động so với AVC (tối thiểu tại $L = 4$), vì $AC = AVC + AFC$ và AFC vẫn đang giảm tại $L = 4$, kéo AC tiếp tục giảm thêm một bước nữa trước khi chi phí biên tăng đủ mạnh để áp đảo.



Average cost plotted directly from the derived schedule above: AC falls steeply at first (spreading \$50 of fixed cost, plus rising productivity, over more output), reaches a minimum of \$6.48 at $L = 5$, then rises as diminishing returns dominate.

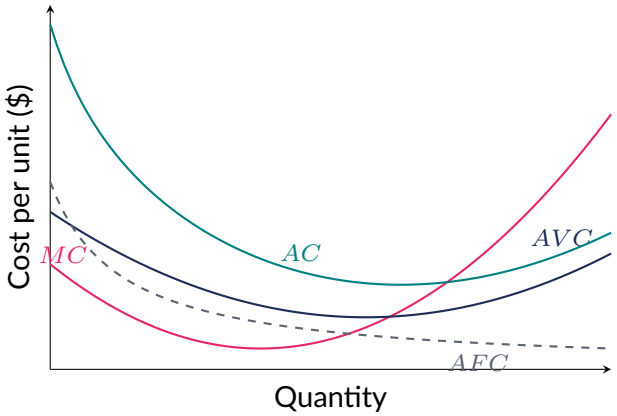
2.7.2 Short-run costs

In the **short run**, at least one factor of production (typically capital) is fixed. Key cost measures, where Q is output:

$$TFC = \text{constant}, \qquad TVC = \text{varies with } Q, \qquad TC = TFC + TVC.$$

$$AFC = \frac{TFC}{Q}, \qquad AVC = \frac{TVC}{Q}, \qquad AC = \frac{TC}{Q} = AFC + AVC, \qquad MC = \frac{\Delta TC}{\Delta Q}.$$

AFC falls continuously as Q rises (a fixed cost is spread over more units). AVC, AC, and MC are all **U-shaped** in the short run: costs per unit initially fall (as fixed costs are spread out and specialisation raises productivity) then rise (as the **law of diminishing marginal returns** sets in — with a fixed factor, each additional unit of the variable factor eventually adds progressively less extra output). MC intersects both AVC and AC exactly at their respective minimum points.



Typical short-run cost curves: AFC falls continuously; AVC, AC, MC are U-shaped, with MC crossing AVC and AC at their respective minima.

A short-run cost schedule

A firm's total cost function is $TC = 40 + 30Q - 6Q^2 + Q^3$. Complete the cost schedule for $Q = 1$ to 6 and identify the output at which AVC is minimised.

Q	1	2	3	4	5	6
TC	65	84	103	128	165	220
MC	25	19	19	25	37	55
AFC	40	20	13.33	10	8	6.67
AVC	25	22	21	22	25	30
AC	65	42	34.33	32	33	36.67

$TFC = TC(0) = 40$. $MC(Q) = TC(Q) - TC(Q-1)$; e.g. $MC(4) = 128 - 103 = 25$. $AVC(Q) = (TC(Q) - 40)/Q$; e.g. $AVC(3) = (103 - 40)/3 = 21$. Reading the table, AVC falls from 25 to a minimum of **21 at** $Q = 3$, then rises — the classic U-shape, driven by diminishing marginal returns setting in once Q exceeds 3.

VN **GIẢI THÍCH TIẾNG VIỆT**

AFC luôn **giảm dần** vì chi phí cố định được chia cho ngày càng nhiều đơn vị sản phẩm. AVC, AC, MC có dạng **chữ U**: giảm lúc đầu (hiệu quả chuyên môn hoá) rồi tăng lên (do **năng suất biên giảm dần** khi thêm lao động vào một lượng vốn cố định). MC luôn cắt AVC và AC đúng tại điểm **tối thiểu** của mỗi đường — đây là hệ quả toán học của quan hệ biên–trung bình (nếu biên nhỏ hơn trung bình thì trung bình đang giảm; nếu biên lớn hơn trung bình thì trung bình đang tăng).

2.7.3 Long-run costs: returns to scale

In the **long run**, all factors of production are variable — a firm can build a larger factory, not just hire more workers. The long-run average cost ($LRAC$) curve traces the minimum average cost attainable at each output level once the firm can choose its scale of operation optimally.

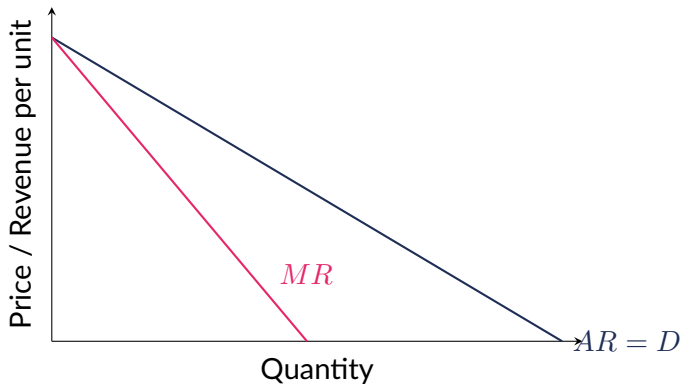
Economies of scale (falling $LRAC$ as output rises) arise from: bulk-buying discounts, specialisation of labour and management, more efficient use of large-scale capital equipment (technical economies), and spreading fixed costs (e.g. marketing, R&D) over greater output. **Diseconomies of scale** (rising $LRAC$) arise mainly from the difficulty of managing very large organisations: communication breakdowns, slower decision-making, and weaker coordination/motivation (managerial diseconomies). The output at which $LRAC$ is minimised is the **minimum efficient scale (MES)**.

VN **GIẢI THÍCH TIẾNG VIỆT**

Trong dài hạn, mọi yếu tố sản xuất đều có thể thay đổi, nên doanh nghiệp chọn được quy mô tối ưu ở mỗi mức sản lượng — đường $LRAC$. **Lợi thế kinh tế theo quy mô** (economies of scale) khiến $LRAC$ giảm khi sản lượng tăng (mua nguyên liệu số lượng lớn giá rẻ hơn, chuyên môn hoá lao động, tận dụng máy móc lớn hiệu quả hơn). **Bất lợi kinh tế theo quy mô** (diseconomies of scale) khiến $LRAC$ tăng trở lại khi doanh nghiệp quá lớn, khó quản lý, giao tiếp kém hiệu quả.

2.8 [HL ONLY] Revenue and profit maximisation

Total revenue $TR = P \times Q$. **Average revenue** $AR = TR/Q = P$ (so the AR curve is identical to the demand curve facing the firm). **Marginal revenue** $MR = \Delta TR/\Delta Q$. For a **price-taking** firm (facing a horizontal demand curve), $P = AR = MR$ — a constant. For a firm facing a **downward-sloping** demand curve, MR lies *below* AR and falls **twice as steeply** (for linear demand): if $AR = a - bQ$, then $MR = a - 2bQ$.



A firm facing downward-sloping demand $AR: P = 50 - 2Q$ has marginal revenue $MR = 50 - 4Q$ — falling twice as steeply and reaching zero at half the quantity where AR reaches zero.

A firm maximises profit at the output where $MR = MC$ (the marginal decision rule from Unit 1, applied to the firm). Profit $= TR - TC = (P - AC) \times Q$. If $P > AC$ at that output: **supernormal (economic) profit**. If $P = AC$: **normal profit** (just enough to keep the entrepreneur in this line of business — economically, a cost, not a "true" profit). If $P < AC$ but $P > AVC$: the firm makes a **loss** but should still produce in the short run, since revenue covers all variable costs and part of fixed costs. If $P < AVC$: the firm should shut down immediately, since it cannot even cover its variable costs.

Profit-maximising output, price, and profit

A firm faces demand (its own AR curve) $P = 50 - 2Q$ and marginal cost $MC = 10 + Q$. At the profit-maximising output, average cost is \$20/unit. Find Q^*, P^*, and profit.

$MR = 50 - 4Q$ (twice the slope of AR). Set $MR = MC$: $50 - 4Q = 10 + Q \implies 40 = 5Q \implies Q^* = 8$.
$P^* = 50 - 2(8) = \$34$.

$$\text{Profit} = (P^* - AC) \times Q^* = (34 - 20) \times 8 = \$112.$$

VN **GIẢI THÍCH TIẾNG VIỆT**

Doanh nghiệp tối đa hoá lợi nhuận tại $MR = MC$. Với đường cầu tuyến tính (dốc xuống), MR luôn dốc gấp **đôi** AR và cắt trục hoành ở nửa quãng đường so với AR. Lợi nhuận $= (P - AC) \times Q$: nếu $P > AC$ là **lợi nhuận siêu ngạch** (supernormal profit); $P = AC$ là **lợi nhuận thông thường** (normal profit — về bản chất kinh tế học, đây được tính là một loại **chi phí cơ hội** của vốn/thời gian chủ doanh nghiệp, không phải "lợi nhuận thật"); nếu $AVC < P < AC$ doanh nghiệp lỗ nhưng vẫn nên tiếp tục sản xuất trong ngắn hạn; nếu $P < AVC$ nên đóng cửa ngay.

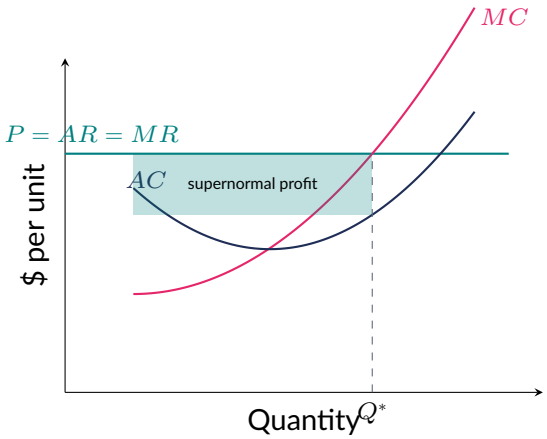
2.9 [HL ONLY] Market structures

Market structures range along a spectrum of competitiveness, distinguished mainly by the number of firms, the degree of product differentiation, and the height of barriers to entry/exit.

- **Perfect competition**: very many small firms, a homogeneous (identical) product, perfect information, free entry and exit, so each firm is a **price taker** with no market power ($P = AR = MR$).
- **Monopolistic competition**: many firms, **differentiated** products (branding, quality, location), relatively low barriers to entry — each firm has a small degree of market power (a downward-sloping but fairly elastic demand curve).
- **Oligopoly**: a few large firms dominate the market, products may be homogeneous or differentiated, significant barriers to entry, and — crucially — firms are **interdependent**: each firm's optimal pricing/output decision depends on how rivals are expected to react.
- **Monopoly**: a single seller with no close substitutes and very high barriers to entry, giving it substantial and durable market power (a "price maker").

2.9.1 Perfect competition

Because each firm is a price taker in perfect competition, its individual demand curve is horizontal at the market price, so $P = AR = MR$.



Short-run supernormal profit in perfect competition: Q^* where $MR = MC$, with $P > AC$ at Q^* (shaded rectangle).

Short-run profit or loss in perfect competition

A price-taking firm faces market price $P = \$25$ and $MC = 5 + 2Q$. Find Q^*, then compute profit if $AC = \$18$ at Q^*, and separately if $AC = \$30$ at Q^*.

Set $MR = MC$: since $P = AR = MR = 25$: $25 = 5 + 2Q \implies Q^* = 10$.
Case 1 ($AC = 18$): profit $= (25 - 18) \times 10 = +\$70$ (**supernormal profit**).
Case 2 ($AC = 30$): profit $= (25-30) \times 10 = -\$50$ (a **loss**) — but since $P = 25 > AVC$ (assuming $AVC < 25$), the firm should still keep producing in the short run, as it is covering all variable costs and part of its fixed costs.

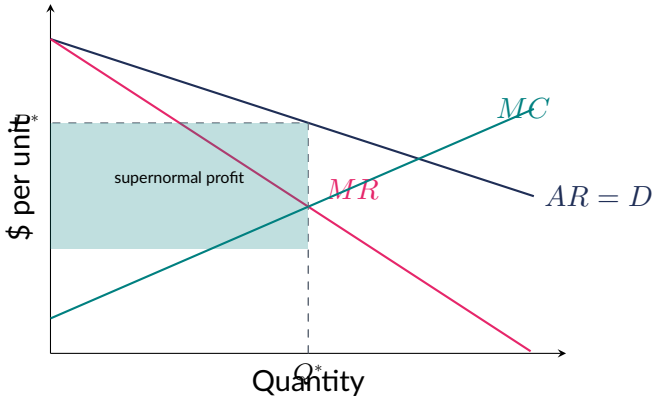
Because entry and exit are free, short-run supernormal profit attracts new entrants (shifting market supply right, lowering price) until, in the **long run**, only **normal profit** remains ($P = AC$ at the minimum point of AC) — perfect competition is both **productively efficient** (produces at minimum AC) and **allocatively efficient** ($P = MC$, so resources are allocated exactly according to consumers' willingness to pay relative to the marginal cost of production) in the long run.

VN **GIẢI THÍCH TIẾNG VIỆT**
Trong cạnh tranh hoàn hảo, doanh nghiệp là "người nhận giá" (price taker) nên $P = AR = MR$ — đường cầu của từng doanh nghiệp là đường ngang. Ngắn hạn có thể lãi siêu ngạch hoặc lỗ;

nhưng do gia nhập/rút lui tự do, dài hạn chỉ còn **lợi nhuận thông thường** ($P = AC_{\text{min}}$). Cạnh tranh hoàn hảo đạt cả **hiệu quả sản xuất** (AC tối thiểu) và **hiệu quả phân bổ** ($P = MC$) trong dài hạn — đây là lý do nó thường được dùng làm chuẩn tham chiếu lý tưởng khi đánh giá các cấu trúc thị trường khác.

2.9.2 Monopoly

A **monopoly** faces the entire (downward-sloping) market demand curve directly, so $MR < AR$ and the firm has genuine pricing power. High **barriers to entry** (legal barriers/patents, economies of scale, control of a key resource, aggressive/predatory behaviour) allow supernormal profit to persist even in the long run, since no new entrants can compete it away.



Monopoly profit maximisation: Q^* where $MR = MC$; price P^* is read off the demand curve at Q^* (note $P^* > MC$, indicating allocative inefficiency).

Monopoly profit maximisation

Demand: $P = 90 - 3Q$. Marginal cost: $MC = 10 + 4Q$. Average cost at the optimal output is \$30. Find Q^*, P^*, and profit.

$MR = 90 - 6Q$ (twice the slope of demand). Set $MR = MC$: $90 - 6Q = 10 + 4Q \implies 80 = 10Q \implies Q^* = 8$.
$P^* = 90 - 3(8) = \$66$.

$$\text{Profit} = (66 - 30) \times 8 = \$288.$$

Note MC at $Q^* = 8$ is $10 + 32 = 42$, while $P^* = 66 > 42 = MC$ — the monopoly restricts output below the level where price equals marginal cost, the source of its **allocative inefficiency** relative to perfect competition.

(!) Lỗi thường gặp: A monopoly is not automatically "bad": it may achieve substantial **economies of scale** unavailable to many small competing firms (relevant for **natural monopolies**, e.g. water/electricity networks, where a single large firm can supply the whole market at lower average cost than several smaller firms could), and monopoly profits can fund large-scale R&D. The standard critique is allocative inefficiency ($P > MC$) and the absence of competitive pressure to innovate or minimise costs — not that a single seller can never benefit consumers.

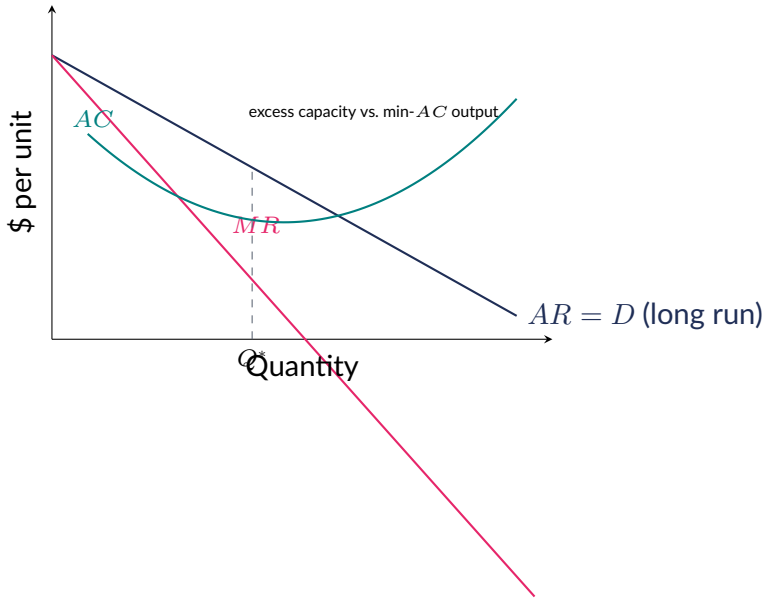
VN **GIẢI THÍCH TIẾNG VIỆT**

Độc quyền (monopoly) đối mặt toàn bộ đường cầu thị trường nên $MR < AR$; nhờ rào cản gia nhập cao, lợi nhuận siêu ngạch có thể duy trì trong **dài hạn** (khác với cạnh tranh hoàn hảo). Độc quyền định giá $P > MC$ nên **kém hiệu quả phân bổ**, nhưng có thể tận dụng **lợi thế quy**

mô (độc quyền tự nhiên như điện, nước) mà nhiều doanh nghiệp nhỏ cạnh tranh không đạt được.

2.9.3 Monopolistic competition

Many firms sell **differentiated** products (via branding, quality, location, service), giving each firm a small degree of market power — a downward-sloping but relatively **elastic** demand curve (because differentiated but reasonably close substitutes exist). Low barriers to entry mean supernormal profit attracts new entrants, shifting each incumbent firm's demand curve left (and making it more elastic, as new competing brands appear) until, in the long run, only normal profit remains.



Long-run equilibrium in monopolistic competition: demand is tangent to AC at Q^* (normal profit only), but Q^* lies to the *left* of the minimum-AC output — **excess capacity**.

Why monopolistic competition is not productively efficient in the long run

In the long-run equilibrium of monopolistic competition, demand is tangent to the AC curve (so $P = AC$, normal profit only — no incentive for further entry or exit). Explain why this tangency point cannot occur at the minimum of the AC curve.

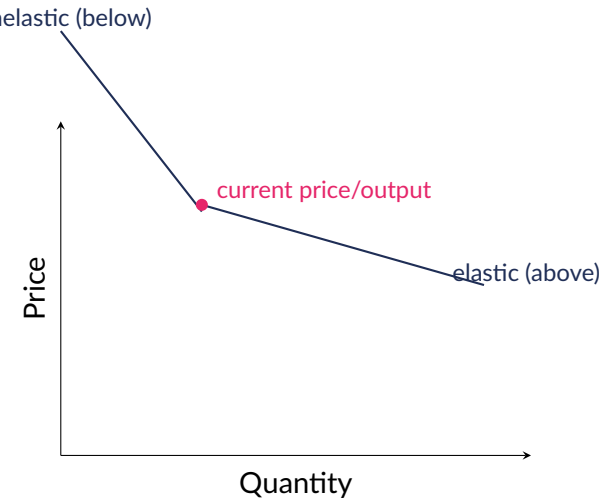
A downward-sloping demand curve can only be *tangent* to a U-shaped AC curve where AC is still **falling** (i.e. on the left/downward-sloping segment of AC) — if the tangency were at the minimum of AC (where AC is momentarily flat), a downward-sloping line could not touch it at a single point without crossing below it elsewhere, which would imply $P < AC$ (a loss) at nearby quantities, contradicting long-run equilibrium. So firms operate at less than the minimum-AC (most productively efficient) output — this gap is called **excess capacity**, the standard efficiency cost of product differentiation (traded off against the benefit of greater consumer choice/variety).

VN **GIẢI THÍCH TIẾNG VIỆT**

Cạnh tranh độc quyền (monopolistic competition): nhiều doanh nghiệp, sản phẩm **khác biệt hoá**, rào cản gia nhập thấp $\Rightarrow$ dài hạn chỉ còn lợi nhuận thông thường (đường cầu tiếp xúc AC), nhưng điểm tiếp xúc luôn nằm ở phần AC đang **giảm** — chưa đạt mức sản lượng tối thiểu hoá AC. Đây gọi là **năng lực dư thừa** (excess capacity): đánh đổi giữa đa dạng hoá sản phẩm (lợi cho người tiêu dùng) và hiệu quả sản xuất.

2.9.4 Oligopoly and interdependence

An **oligopoly** is dominated by a few large firms whose decisions are **interdependent**: each firm must consider how rivals will react to any price or output change. This interdependence can be modelled with a **kinked demand curve**: rivals are assumed to *match* any price cut (to avoid losing market share) but *not follow* a price rise (happy to gain market share) — making demand relatively **elastic** above the current price and relatively **inelastic** below it, which helps explain the tendency toward **price rigidity** (stability) observed in many oligopolistic markets.



The kinked demand curve: rivals match price cuts (inelastic segment below the kink) but not price rises (elastic segment above), reinforcing stable prices in oligopoly.

[HL ONLY] Game theory: a pricing dilemma

Two firms, A and B, simultaneously choose a High or Low price. Annual profits ($m) are given below (Firm A's payoff listed first in each cell).

	Firm B: High	**Firm B: Low**
Firm A: High	$(10,\ 10)$	$(4,\ 14)$
Firm A: Low	$(14,\ 4)$	$(6,\ 6)$

Find the Nash equilibrium and explain why it is not the jointly best outcome.

Whatever B does, A does better by choosing **Low** (if B is High: $14 > 10$; if B is Low: $6 > 4$) — Low is a **dominant strategy** for A. By symmetry, Low is also dominant for B. The **Nash equilibrium** is therefore (Low, Low), giving both firms only $6m — even though *both* choosing High would give each firm $10m (a jointly better, **collusive** outcome). This is a classic **prisoner's dilemma**: each firm has an individual incentive to undercut, so the mutually beneficial (collusive) outcome is unstable without some way to enforce cooperation (formal cartel agreements are illegal in most jurisdictions, so real-world oligopolies rely on tacit collusion, repeated interaction, and retaliation threats to sustain higher joint prices).

VN **GIẢI THÍCH TIẾNG VIỆT**

Độc quyền nhóm (oligopoly) đặc trưng bởi tính **phụ thuộc lẫn nhau** (interdependence) — quyết định của một hãng luôn phải tính đến phản ứng của đối thủ. Đường cầu gấp khúc (kinked demand) giải thích vì sao giá cả trong oligopoly thường **ổn định** (đối thủ theo giá giảm nhưng không theo giá tăng). Lý thuyết trò chơi (game theory — HL) cho thấy dù thông đồng (collusion) mang lại lợi nhuận chung cao hơn, mỗi hãng vẫn có động cơ cá nhân để "phá vỡ" thoả thuận —

đây là bản chất của "thế lưỡng nan của người tù" (prisoner's dilemma) áp dụng vào cạnh tranh giá.

2.9.5 [HL ONLY] Game theory and strategic interdependence

Because oligopolists are **mutually interdependent**, economists formally analyse their pricing and output decisions using **game theory**: each firm (a "player") chooses a strategy, and the resulting profit ("payoff") for each firm depends on *both* its own choice *and* its rival's choice. These payoffs are conventionally summarised in a **payoff matrix**.

A **dominant strategy** is a strategy that gives a player a higher payoff *no matter what* the rival chooses — so a player with a dominant strategy never needs to guess what the rival will do. A **Nash equilibrium** is a combination of strategies (one per player) such that *neither* player could improve their own payoff by unilaterally changing their own strategy, given the strategy the other player has chosen. If both players have a dominant strategy, the combination of those two dominant strategies is automatically the (unique) Nash equilibrium.

Solving a payoff matrix: dominant strategy and Nash equilibrium

Two firms, A and B, simultaneously choose to set a High price or a Low price. Annual profits ($m) are shown below (Firm A's payoff listed first in each cell).

	Firm B: High	**Firm B: Low**
Firm A: High	$(50,\ 50)$	$(20,\ 70)$
Firm A: Low	$(70,\ 20)$	$(35,\ 35)$

Find each firm's dominant strategy (if one exists) and the Nash equilibrium, and comment on the stability of collusion.

Firm A: if B plays High, A compares High (50) with Low (70) — Low is better $(70 > 50)$. If B plays Low, A compares High (20) with Low (35) — Low is again better $(35 > 20)$. So **Low price is a dominant strategy for A**: it is A's best choice *regardless* of what B does.
Firm B: by the symmetry of the matrix, exactly the same logic applies — **Low price is also a dominant strategy for B**.
Since both firms' dominant strategy is Low, the **Nash equilibrium is (Low, Low)**, with payoffs $(35, 35)$. Yet if both firms could credibly agree to set High prices instead, they would jointly earn $(50, 50)$ — *more* than at the Nash equilibrium. This is a classic **prisoner's dilemma** structure: it explains *both* why collusion (a cartel setting High, High) is tempting — $50 > 35$ for each firm — *and* why collusion is inherently unstable: whatever price the rival is expected to charge, each firm individually earns more by undercutting to Low ($70 > 50$ if the rival stays High; $35 > 20$ if the rival also cuts to Low), so each cartel member always has a unilateral incentive to cheat on the agreement — exactly why real-world cartels tend to break down even when collusion would make every member better off.

VN **GIẢI THÍCH TIẾNG VIỆT**

Lý thuyết trò chơi (game theory) mô hình hoá tính phụ thuộc lẫn nhau giữa các doanh nghiệp oligopoly bằng **ma trận lợi ích** (payoff matrix): lợi nhuận của mỗi hãng phụ thuộc vào lựa chọn của *cả hai* hãng. **Chiến lược trội** (dominant strategy) là lựa chọn luôn tốt hơn bất kể đối thủ làm gì. **Cân bằng Nash** (Nash equilibrium) là tổ hợp chiến lược mà không hãng nào muốn đơn phương thay đổi lựa chọn của mình. Trong ví dụ trên, "Giá thấp" là chiến lược trội của cả hai hãng nên cân bằng Nash là (Thấp, Thấp) với lợi nhuận $(35, 35)$ — thấp hơn hẳn so với $(50, 50)$

nếu cả hai cùng giữ giá cao. Đây là lý do **các-ten** (cartel — thoả thuận thông đồng) tuy hấp dẫn về mặt lợi nhuận chung nhưng **dễ sụp đổ**: mỗi hãng luôn có động cơ cá nhân để "phá kèo", giảm giá để giành thêm lợi nhuận, bất kể đối thủ làm gì.

(!) Lỗi thường gặp: A common error is assuming the Nash equilibrium must be the cell with the **highest combined** payoff. It is not: the Nash equilibrium is defined by *individual* incentives to deviate, holding the rival's strategy fixed — not by which outcome is jointly best. In the example above, $(\text{High}, \text{High}) = (50, 50)$ has the highest *combined* payoff (100), yet it is **not** the Nash equilibrium, because each firm can unilaterally improve its own payoff by switching to Low. Always test each cell by asking "would either player want to change *only their own* choice, given what the other player is doing?" — never simply pick the cell with the largest total.

Repeated games and the sustainability of collusion

The one-shot payoff matrix above predicts that collusion collapses, because each firm can profitably undercut *once*. But real-world oligopolists interact **repeatedly**, period after period — and this changes the incentives. If firms expect to compete against the *same* rival indefinitely, a strategy such as **tit-for-tat** (cooperate — i.e. keep price High — as long as the rival does, but immediately punish any undercutting by matching Low prices for some period afterward) can make honouring a collusive agreement individually rational: the one-off gain from cheating (undercutting to Low) must be weighed against the loss of the higher collusive payoff in *every future* period once the rival retaliates. The more firms value future profit relative to a one-off gain today (i.e. the lower their discount rate, and the more frequently/reliably they interact), the more likely tacit collusion is to be **sustained** without any formal (and typically illegal) cartel agreement — this is the standard economic explanation for price stability and parallel pricing observed in many real-world oligopolistic industries. A well-documented real-world illustration is **OPEC** (the Organization of the Petroleum Exporting Countries): member states agree collectively on oil production quotas to keep the world price high (the jointly-preferred, collusive outcome), yet individual members are regularly found to **exceed** their agreed quota when the world price is high, since each member individually gains from producing more at the prevailing high price — exactly the temptation to "cheat" identified in the payoff-matrix analysis above, and the reason OPEC's official quotas are not always fully respected in practice.

Nash equilibrium when only one firm has a dominant strategy

Two firms, A and B, choose High or Low output. Payoffs ($m, Firm A first): both High $(40, 30)$; A High, B Low $(45, 20)$; A Low, B High $(20, 25)$; A Low, B Low $(25, 35)$. Find the Nash equilibrium.

Firm A: if B is High, A compares High (40) with Low (20) — High is better. If B is Low, A compares High (45) with Low (25) — High is again better. So **High is a dominant strategy for A** (always the better choice, regardless of B).
Firm B: if A is High, B compares High (30) with Low (20) — High is better. If A is Low, B compares High (25) with Low (35) — **Low** is better. So B has **no dominant strategy**: B's best choice depends on what A does.
Since A's dominant strategy is High regardless of B, a rational B should anticipate that A will play High — and **B's best response to A = High is High** $(30 > 20)$. So the **Nash equilibrium is (High, High)**, with payoffs $(40, 30)$: neither firm can improve its own payoff by unilaterally switching (A would fall to 20 by switching to Low given B stays High; B would fall to 20 by switching to Low given A stays High) — confirming (High, High) is indeed the (unique) Nash equilibrium, even though only one player had a strategy that was dominant in its own right.

VN **GIẢI THÍCH TIẾNG VIỆT**

Không phải lúc nào cả hai hãng đều có **chiến lược trội**. Khi chỉ một hãng (ở đây là hãng A) có chiến lược trội, ta xác định chiến lược đó trước, sau đó tìm **phản ứng tốt nhất** (best response) của hãng còn lại *với giả định* hãng kia sẽ chơi chiến lược trội của mình. Cân bằng Nash không nhất thiết là ô có **tổng lợi nhuận cao nhất** — đây là lỗi rất phổ biến; cân bằng Nash chỉ đòi hỏi **không ai muốn đơn phương đổi lựa chọn**, bất kể tổng lợi nhuận ở ô đó cao hay thấp. Trong các trò chơi **lặp lại** (repeated games) — khác với trò chơi một lần — các hãng có thể duy trì thông đồng ngầm nhờ chiến lược "ăn miếng trả miếng" (tit-for-tat): giữ giá cao nếu đối thủ hợp tác, trừng phạt ngay nếu đối thủ phá vỡ thoả thuận.

A coordination game: more than one Nash equilibrium

Two firms, A and B, must independently choose which of two mutually incompatible technology standards, X or Y, to adopt for a new product — both firms benefit far more if they *coordinate* on the *same* standard, whichever it is. Payoffs ($m, Firm A first): both choose X $(60, 60)$; both choose Y $(45, 45)$; A chooses X and B chooses Y $(10, 10)$; A chooses Y and B chooses X $(10, 10)$. Find all the Nash equilibria.

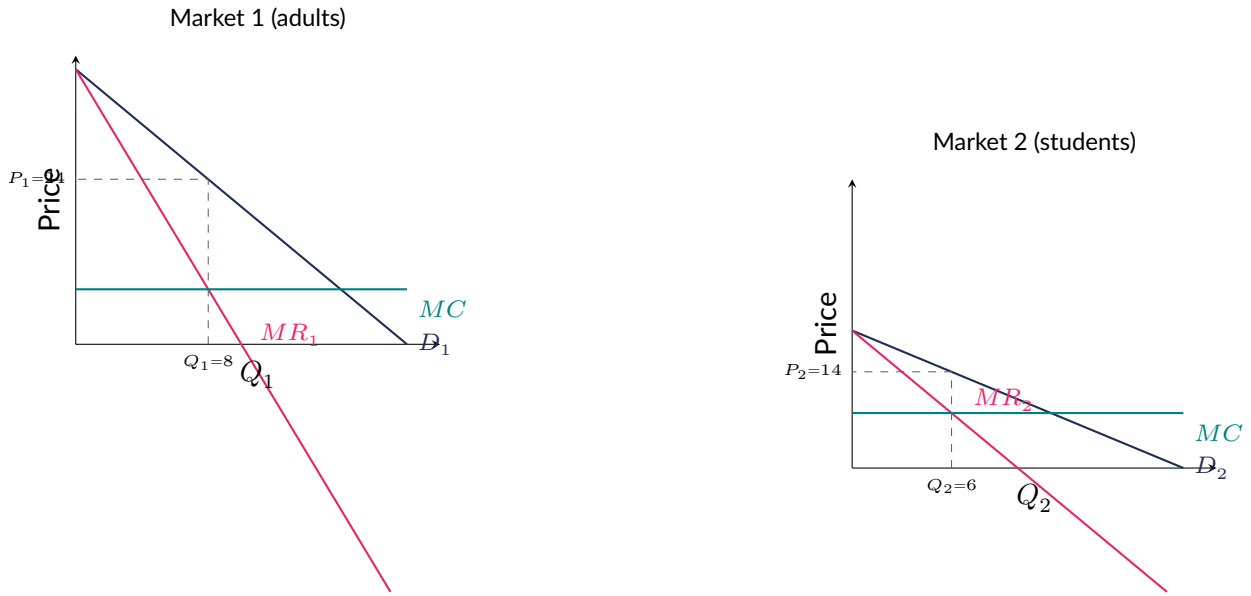
Check (X,X): given B chooses X, A compares X (60) with Y (10) — X is A's best response. Given A chooses X, B compares X (60) with Y (10) — X is B's best response too. Since *both* are best-responding, **(X,X) is a Nash equilibrium**.
Check (Y,Y): given B chooses Y, A compares Y (45) with X (10) — Y is A's best response. Given A chooses Y, B compares Y (45) with X (10) — Y is B's best response too. So **(Y,Y) is also a Nash equilibrium**.
Check (X,Y): given B chooses Y, A's best response is Y, not X — so A would want to deviate; **(X,Y) is not a Nash equilibrium**. By the same logic, (Y,X) is not a Nash equilibrium either.
This is a **coordination game**, not a prisoner's dilemma: unlike the pricing example above, neither firm has a unilateral incentive to deviate from *either* (X, X) or (Y, Y) once coordinated there, so there are **two** Nash equilibria. Since $(X, X) = (60, 60)$ gives both firms strictly more than $(Y, Y) = (45, 45)$, (X, X) **Pareto-dominates** (Y, Y) — both firms would prefer it — but without communication or an industry-wide standard-setting body, firms cannot be certain the other will also choose X, so there is a genuine risk of the two firms miscoordinating (one choosing X, the other Y) or settling on the inferior (Y, Y) equilibrium purely out of caution.

VN **GIẢI THÍCH TIẾNG VIỆT**

Không phải mọi trò chơi đều có cấu trúc "thế lưỡng nan của người tù". Trò chơi **phối hợp** (coordination game) ở trên có **hai** cân bằng Nash: (X,X) và (Y,Y) — ở cả hai điểm này, không hãng nào muốn đơn phương đổi lựa chọn. Vì (X,X) mang lại lợi nhuận cao hơn cho *cả hai* hãng so với (Y,Y), ta nói (X,X) **trội hơn theo nghĩa Pareto** (Pareto-dominant). Tuy nhiên, nếu không có sự phối hợp/giao tiếp giữa hai hãng, họ có thể vô tình chọn sai (mỗi hãng một chuẩn khác nhau) hoặc rơi vào cân bằng kém tối ưu hơn (Y,Y) chỉ vì thận trọng.

2.9.6 Price discrimination

Price discrimination occurs when a firm with market power charges *different* prices to different groups of consumers for the same good, where the price difference is *not* justified by a cost difference. It requires: (i) market power, (ii) the ability to identify/separate different consumer groups with different price elasticities of demand, and (iii) the ability to prevent resale between groups. A profit-maximising firm sets a **higher** price in the segment with **less elastic** demand, and a **lower** price in the segment with **more elastic** demand.



Third-degree price discrimination: the firm sets $MR = MC$ separately in each segment, charging the higher price ($P_1 = \$24$) to the less elastic segment (adults) and the lower price ($P_2 = \$14$) to the more elastic segment (students).

Third-degree price discrimination

A cinema faces two separate demand curves: adults $P_1 = 40 - 2Q_1$; students $P_2 = 20 - Q_2$. Marginal cost is constant at $MC = 8$ in both segments. Find the profit-maximising price in each segment, and verify which segment has the more elastic demand at that price.

Adults: $MR_1 = 40 - 4Q_1$. Set $MR_1 = MC$: $40 - 4Q_1 = 8 \implies Q_1 = 8,\ P_1 = 40 - 16 = \$24$.
Students: $MR_2 = 20 - 2Q_2$. Set $MR_2 = MC$: $20 - 2Q_2 = 8 \implies Q_2 = 6,\ P_2 = 20 - 6 = \$14$.
Elasticity check (using $PED = \frac{dQ}{dP} \times \frac{P}{Q}$): from $Q_1 = 20 - 0.5P_1$, $\frac{dQ_1}{dP_1} = -0.5$, so at $(Q_1, P_1) = (8, 24)$: $PED_1 = -0.5 \times \frac{24}{8} = -1.5$. From $Q_2 = 20 - P_2$, $\frac{dQ_2}{dP_2} = -1$, so at $(6, 14)$: $PED_2 = -1 \times \frac{14}{6} \approx -2.33$.
Since $|PED_1| = 1.5 < |PED_2| = 2.33$, adults have the **less elastic** demand — and indeed they are charged the **higher** price ($24 vs. $14), exactly as the theory predicts.

VN **GIẢI THÍCH TIẾNG VIỆT**

Phân biệt giá (price discrimination) yêu cầu doanh nghiệp có sức mạnh thị trường, có thể tách nhóm khách hàng theo độ co giãn cầu khác nhau, và ngăn được việc bán lại giữa các nhóm. Nguyên tắc: đặt giá **cao hơn** cho nhóm có cầu **kém co giãn** (ít nhạy cảm với giá — ví dụ người lớn) và giá **thấp hơn** cho nhóm có cầu **co giãn hơn** (ví dụ học sinh/sinh viên, dễ chuyển sang lựa chọn khác nếu giá cao) — mỗi thị trường được tối ưu riêng theo quy tắc $MR = MC$.

2.10 Government failure

Government failure occurs when an intervention intended to correct a market failure instead makes the allocation of resources *less* efficient than before — a reminder that **intervention** is not automatically an improvement over the free-market outcome, even when the original market failure was real.

Common causes of government failure

- **Imperfect information**: policymakers rarely know the true size of an externality or the true shape of demand/supply curves, so a tax, subsidy, or regulation can easily be set at the

wrong level (too high or too low), creating a new deadweight loss rather than eliminating the original one.

- **Unintended consequences**: interventions can change behaviour in unforeseen ways (e.g. a well-intentioned rent ceiling can lead landlords to withdraw housing from the rental market entirely, worsening the housing shortage it aimed to fix).
- **Administrative and enforcement costs**: designing, monitoring, and enforcing a policy (e.g. collecting a new tax, policing a regulation) itself uses scarce resources, an opportunity cost that must be weighed against the policy's benefits.
- **Political self-interest**: politicians may favour policies that are popular or benefit organised interest groups in the short run (e.g. ahead of an election) over policies that are efficient but less visible or politically costly in the long run.
- **Regulatory capture**: the regulator responsible for overseeing an industry can become unduly influenced by the very firms it is meant to regulate, weakening the effectiveness of the intervention.

Government failure from a mis-set Pigouvian tax

A government estimates the external cost of a negative production externality at \$3/unit and sets a Pigouvian tax accordingly. The *true* external cost is actually only \$1/unit. $D = MSB$: $P = 20 - Q$. $MPC = S$: $P = 2 + Q$. MSC : $P = 3 + Q$ (true social cost, using the correct \$1 externality). Compare the outcome under the \$3 tax to the social optimum.

True social optimum (where $D = MSC$): $20 - Q = 3 + Q \implies 17 = 2Q \implies Q_{opt} = 8.5$.
Outcome under the (mis-set) \$3 tax: taxed supply $P = 2 + 3 + Q = 5 + Q$. Setting $D =$ taxed supply: $20 - Q = 5 + Q \implies 15 = 2Q \implies Q_{tax} = 7.5$.
Since $Q_{tax} = 7.5 < Q_{opt} = 8.5$, the over-sized tax causes the market to **under**-produce relative to the true social optimum — creating a *new* deadweight loss (from under-production) in the opposite direction from the original over-production problem, illustrating how imperfect information about the size of an externality can turn a well-intentioned correction into a new source of inefficiency — a textbook case of **government failure**.

VN **GIẢI THÍCH TIẾNG VIỆT**

Thất bại của chính phủ (government failure) xảy ra khi can thiệp nhằm sửa chữa thất bại thị trường lại khiến việc phân bổ nguồn lực **kém hiệu quả hơn**. Nguyên nhân: thông tin không hoàn hảo (không biết chính xác quy mô ngoại tác nên đặt thuế/trợ cấp sai mức), hậu quả ngoài dự kiến, chi phí hành chính/giám sát, động cơ chính trị ngắn hạn, và "quy hoạch ngược" (regulatory capture — cơ quan quản lý bị chi phối bởi chính ngành mà nó giám sát). Đây là lý do luôn cần đánh giá **cả hai chiều**: chi phí của thất bại thị trường *và* chi phí/rủi ro của chính can thiệp.

2.11 [HL ONLY] Regulation of monopoly power and contestable markets

Because an unregulated monopoly can be both allocatively inefficient ($P > MC$) and capture large, durable supernormal profit, governments often regulate monopolies directly rather than relying on competition (which structurally cannot emerge in a natural monopoly).

Price-cap regulation (e.g. an "RPI−X" formula, common for regulated utilities) limits how much a monopoly can raise its price each year — typically inflation minus an efficiency factor X, forcing the firm to find cost savings just to maintain its profit margin, indirectly passing efficiency gains to consumers over time. **Rate-of-return regulation** instead caps the *profit rate* a regulated firm can earn on its invested capital — simpler to apply, but can blunt the incentive to cut costs (since higher costs, up to the allowed rate of return, are effectively passed through) and can even encourage over-investment in capital (to raise the capital base on which the allowed profit is calculated). **Break-up/divestiture** (forcing a monopoly to split into competing firms) is the most direct intervention, but — as discussed in Unit 1's synthesis practice — may sacrifice genuine economies of scale if the industry has strong natural-monopoly characteristics.

Contestable markets

A market is **contestable** if entry and exit are free/costless (low **barriers to entry and exit**, in particular low "sunk costs" that cannot be recovered on exit), even if only a small number of firms currently operate in it. The key insight: even a market with just one or two incumbent firms can behave close to competitively if it faces a **credible threat of entry** — a "hit and run" entrant could undercut the incumbent's price, earn a quick profit, and exit again before the incumbent can retaliate, so incumbents in a highly contestable market are disciplined toward closer-to-competitive pricing even without many actual rivals currently present. This weakens the traditional assumption that market *structure* (number of firms) alone determines market *conduct* and *performance* — what matters most may be the credibility of the entry threat, not the current firm count.

Assessing contestability

Two industries each have exactly two firms. Industry A requires enormous, highly specialised factories that cannot be resold or repurposed if a firm exits (high sunk costs); Industry B requires only leased, general-purpose equipment that can be returned with minimal loss if a firm exits (low sunk costs). Which industry is likely to be more contestable, and why does this matter for pricing behaviour even though both have the same number of firms?

Industry B is more contestable: low sunk costs mean a potential entrant faces little risk from trying to enter and, if unsuccessful, exiting again — the threat of "hit and run" entry is credible, disciplining the two incumbent firms to price closer to the competitive (lower, closer-to-MC) level even without any *actual* additional competitors. **Industry A is far less contestable**: the huge sunk costs mean any potential entrant risks losing an enormous, unrecoverable investment if the venture fails, so entry is unlikely regardless of how profitable the incumbents currently appear — the two incumbents in Industry A can sustain higher, less competitive pricing despite having the identical firm count (two) as Industry B. This shows why **sunk costs**, not just the number of current firms, are often the more important determinant of real-world market conduct.

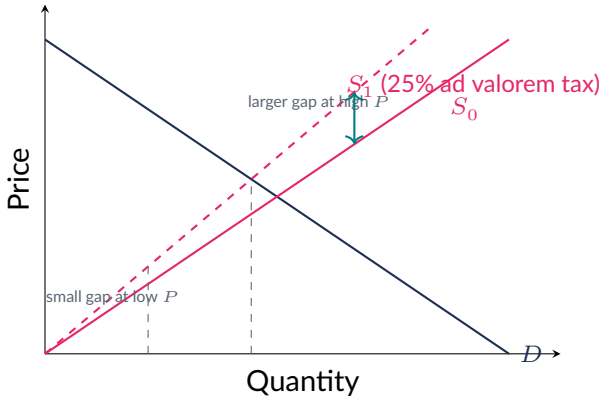
VN **GIẢI THÍCH TIẾNG VIỆT**

Cơ quan quản lý có thể kiểm soát sức mạnh độc quyền bằng **trần giá** (price-cap regulation — giới hạn mức tăng giá hàng năm) hoặc **giới hạn tỉ suất lợi nhuận** (rate-of-return regulation). Lý thuyết **thị trường có thể cạnh tranh được** (contestable markets — HL): một thị trường ít doanh nghiệp vẫn có thể định giá gần với cạnh tranh nếu rào cản gia nhập/rút lui thấp (đặc biệt là **chi phí chìm** — sunk costs — thấp), vì đối thủ tiềm năng có thể gia nhập "đánh nhanh rút gọn" nếu giá hiện tại quá cao. Điều này cho thấy **số lượng doanh nghiệp** không phải lúc nào cũng là yếu tố quyết định hành vi định giá thực tế.

2.12 Ad valorem taxes, and long-run costs revisited

2.12.1 Specific vs. ad valorem taxes

Section 2.6 introduced the specific tax (a fixed $ amount per unit, shifting supply *parallel* upward). An **ad valorem tax** (e.g. VAT/sales tax) is instead a fixed *percentage* of the price, so the vertical gap between the original and taxed supply curves **widens** as the price rises — the taxed curve pivots/fans out from the vertical intercept rather than shifting in a strictly parallel line.



An ad valorem (percentage) tax of 25%: $S_1 = 1.25 \times S_0$. Unlike a specific tax (a constant vertical gap), the gap between S_0 and S_1 **widens** as the price rises, since 25% of a higher price is a larger absolute amount.

Ad valorem tax calculation

$S_0 : P = 2 + 0.5Q$. A 20% ad valorem tax is imposed (the price consumers pay is 1.20 times the price needed to induce firms to supply, at each quantity). $D : P = 20 - Q$. Find the new equilibrium.

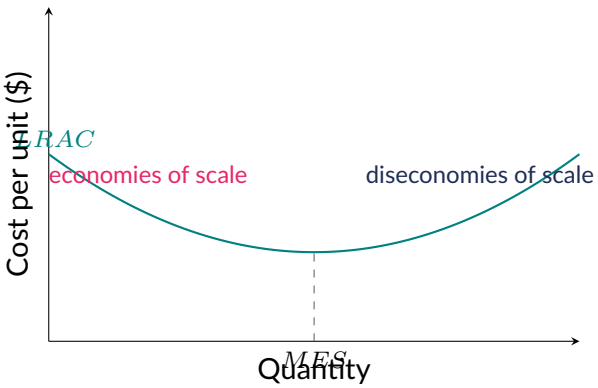
Taxed supply: $S_1 : P = 1.20 \times (2 + 0.5Q) = 2.4 + 0.6Q$. Set $D = S_1$: $20 - Q = 2.4 + 0.6Q \implies 17.6 = 1.6Q \implies Q_1 = 11$.
Consumer price $P_1 = 20 - 11 = \$9$. Producer keeps $P_1/1.20 = 9/1.20 = \$7.50$ (check against S_0: $2 + 0.5(11) = 2 + 5.5 = 7.5$ ✓). Tax per unit here is $9 - 7.5 = \$1.50$ — note that (unlike a specific tax) this $ tax amount is itself a *result* of the equilibrium price, not fixed in advance.

VN **GIẢI THÍCH TIẾNG VIỆT**

Thuế theo **tỉ lệ phần trăm** (ad valorem, ví dụ VAT) khác thuế **theo đơn vị** (specific tax): đường cung sau thuế không dịch song song mà **xoè rộng** dần khi giá tăng (vì % của một số tiền lớn hơn là một số tiền tuyệt đối lớn hơn). Khi giải bài toán ad valorem, nhân giá cung gốc với $(1 +$ thuế suất$)$ để ra đường cung mới, thay vì cộng thêm một số tiền cố định như thuế theo đơn vị.

2.12.2 Long-run average cost and minimum efficient scale

Section 2.10 introduced economies/diseconomies of scale conceptually; the $LRAC$ curve traces them out directly.



The long-run average cost ($LRAC$) curve: falling (economies of scale) until the minimum efficient scale (MES), then rising (diseconomies of scale).

Minimum efficient scale and market structure

Industry A has an MES reached at an output representing only 2% of total market demand. Industry B has an MES reached at an output representing 40% of total market demand. Predict which industry is likely to end up more concentrated (fewer, larger firms), and explain why.

In **Industry A**, a firm only needs to capture about 2% of the market to reach its lowest possible $LRAC$ — many separate firms (up to about 50) could each independently operate at or near minimum efficient scale, so the industry can sustain **many competing firms** without any of them suffering a cost disadvantage (consistent with something closer to perfect competition or monopolistic competition). In **Industry B**, a firm needs 40% of the entire market just to reach its lowest-cost scale — only about two to three firms could *each* operate at MES simultaneously, so the industry is structurally predisposed toward a small number of large firms (**oligopoly**) or even a single dominant firm (**natural monopoly**), since a new, smaller entrant would face a real cost disadvantage (a higher $LRAC$) relative to the established larger firms until it too could grow to a comparable scale.

GIẢI THÍCH TIẾNG VIỆT

VN

Đường $LRAC$ giảm dần do lợi thế kinh tế theo quy mô, đạt tối thiểu tại **quy mô hiệu quả tối thiểu** (minimum efficient scale — MES), sau đó tăng trở lại do bất lợi kinh tế theo quy mô. Nếu MES chỉ chiếm một phần rất nhỏ tổng nhu cầu thị trường, ngành đó có thể có **nhiều doanh nghiệp** cạnh tranh (gần với cạnh tranh hoàn hảo/độc quyền cạnh tranh); nếu MES chiếm một phần rất lớn thị trường, ngành đó có xu hướng chỉ có **một vài doanh nghiệp lớn** (độc quyền nhóm/độc quyền tự nhiên) vì doanh nghiệp nhỏ hơn sẽ chịu bất lợi chi phí.

Bài tập luyện tập

$S_0 : P = 4 + Q$. A 50% ad valorem tax is imposed. $D : P = 28 - 2Q$. Find the new equilibrium price and quantity.

Lời giải chi tiết

Taxed supply: $S_1 : P = 1.5 \times (4 + Q) = 6 + 1.5Q$. Set $D = S_1$: $28 - 2Q = 6 + 1.5Q \implies 22 = 3.5Q \implies Q_1 \approx 6.29$. Consumer price $P_1 = 28 - 2(6.29) \approx \$15.43$. (Producer keeps $P_1/1.5 \approx \$10.29$, consistent with S_0 at $Q \approx 6.29$: $4 + 6.29 = 10.29$ ✓.)

Bài tập luyện tập

An industry's MES output represents 35% of total market demand. Explain what this suggests about the industry's likely market structure, and identify one real-world industry that plausibly fits this pattern.

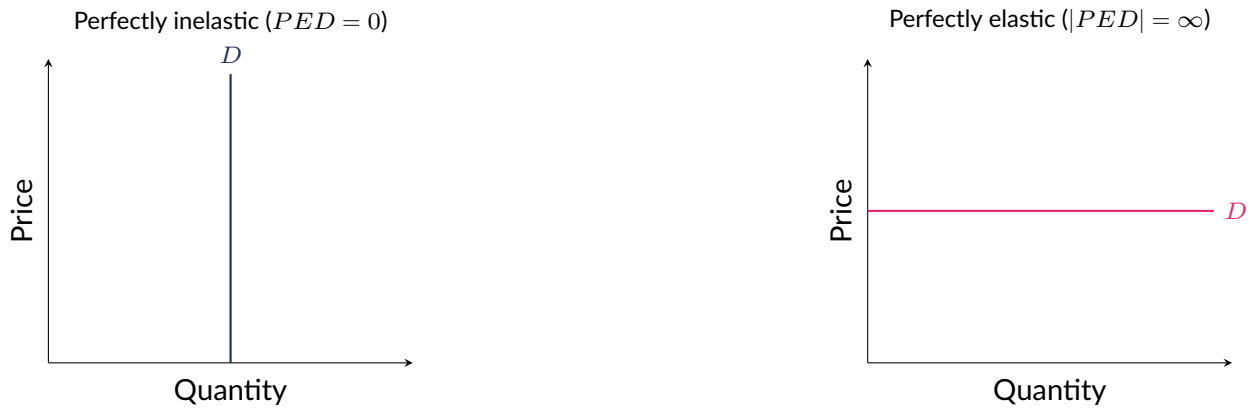
Lời giải chi tiết

Since only about $100\%/35\% \approx 2.9$ firms could each operate at or near minimum efficient scale simultaneously, this industry structurally favours a **small number of large firms** — consistent with **oligopoly**. A plausible real-world example is an industry requiring very large-scale, capital-intensive production facilities relative to total national demand (e.g. commercial aircraft manufacturing, integrated steel production, or national mobile-network infrastructure) — sectors that in practice tend to be dominated by just a handful of large producers rather than many small ones, precisely because of this scale requirement.

2.13 Extreme elasticities, and welfare loss from taxation

2.13.1 Perfectly elastic and perfectly inelastic curves

Two special-case elasticity values appear frequently in diagram-based exam questions: a **perfectly inelastic** curve ($PED = 0$ or $PES = 0$) is drawn perfectly **vertical** — quantity does not respond *at all* to a price change (e.g. a life-saving medicine with literally no substitute, in the very short run; or a fixed supply of original artwork). A **perfectly elastic** curve ($|PED| = \infty$ or $PES = \infty$) is drawn perfectly **horizontal** — even an infinitesimally small price change causes quantity to swing to zero or to infinity (a theoretical benchmark, e.g. a single small firm selling an undifferentiated product into a huge world market at the fixed world price, unable to sell anything at all if it charges even slightly more).



The two extreme elasticity benchmarks: perfectly inelastic (vertical — quantity fixed regardless of price) and perfectly elastic (horizontal — quantity fully flexible at a single fixed price).

Tax incidence at extreme elasticities

Using the tax-incidence rule (Section 2.6): if supply is **perfectly inelastic** ($PES = 0$) and a specific tax is imposed, predict who bears the entire burden of the tax, and explain using the vertical supply curve.

Since the tax-incidence rule states the more inelastic side bears the larger share of a tax, and supply here is *perfectly* inelastic (the extreme case), **producers bear 100% of the tax burden** — the equilibrium *quantity* cannot change at all (the vertical supply curve fixes it), so the price

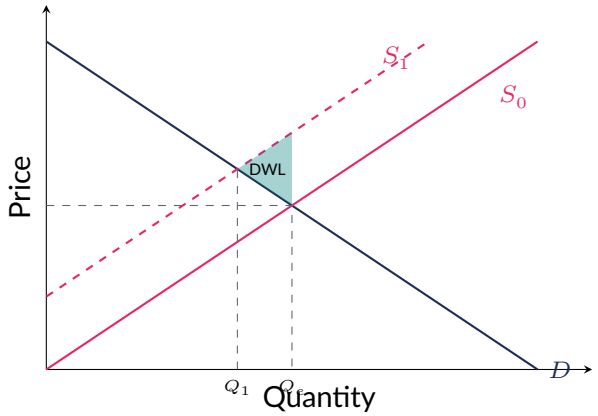
consumers pay cannot rise either; producers simply receive a lower net-of-tax price on the same fixed quantity they were always going to supply. This is the standard reasoning behind proposals to tax perfectly inelastic tax bases (e.g. a tax on the unimproved value of land, which cannot physically be relocated or reduced in supply) — such taxes are often argued to cause *no* deadweight loss at all, since quantity does not fall.

VN **GIẢI THÍCH TIẾNG VIỆT**

Đường cầu/cung **hoàn toàn không co giãn** (perfectly inelastic, PED hoặc $PES = 0$) là đường **thẳng đứng** — lượng không đổi dù giá thay đổi thế nào. Đường **hoàn toàn co giãn** (perfectly elastic) là đường **nằm ngang** — chỉ một mức giá duy nhất được chấp nhận. Nếu cung hoàn toàn không co giãn, người bán gánh **100%** thuế (vì lượng không đổi nên giá người mua trả không đổi) — đây là lý do thuế đánh vào đất đai (vốn có nguồn cung cố định) thường được cho là không gây tổn thất phúc lợi.

2.13.2 Deadweight loss: a direct visual

Combining Sections 2.3 (surplus) and 2.6 (tax incidence) directly: the tax's deadweight loss is precisely the loss of total (consumer + producer) surplus caused by trade shrinking from Q_e to Q_1.



The deadweight loss (DWL) triangle from a specific tax: bounded by D, S_0 (the original, untaxed supply), and the vertical line at the new, lower post-tax quantity Q_1 — the surplus that existed on the "lost" units of trade between Q_1 and Q_e.

Bài tập luyện tập

If demand is **perfectly elastic** and a specific tax is imposed on suppliers, predict who bears the tax burden and explain using the horizontal demand curve.

Lời giải chi tiết

Since demand is *perfectly* elastic (the extreme opposite case from the worked example above), **producers bear 100% of the tax burden**: consumers will only buy at the single fixed price the horizontal demand curve represents (any higher price and quantity demanded collapses to zero, e.g. because perfect substitutes are available elsewhere at that price), so firms cannot pass on any of the tax to consumers — they must absorb the full tax themselves out of their own margin, or exit the market entirely if that makes production unprofitable.

Bài tập luyện tập

Using $D: P = 16 - Q$, $S_0: P = Q$, and a \$4/unit tax, calculate Q_e, Q_1 (post-tax), and the deadweight loss.

Lời giải chi tiết

Pre-tax: $16 - Q = Q \implies Q_e = 8$. Taxed supply $S_1: P = 4 + Q$. Post-tax: $16 - Q = 4 + Q \implies 12 = 2Q \implies Q_1 = 6$.

$$\text{DWL} = \tfrac{1}{2} \times (Q_e - Q_1) \times \text{tax} = \tfrac{1}{2} \times (8 - 6) \times 4 = \$4.$$

2.14 Comparing total welfare: perfect competition vs. monopoly

Sections 2.12 and 2.13 established that perfect competition achieves $P = MC$ (allocative efficiency) while monopoly sets $P > MC$. This can be made fully concrete by comparing total welfare (consumer + producer surplus) directly under each structure, holding demand and cost conditions identical.

Quantifying the welfare loss from monopolisation

A market has $D: P = 40 - Q$ and constant marginal cost $MC = AC = 10$ (constant costs, for simplicity — so there are no economies/diseconomies of scale to consider separately). Compare the outcome, and total welfare, if the market is (a) perfectly competitive vs. (b) monopolised by a single firm.

(a) Perfect competition: firms produce where $P = MC$: $40 - Q = 10 \implies Q_{PC} = 30,\ P_{PC} = 10$.

$CS_{PC} = \tfrac{1}{2} \times 30 \times (40 - 10) = \tfrac{1}{2} \times 30 \times 30 = 450.$ $PS_{PC} = 0$ (since $P = MC = AC$ everywhere, zero producer

$$\text{Total welfare (PC)} = 450 + 0 = 450.$$

(b) Monopoly: $MR = 40 - 2Q$. Set $MR = MC$: $40 - 2Q = 10 \implies Q_M = 15,\ P_M = 40 - 15 = 25$.

$$CS_M = \tfrac{1}{2} \times 15 \times (40 - 25) = \tfrac{1}{2} \times 15 \times 15 = 112.5.$$

$$PS_M = (P_M - MC) \times Q_M = (25 - 10) \times 15 = 225.$$

$$\text{Total welfare (Monopoly)} = 112.5 + 225 = 337.5.$$

$$\text{Deadweight loss from monopolisation} = 450 - 337.5 = \$112.5.$$

Monopolising this market **redistributes** some surplus from consumers to the producer (consumer surplus falls from 450 to 112.5, while producer surplus rises from 0 to 225) — but total welfare still **falls** by \$112.5, the pure efficiency cost of restricting output from $Q_{PC} = 30$ to $Q_M = 15$, exactly the allocative-inefficiency argument against monopoly made qualitatively in Section 2.13, now shown numerically.

VN **GIẢI THÍCH TIẾNG VIỆT**

So sánh trực tiếp bằng số cho thấy: khi thị trường chuyển từ cạnh tranh hoàn hảo sang độc quyền (với cùng đường cầu và chi phí), **thặng dư tiêu dùng giảm**, **thặng dư sản xuất tăng** (độc quyền "lấy" một phần thặng dư của người tiêu dùng), nhưng **tổng phúc lợi giảm** — đây chính là **tổn thất phúc lợi ròng** (deadweight loss) do độc quyền hạn chế sản lượng để đẩy giá lên. Đây là bằng chứng định lượng cho lập luận "độc quyền kém hiệu quả phân bổ" đã học ở phần lý

thuyết.

Bài tập luyện tập

A market has $D: P = 60 - Q$ and constant $MC = AC = 20$. Calculate total welfare under (a) perfect competition and (b) monopoly, and the resulting deadweight loss.

Lời giải chi tiết

(a) PC: $60 - Q = 20 \implies Q_{PC} = 40,\ P_{PC} = 20.\ CS_{PC} = \frac{1}{2} \times 40 \times 40 = 800.\ PS_{PC} = 0.$ Total $= 800.$
(b) Monopoly: $MR = 60 - 2Q.\ 60 - 2Q = 20 \implies Q_M = 20,\ P_M = 40.\ CS_M = \frac{1}{2} \times 20 \times 20 = 200.\ PS_M = (40 - 20) \times 20 = 400.$ Total $= 600.$

$$\text{DWL} = 800 - 600 = \$200.$$

2.15 Market structures: a consolidated comparison

	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
Number of firms	Very many	Many	Few (dominant)	One
Product	Homogeneous	Differentiated	Homo. or differentiated	Unique, no close substitute
Barriers to entry	None	Low	High	Very high
Long-run profit	Normal only	Normal only	Can be supernormal	Can be supernormal
Allocative efficiency	Yes ($P = MC$)	No ($P > MC$)	No ($P > MC$)	No ($P > MC$)
Productive efficiency	Yes (min AC)	No (excess capacity)	Usually no	Usually no

VN **GIẢI THÍCH TIẾNG VIỆT**
Bảng tổng hợp bốn cấu trúc thị trường: càng về phía **độc quyền**, số doanh nghiệp càng ít, rào cản gia nhập càng cao, khả năng duy trì lợi nhuận siêu ngạch dài hạn càng lớn, nhưng hiệu quả phân bổ ($P = MC$) càng kém. Chỉ **cạnh tranh hoàn hảo** đạt cả hai loại hiệu quả (phân bổ và sản xuất) trong dài hạn — các cấu trúc còn lại đều có ít nhất một dạng phi hiệu quả, nhưng đổi lại có thể mang lại lợi ích khác (đa dạng sản phẩm ở cạnh tranh độc quyền, lợi thế quy mô ở độc quyền/độc quyền nhóm).

2.15.1 The kinked demand curve: a discontinuous MR

Section 2.15's kinked demand curve has a distinctive consequence for marginal revenue: because the demand curve itself is *steeper* below the kink than above it, MR has a **vertical discontinuity (gap)** directly below the kink.

Why the kinked demand curve implies stable prices

Explain why a discontinuous (gapped) MR curve at the kink helps explain why oligopolists often leave prices unchanged even after a moderate change in marginal cost.

Because MR jumps discontinuously downward at the output level corresponding to the kink, a firm's profit-maximising output (where $MR = MC$) can remain *exactly the same* even if MC

shifts up or down by a moderate amount — as long as the new MC curve still passes through the vertical gap in MR, the intersection point (and therefore the profit-maximising price and quantity) does not change at all. This gives a formal explanation for a commonly observed pattern in oligopolistic markets: firms often leave prices unchanged for extended periods even as underlying costs fluctuate somewhat, only adjusting prices when a cost change is large enough to push MC outside the discontinuous gap in MR.

VN **GIẢI THÍCH TIẾNG VIỆT**

Đường cầu gấp khúc có MR **gián đoạn** (có một "khoảng trống" thẳng đứng) ngay dưới điểm gấp khúc, vì đường cầu dốc hơn ở phần dưới so với phần trên điểm gấp khúc. Điều này giải thích vì sao doanh nghiệp oligopoly thường **giữ nguyên giá** ngay cả khi chi phí biên thay đổi vừa phải — miễn đường MC mới vẫn cắt qua "khoảng trống" của MR, sản lượng và giá tối ưu ($MR = MC$) không đổi.

Bài tập luyện tập

Using the market-structure comparison table, identify which market structure(s) achieve productive efficiency in the long run, and explain why the others do not, in one sentence each.

Lời giải chi tiết

Only **perfect competition** achieves productive efficiency in the long run (competitive pressure and free entry/exit force firms to produce at minimum AC). **Monopolistic competition** does not, because the tangency between demand and AC occurs on the falling portion of AC (excess capacity, Section 2.14). **Oligopoly** and **monopoly** do not typically achieve it either, since weak or absent competitive pressure removes the forces that would otherwise push firms toward their minimum-cost output level.

2.16 Practice problems

Bài tập luyện tập

A rise in the price of coffee beans (a key input) causes coffee shops to raise their prices and reduce the quantity of coffee offered for sale at every price. This is best shown as:

(A) A rightward shift of the demand curve for coffee

(B) A movement up along a fixed supply curve for coffee

(C) A leftward shift of the supply curve for coffee

(D) A leftward shift of the demand curve for coffee

Lời giải chi tiết

A change in the cost of an input is a non-price determinant of **supply** (not demand), so it shifts the entire supply curve. Since the input cost rose, firms are willing to supply *less* at every price — a **leftward (upward) shift of supply**. **(C)**.

Bài tập luyện tập

Given $Q_d = 180 - 6P$ and $Q_s = -30 + 9P$, find the equilibrium price and quantity, then calculate consumer surplus given the demand curve's price-intercept is $P = 30$.

Lời giải chi tiết

Set $Q_d = Q_s$: $180 - 6P = -30 + 9P \implies 210 = 15P \implies P^* = 14$. $Q^* = 180 - 6(14) = 180 - 84 = 96$.
$CS = \frac{1}{2} \times Q^* \times (30 - 14) = \frac{1}{2} \times 96 \times 16 = \$768$.

Bài tập luyện tập

Price falls from \$40 to \$32 (a 20% decrease) and quantity demanded rises from 500 to 550 (a 10% increase). Calculate PED and state whether total revenue rose or fell.

(A) $PED = -0.5$; TR rose
(B) $PED = -0.5$; TR fell
(C) $PED = -2.0$; TR fell
(D) $PED = -2.0$; TR rose

Lời giải chi tiết

$PED = \dfrac{+10\%}{-20\%} = -0.5$ (inelastic). $TR_0 = 40 \times 500 = 20{,}000$; $TR_1 = 32 \times 550 = 17{,}600$ — TR **fell**. This matches the rule: for inelastic demand, a price *fall* reduces TR (the reverse of a price rise raising it). **(B)**.

Bài tập luyện tập

A 5% rise in income causes quantity demanded of a good to fall by 2%. Classify the good and explain.

(A) Luxury good, $YED = -0.4$
(B) Inferior good, $YED = -0.4$
(C) Necessity, $YED = 0.4$
(D) Normal good, $YED = 2.5$

Lời giải chi tiết

$YED = \dfrac{-2\%}{+5\%} = -0.4$. Since $YED < 0$, quantity demanded *falls* as income rises — this is an **inferior good**. **(B)**.

Bài tập luyện tập

The price of flights rises by 8%, causing demand for hotel bookings at the destination to fall by 6%. Calculate XED and classify the relationship between flights and hotel bookings.

Lời giải chi tiết

$XED = \dfrac{-6\%}{+8\%} = -0.75$. Since $XED < 0$, flights and hotel bookings are **complements** — a rise in the price of one good (flights) reduces demand for the other (hotel bookings), consistent with them typically being consumed together.

Bài tập luyện tập

A \$3/unit specific tax is imposed on a good with $D: P = 24 - Q$ and $S_0: P = Q$. Find the pre-tax equilibrium, the post-tax consumer price, producer price, quantity, and the deadweight loss.

Lời giải chi tiết

Pre-tax: $24 - Q = Q \implies Q_e = 12,\ P_e = 12$. Taxed supply $S_1: P = Q + 3$. New equilibrium: $24 - Q = Q + 3 \implies 21 = 2Q \implies Q_1 = 10.5$. Consumer price $P_1 = 24 - 10.5 = 13.5$. Producer price $P_2 = 13.5 - 3 = 10.5$.

$$\text{DWL} = \tfrac{1}{2} \times (Q_e - Q_1) \times \text{tax} = \tfrac{1}{2} \times (12 - 10.5) \times 3 = \$2.25.$$

Bài tập luyện tập

Which combination correctly describes the effect of a subsidy on a market where demand is *more price-elastic* than supply?

(A) Producers capture the larger share of the subsidy's benefit

(B) Consumers capture the larger share of the subsidy's benefit

(C) The subsidy has no effect on price

(D) The subsidy only benefits the government

Lời giải chi tiết

The rule for a subsidy mirrors the tax-incidence rule: the side of the market that is *more inelastic* (less responsive) captures the **larger** share of the benefit. If demand is more elastic than supply, then **supply is the more inelastic side**, so **producers** capture the larger share. **(A)**.

Bài tập luyện tập

A government sets a minimum price for wheat above the free-market equilibrium and commits to buying up any resulting surplus. Using the concepts of **efficiency** and **equity**, evaluate this buffer-stock policy. (Short response.)

Lời giải chi tiết

The policy directly supports farmer incomes (an **equity** goal, protecting often-vulnerable agricultural producers from volatile world prices), and stockpiling can stabilise prices for consumers over time by releasing stock in years of shortage. However, it typically requires ongoing government spending to purchase and store the surplus (an opportunity cost — those funds could fund other programmes), and if the minimum price is set persistently above equilibrium, it causes chronic over-production, a form of **productive inefficiency** in the sense that resources are devoted to producing units that would not clear the market at a genuine market-determined price — an efficiency cost being incurred to pursue the equity/stability goal.

Bài tập luyện tập

Diagram-drawing prompt. Draw and fully label a diagram of a negative production externality. Show the market equilibrium, the socially optimal equilibrium, and shade the welfare loss triangle. Then state one specific real-world policy that could move the market from Q_m toward

Q_{opt}.

Lời giải chi tiết

A correct diagram has quantity on the horizontal axis and cost/benefit (\$) on the vertical axis, with three lines: $D = MPB = MSB$ (downward-sloping, unaffected by a *production* externality), $MPC = S$ (upward-sloping, lower), and MSC (upward-sloping, lying *above* MPC by the constant external cost per unit). Q_m is where D crosses MPC; Q_{opt} (to the *left* of Q_m) is where D crosses MSC. The welfare-loss triangle is bounded by MSC, $MPB(= D)$, and the vertical line at Q_m, between Q_{opt} and Q_m. A specific policy: a **Pigouvian tax** per unit equal to the external cost, which shifts MPC up until it coincides with MSC, moving the new market equilibrium to Q_{opt}.

Bài tập luyện tập

$MPB = D:\ P = 30 - Q$. $MSB:\ P = 24 - Q$ (a negative consumption externality of \$6/unit). $S = MPC = MSC:\ P = 2 + Q$. Find Q_m, Q_{opt}, and the welfare loss.

Lời giải chi tiết

Q_m (where $D = S$): $30 - Q = 2 + Q \implies 28 = 2Q \implies Q_m = 14$.
Q_{opt} (where $MSB = MSC$): $24 - Q = 2 + Q \implies 22 = 2Q \implies Q_{opt} = 11$.
At $Q_m = 14$: $MSB = 24 - 14 = 10$; $MSC = 2 + 14 = 16$. Gap $= 16 - 10 = 6$.

$$\text{Welfare loss} = \tfrac{1}{2} \times (Q_m - Q_{opt}) \times 6 = \tfrac{1}{2} \times 3 \times 6 = \$9.$$

Bài tập luyện tập

State whether each is best classified as a public good, a common-pool resource, or neither, and justify briefly: (a) a lighthouse; (b) an underground aquifer shared by many farms; (c) a subscription streaming service.

Lời giải chi tiết

(a) **Public good**: a lighthouse's warning light is non-excludable (any ship can see it) and non-rivalrous (one ship benefiting does not reduce the light available to others). (b) **Common-pool resource**: the aquifer is non-excludable (hard to stop any farm from pumping) but **rivalrous** (water pumped by one farm is unavailable to others) — at risk of a tragedy of the commons (over-pumping). (c) **Neither** (a private/club good): the streaming service is **excludable** (a subscription/login is required) even though, once subscribed, additional viewers add little extra cost (weakly non-rivalrous) — it does not fit the public-good definition because non-payers can be excluded.

Bài tập luyện tập

[HL ONLY] A used-car market suffers because sellers know far more about each car's true condition than buyers do, causing many buyers to assume any given car might be a "lemon" and offer only a low average price — pushing some owners of genuinely good cars to withdraw from selling. Name this type of market failure and explain the mechanism. (Short response.)

Lời giải chi tiết

This is **adverse selection** arising from **asymmetric information**. Because buyers cannot distinguish good cars from "lemons" (poor-quality cars) before purchase, they rationally offer a price reflecting the *average* expected quality. This price is too low to tempt owners of genuinely good cars to sell (they know their car is worth more than the average-quality price offered), so those cars are withdrawn from the market — leaving a disproportionate share of lower-quality cars for sale, which can further depress the average price buyers are willing to offer, potentially causing the market to shrink or partially collapse even though mutually beneficial trades (of good cars) would exist under full information.

Bài tập luyện tập

A firm's short-run total cost function is $TC = 60 + 20Q + Q^2$. Find TFC, and MC at $Q = 5$ and $Q = 6$.

(A) $TFC = 60$; $MC(5) = 30$; $MC(6) = 32$

(B) $TFC = 80$; $MC(5) = 25$; $MC(6) = 27$

(C) $TFC = 60$; $MC(5) = 145$; $MC(6) = 176$

(D) $TFC = 20$; $MC(5) = 30$; $MC(6) = 32$

Lời giải chi tiết

$TFC = TC(0) = 60$. $TC(5) = 60 + 100 + 25 = 185$; $TC(4) = 60 + 80 + 16 = 156$; $MC(5) = 185 - 156 = 29$... let's use the calculus shortcut instead: for $TC = 60 + 20Q + Q^2$, $MC = \frac{d(TC)}{dQ} = 20 + 2Q$. $MC(5) = 20 + 10 = 30$. $MC(6) = 20 + 12 = 32$. **(A)**. (The discrete difference $TC(5) - TC(4) = 29$ is close to the calculus value of 30 because MC is continuous and roughly linear here — for exam purposes with a given cost *function*, use $MC = d(TC)/dQ$.)

Bài tập luyện tập

In perfect competition, a price-taking firm faces $P = \$40$ and $MC = 8 + 4Q$. Find the profit-maximising output, and the firm's profit if $AC = \$32$ at that output.

(A) $Q^* = 8$; profit $= \$64$

(B) $Q^* = 8$; profit $= \$320$

(C) $Q^* = 10$; profit $= \$80$

(D) $Q^* = 10$; profit $= \$320$

Lời giải chi tiết

Since the firm is a price taker, $P = AR = MR = 40$. Set $MR = MC$: $40 = 8 + 4Q \implies Q^* = 8$. Profit $= (P - AC) \times Q^* = (40 - 32) \times 8 = \$64$. **(A)**.

Bài tập luyện tập

A monopolist faces demand $P = 120 - 4Q$ and $MC = 20 + 2Q$. Find the profit-maximising price and quantity, and state whether the outcome is allocatively efficient, with reasoning.

Lời giải chi tiết

$MR = 120 - 8Q$. Set $MR = MC$: $120 - 8Q = 20 + 2Q \implies 100 = 10Q \implies Q^* = 10$. $P^* = 120 - 4(10) = \$80$.
Check MC at $Q^* = 10$: $MC = 20 + 20 = 40$. Since $P^* = 80 > MC = 40$, the outcome is **not allocatively efficient** — the monopolist restricts output and charges a price above marginal cost, meaning consumers value additional units (at \$80) far more than the resources cost to

produce them ($40), so total welfare would rise if output expanded — but the monopolist has no incentive to expand beyond Q^*, since that is where its own profit is maximised.

Bài tập luyện tập

Explain, using the concept of **excess capacity**, why consumers might still prefer a monopolistically competitive market to a perfectly competitive one for a good like restaurants, despite the long-run inefficiency. (Short response.)

Lời giải chi tiết

Excess capacity means restaurants (in long-run equilibrium) operate below the output level that would minimise average cost — a productive inefficiency. However, this is the direct result of **product differentiation**: instead of one homogeneous "restaurant meal" as in perfect competition, consumers can choose between many different cuisines, price points, atmospheres, and locations. Many consumers place a high value on this **variety and choice** — arguably raising **economic well-being** even though it comes at some efficiency cost, illustrating a genuine trade-off between the central concepts of **efficiency** and (broader) consumer welfare, rather than one structure being unambiguously "better".

Bài tập luyện tập

Two airlines set prices for a new route. Payoffs ($m/year, Airline A first): both set High price $(8, 8)$; A High, B Low $(2, 11)$; A Low, B High $(11, 2)$; both Low $(4, 4)$. Find the Nash equilibrium and comment on its efficiency relative to the joint-profit-maximising outcome.

Lời giải chi tiết

For Airline A: if B is High, A prefers Low ($11 > 8$); if B is Low, A prefers Low ($4 > 2$) — Low is dominant. By symmetry, Low is dominant for B too. **Nash equilibrium: (Low, Low)**, giving each airline $4m. This is worse for *both* firms than the jointly best outcome (both High, $8m each) — a classic prisoner's dilemma showing why, absent effective (and typically illegal) collusion, competitive pressure in oligopoly can drive prices — and profits — below what firms could jointly achieve, though this competitive outcome is generally *better for consumers* than the collusive one.

Bài tập luyện tập

A firm price-discriminates between business travellers ($P_1 = 100 - Q_1$) and leisure travellers ($P_2 = 60 - 2Q_2$), with constant $MC = 20$ in both segments. Find P_1, P_2, and identify which segment is charged more and why.

(A) $P_1 = \$60$; $P_2 = \$40$; business less elastic

(B) $P_1 = \$40$; $P_2 = \$60$; leisure less elastic

(C) $P_1 = \$60$; $P_2 = \$40$; business more elastic

(D) $P_1 = \$80$; $P_2 = \$50$; business less elastic

Lời giải chi tiết

Business: $MR_1 = 100 - 2Q_1$. Set $= MC = 20$: $100 - 2Q_1 = 20 \implies Q_1 = 40,\ P_1 = 100 - 40 = \$60$.
Leisure: $MR_2 = 60 - 4Q_2$. Set $= 20$: $60 - 4Q_2 = 20 \implies Q_2 = 10,\ P_2 = 60 - 20 = \$40$.

Business travellers are charged the higher price ($60), consistent with business travel typically having **less elastic** demand (time-sensitive, employer-paid, few substitutes for a specific flight time) than leisure travel, which is more price-sensitive. **(A)**.

Bài tập luyện tập

Explain why a firm facing a linear demand curve $P = a - bQ$ always has $MR = a - 2bQ$, and use this to state, in general terms, where MR crosses the horizontal axis relative to where demand crosses it. (Short response.)

Lời giải chi tiết

$TR = P \times Q = (a - bQ)Q = aQ - bQ^2$. Differentiating (or taking the marginal/incremental relationship for a linear function), $MR = \frac{d(TR)}{dQ} = a - 2bQ$ — the same vertical intercept a as demand, but twice the (negative) slope. Demand reaches zero (crosses the horizontal axis) at $Q = a/b$; MR reaches zero at $Q = a/(2b)$ — exactly **half** the quantity at which demand reaches zero. This is why, on any diagram with linear demand, MR should always be drawn crossing the horizontal axis at exactly half the horizontal distance that demand does.

Bài tập luyện tập

Paper 1-style extended response. "A national telecommunications regulator is deciding whether to break up a dominant telecom monopoly into several competing firms." Using at least three named central concepts and relevant market-structure theory, evaluate this proposal.

Lời giải chi tiết

A strong answer addresses: (1) **Efficiency** — breaking up the monopoly could move the market toward allocative efficiency (P closer to MC) by introducing competitive pressure, but could sacrifice **productive** efficiency if telecom infrastructure exhibits strong economies of scale (a natural-monopoly argument), since splitting the network could raise average costs for everyone; (2) **Intervention** — this is itself a major act of regulatory intervention, and the analysis should weigh it against lighter-touch alternatives (e.g. price-cap regulation of the existing monopoly, or forced network access for competitors, rather than a full break-up); (3) **Economic well-being / equity** — lower long-run prices and more innovation from increased competition could raise consumer welfare broadly, particularly benefiting price-sensitive consumers, but transitional disruption (job losses, investment uncertainty during restructuring) is a real short-run cost; (4) a complete answer reaches a **normative conclusion**, e.g. that a break-up is justified only if the market does *not* exhibit strong natural-monopoly characteristics — otherwise regulation of the existing monopoly (rather than break-up) better balances efficiency and consumer welfare.

Bài tập luyện tập

A market has $D : P = 50 - 2Q$ and $S : P = 5 + 3Q$. (a) Find equilibrium. (b) A $5 subsidy is introduced. Find the new equilibrium quantity and the price consumers pay.

Lời giải chi tiết

(a) $50 - 2Q = 5 + 3Q \implies 45 = 5Q \implies Q_e = 9,\ P_e = 50 - 18 = 32$.
(b) New (subsidised) supply: $S_1 : P = 5 + 3Q - 5 = 3Q$ (firms need \$5 less at each quantity). New equilibrium: $50 - 2Q = 3Q \implies 50 = 5Q \implies Q_1 = 10$. Consumer price $= 50 - 2(10) = \$30$ (a fall of \$2 from the original \$32; producers now receive $30 + 5 = \$35$, a rise of \$3 — consistent with supply here being the relatively steeper/more inelastic curve, capturing the larger share of the subsidy).

Bài tập luyện tập

A government sets a Pigouvian tax at \$5/unit on a negative externality, but the true external cost is only \$2/unit. $D = MSB:\ P = 30 - Q$, $MPC = S:\ P = 4 + Q$, $MSC:\ P = 6 + Q$ (true). Find the true social optimum and the outcome under the mis-set tax, and classify the resulting inefficiency.

Lời giải chi tiết

True social optimum ($D = MSC$): $30 - Q = 6 + Q \implies 24 = 2Q \implies Q_{opt} = 12$.
Under the \$5 tax: taxed supply $P = 4 + 5 + Q = 9 + Q$. Setting $D =$ taxed supply: $30 - Q = 9 + Q \implies 21 = 2Q \implies Q_{tax} = 10.5$.
Since $Q_{tax} = 10.5 < Q_{opt} = 12$, the market now **under**-produces relative to the true optimum — the over-sized tax has overcorrected the original over-production problem, creating a new welfare loss from under-production. This is **government failure** caused by imperfect information about the true size of the externality.

Bài tập luyện tập

State whether each scenario is best described as market failure or government failure: (a) a factory pollutes a river with no penalty because no law restricts it; (b) a well-intentioned rent ceiling causes landlords to withdraw so many properties from the rental market that the housing shortage worsens; (c) an unregulated monopoly restricts output below the competitive level.

Lời giải chi tiết

(a) **Market failure** — an unpriced negative externality with no intervention at all. (b) **Government failure** — the intervention (rent ceiling) itself worsened the very problem (housing shortage) it aimed to solve, an unintended consequence. (c) **Market failure** — the absence of competitive pressure (not any government action) causes the allocative inefficiency.

Bài tập luyện tập

[HL ONLY] Explain why a natural monopoly regulated with rate-of-return regulation might have a weaker incentive to cut costs than one regulated with price-cap (RPI$-X$) regulation. (Short response.)

Lời giải chi tiết

Under **rate-of-return regulation**, the firm is permitted to earn a fixed percentage return on its capital base — if its costs rise, its allowed revenue/profit can effectively rise too (as long as the rate of return stays within the cap), so cost increases are substantially passed through rather

than absorbed by the firm, blunting the incentive to minimise costs (and can even reward excessive capital investment, since a larger capital base supports a larger allowed profit in dollar terms). Under **price-cap regulation**, the firm's *price* is fixed (typically for several years, adjusted only by inflation minus an efficiency factor X) regardless of the firm's actual costs — so any cost reduction the firm achieves flows straight to its own profit until the price cap is next reviewed, creating a much stronger, more direct incentive to cut costs and improve efficiency.

Bài tập luyện tập

[HL ONLY] Two duopoly industries both have exactly three firms. Industry X has very high sunk costs (specialised, unresellable equipment); Industry Y has very low sunk costs (general-purpose, easily resold equipment). Predict which industry will see prices closer to the competitive level, and explain why using the theory of contestable markets.

Lời giải chi tiết

Industry Y is likely to see prices closer to the competitive level. Even with the same number of incumbent firms (three) in both industries, low sunk costs in Industry Y make "hit and run" entry credible: a new firm could enter, undercut prices, capture some profit, and exit again with minimal loss if the incumbents retaliate — this *threat* disciplines incumbent pricing even without any actual new entry occurring. In Industry X, the very high sunk costs mean a potential entrant risks losing an unrecoverable investment if the incumbents respond aggressively, so the threat of entry is far less credible, allowing the three incumbents more room to sustain higher, less competitive prices.

Bài tập luyện tập

A firm produces where $MSC > MSB$ due to an unregulated negative externality. The government responds with a regulation banning production above the socially optimal quantity, but enforcement is weak and 30% of firms ignore the ban with no consequence. Using the concept of **government failure**, explain why this regulation might fail to achieve its goal even though it was correctly calculated. (Short response.)

Lời giải chi tiết

Even a regulation calculated with perfectly accurate information about the externality (correctly identifying Q_{opt}) can fail in practice if **enforcement** is weak: the **administrative/enforcement cost** of monitoring and penalising every firm is a real resource cost, and if it is under-funded, a meaningful share of firms (here, 30%) can simply ignore the rule without consequence, so actual market output remains above Q_{opt} despite the "correct" policy on paper — illustrating that government failure can arise not only from mis-calculating a policy, but also from failing to implement and enforce even a well-designed one.

Bài tập luyện tập

A regulator caps a water utility's allowed price increases at "inflation minus 2%" each year (an RPI$-X$ formula with $X = 2\%$). If inflation is 4% this year, by what maximum percentage can the utility raise its price, and what is the economic purpose of subtracting X?

(A) 6%; to guarantee the firm's profit rises
(B) 2%; to force efficiency gains to be shared with consumers
(C) 4%; matches inflation exactly
(D) 0%; prices are frozen

Lời giải chi tiết

Maximum price rise = inflation $-X = 4\% - 2\% = 2\%$. Subtracting X forces the regulated firm to find real efficiency/productivity gains each year just to maintain its profit margin (since its allowed price rises *more slowly* than general inflation) — the resulting cost savings are then indirectly passed on to consumers through a real (inflation-adjusted) price that gradually falls over time. **(B)**.

Bài tập luyện tập

A firm operates in a market with $MC = 8 + 2Q$ and faces demand $P = 56 - 2Q$ if it behaves as a monopoly, but the market is highly **contestable**. Explain how the firm's actual pricing behaviour might differ from the standard monopoly $MR = MC$ prediction, and why.

Lời giải chi tiết

The standard monopoly calculation ($MR = 56 - 4Q$, set $= MC = 8 + 2Q \implies 48 = 6Q \implies Q^* = 8,\ P^* = 56 - 16 = \$40$) assumes the firm can safely exploit its position as sole seller. But if the market is highly **contestable** (low sunk/entry costs), pricing at the full monopoly level ($P = \$40$, well above $MC = 8 + 16 = 24$ at that output) would invite "hit and run" entry from a rival undercutting the price — so a profit-maximising incumbent in a contestable market may instead set a **lower, limit price** closer to (but still somewhat above) average cost, sacrificing some short-run monopoly profit in order to deter entry and protect its market position over the longer run — a real-world qualification to the textbook monopoly pricing rule.

Bài tập luyện tập

A market has $D: P = 45 - 3Q$ and $S: P = 5 + 2Q$. (a) Find the equilibrium. (b) Calculate consumer surplus, producer surplus, and total welfare.

Lời giải chi tiết

(a) $45 - 3Q = 5 + 2Q \implies 40 = 5Q \implies Q_e = 8,\ P_e = 45 - 24 = 21$.
(b) $CS = \frac{1}{2} \times 8 \times (45 - 21) = \frac{1}{2} \times 8 \times 24 = 96$. $PS = \frac{1}{2} \times 8 \times (21 - 5) = \frac{1}{2} \times 8 \times 16 = 64$. Total welfare $= 96 + 64 = 160$.

Bài tập luyện tập

Explain why a firm in monopolistic competition might rationally choose *not* to cut its price to the level that would maximise short-run profit, if doing so would attract disproportionate attention from close competitors. Relate your answer to the kinked demand curve idea from oligopoly, even though monopolistic competition formally has many competitors rather than a few.

Lời giải chi tiết

Although monopolistic competition formally assumes firms act independently (unlike the explicit **interdependence** of oligopoly), in practice a firm operating among several very close competing brands may still reasonably expect that an aggressive price cut would be quickly matched by its nearest rivals (who do not want to lose market share), while a price rise might not be matched (rivals gladly gain the customers priced out) — a demand response that resembles the logic of the kinked demand curve even outside formal oligopoly theory. This can make firms cautious about price competition even in monopolistic competition, preferring to compete instead on non-price dimensions (branding, quality, service) where the "kink" logic does not apply as strongly.

Bài tập luyện tập

Diagram-drawing prompt. Draw and label a long-run monopolistic competition equilibrium diagram, clearly marking: the demand (AR) curve, the MR curve, the AC curve, the profit-maximising output Q^*, the price P^*, and the minimum-AC output level (to show excess capacity).

Lời giải chi tiết

A correct diagram shows a downward-sloping AR curve tangent to a U-shaped AC curve at exactly the output Q^* where MR (drawn steeper than, and below, AR) crosses MC (also drawn, rising through the tangency point). The tangency point confirms $P^* = AC$ at Q^* (normal profit only). A separate vertical dashed line should mark the *minimum*-AC output level, positioned clearly to the **right** of Q^* — the horizontal gap between Q^* and this minimum-AC output is the **excess capacity**, which should be explicitly labelled.

Bài tập luyện tập

A firm's total product schedule for labour $L = 0$ to 6 is: $TP = 0,\ 9,\ 20,\ 33,\ 43,\ 50,\ 54$. Complete the MP and AP columns, and state at which level of labour diminishing marginal returns begin.

Lời giải chi tiết

$MP(L) = TP(L) - TP(L-1)$: $MP = 9,\ 11,\ 13,\ 10,\ 7,\ 4$ for $L = 1$ to 6 (e.g. $MP(3) = 33 - 20 = 13$; $MP(4) = 43 - 33 = 10$).
$AP(L) = TP(L)/L$: $AP = 9.00,\ 10.00,\ 11.00,\ 10.75,\ 10.00,\ 9.00$ (e.g. $AP(4) = 43/4 = 10.75$).
MP rises from $L = 1$ to $L = 3$ ($9 \to 11 \to 13$) then falls from $L = 4$ onward ($10 \to 7 \to 4$) — **diminishing marginal returns begin at** $L = 4$, the point where the 4th worker adds less extra output than the 3rd worker did.

Bài tập luyện tập

A firm's marginal product schedule for labour $L = 1$ to 5 is $MP = 6,\ 10,\ 15,\ 9,\ 5$. The wage rate is constant at \$45 per worker. Using $MC = w/MP$, compute marginal cost at each level of labour, and state over which range of L this firm's MC is falling.

Lời giải chi tiết

$MC(1) = 45/6 = \$7.50$; $MC(2) = 45/10 = \$4.50$; $MC(3) = 45/15 = \$3.00$; $MC(4) = 45/9 = \$5.00$; $MC(5) = 45/5 = \$9.00$.
MC **falls** from $L = 1$ to $L = 3$ (\$7.50 → \$4.50 → \$3.00), exactly while MP is rising, then **rises** from $L = 4$ onward (\$5.00 → \$9.00) once diminishing marginal returns set in — confirming that MC is the mirror image of MP.

Bài tập luyện tập

A firm's marginal product schedule for labour $L = 1$ to 6 is $MP = 8, 12, 17, 14, 9, 5$, and $TP(0) = 0$. Reconstruct the TP schedule (by cumulating MP) and the AP schedule, and state at which level of labour AP is maximised.

Lời giải chi tiết

Cumulating MP: $TP(1) = 0 + 8 = 8$; $TP(2) = 8 + 12 = 20$; $TP(3) = 20 + 17 = 37$; $TP(4) = 37 + 14 = 51$; $TP(5) = 51 + 9 = 60$; $TP(6) = 60 + 5 = 65$.
$AP(L) = TP(L)/L$: $AP(1) = 8.00$; $AP(2) = 10.00$; $AP(3) = 37/3 \approx 12.33$; $AP(4) = 51/4 = 12.75$; $AP(5) = 60/5 = 12.00$; $AP(6) = 65/6 \approx 10.83$.
AP rises steadily up to $L = 4$ and is **maximised at** $L = 4$ ($AP = 12.75$), before falling once MP drops below the current average.

Bài tập luyện tập

[HL ONLY] Two firms, C and D, simultaneously decide whether to Advertise heavily or Not. Annual profits (\$m, Firm C first) are: both Advertise $(40, 40)$; C Advertise, D Not $(60, 20)$; C Not, D Advertise $(20, 60)$; both Not $(50, 50)$. Find each firm's dominant strategy and the Nash equilibrium, and comment on why both firms end up worse off than if neither advertised.

Lời giải chi tiết

Firm C: if D Advertises, C compares Advertise (40) with Not (20) — Advertise is better. If D does Not, C compares Advertise (60) with Not (50) — Advertise is again better. So **Advertise is a dominant strategy for C**. By the symmetry of the payoffs, **Advertise is also dominant for D**. **Nash equilibrium: (Advertise, Advertise)**, giving each firm \$40m — worse for *both* than the (Not, Not) outcome of \$50m each. This is a prisoner's-dilemma structure: advertising is individually rational (it raises a firm's own profit whatever the rival does) but collectively wasteful, since heavy advertising by both firms mostly cancels out and simply raises costs without changing either firm's relative market position.

Bài tập luyện tập

[HL ONLY] Two firms, G and H, simultaneously choose a High or Low advertising budget. Annual profits (\$m, Firm G first) are: both High $(30, 20)$; G High, H Low $(45, 15)$; G Low, H High $(25, 35)$; both Low $(35, 25)$. Find the Nash equilibrium, and explain why it is not the jointly best outcome for either firm.

Lời giải chi tiết

Firm G: if H is High, G compares High (30) with Low (25) — High is better. If H is Low, G compares High (45) with Low (35) — High is again better. So **High is a dominant strategy for G**.

Firm H: if G is High, H compares High (20) with Low (15) — High is better. If G is Low, H compares High (35) with Low (25) — High is again better. So **High is also a dominant strategy for H.**
Nash equilibrium: (High, High), giving G \$30m and H \$20m. Yet if both instead chose Low, they would earn $(35, 25)$ — *more for both firms simultaneously* than the Nash outcome ($30 < 35$ for G; $20 < 25$ for H). As in the classic prisoner's dilemma, neither firm can profitably deviate to Low on its own (since High remains individually optimal regardless of the rival's choice), so the mutually preferable (Low, Low) outcome is unstable without some way to coordinate.

Bài tập luyện tập

A market for wheat is described by $D: P = 40 - Q$ and $S: P = Q$. The government sets a minimum price of \$28 and commits to buying any surplus. Find the free-market equilibrium, the quantity demanded and supplied at the floor price, the resulting surplus, and the cost of the government's purchase.

Lời giải chi tiết

Free-market equilibrium: $40 - Q = Q \implies Q_e = 20,\ P_e = 20$.
At $P = \$28$: $Q_d = 40 - 28 = 12$; $Q_s = 28$ (from $S: P = Q$).

$$\text{Surplus} = Q_s - Q_d = 28 - 12 = 16 \text{ units.} \qquad \text{Cost} = 16 \times \$28 = \$448.$$

Bài tập luyện tập

A market for rice is described by $D: P = 45 - Q$ and $S: P = 0.5Q$. The government sets a minimum price of \$21 and commits to buying any surplus, storing it for release in a future poor-harvest year. Find the free-market equilibrium, the surplus generated at the floor price, and the government's purchase cost. Then briefly state one ongoing cost of running this scheme.

Lời giải chi tiết

Free-market equilibrium: $45 - Q = 0.5Q \implies 45 = 1.5Q \implies Q_e = 30,\ P_e = 15$.
At $P = \$21$: $Q_d = 45 - 21 = 24$; from $S: P = 0.5Q \implies Q = 2P$, so $Q_s = 2(21) = 42$.

$$\text{Surplus} = Q_s - Q_d = 42 - 24 = 18 \text{ units.} \qquad \text{Cost} = 18 \times \$21 = \$378.$$

Beyond the initial \$378 purchase cost, the scheme incurs an ongoing **storage and financing cost** for as long as the rice is held in reserve, and — since rice is perishable — a risk that some of the stored stock **spoils** before it can be released in a future shortage year.

Bài tập luyện tập

Price falls from \$80 to \$72 (a 10% decrease), causing quantity demanded to rise from 200 to 240 units (a 20% increase). Calculate PED, classify it, and state — with figures — whether total revenue rises or falls.

(A) $PED = -0.5$; TR falls
(B) $PED = -2.0$; TR rises
(C) $PED = -2.0$; TR falls
(D) $PED = +2.0$; TR rises

Lời giải chi tiết

$PED = \dfrac{+20\%}{-10\%} = -2.0$ (relatively elastic, since $|PED| > 1$). $TR_0 = 80 \times 200 = \$16{,}000$. $TR_1 = 72 \times 240 = \$17{,}280$ — TR **rises**. This matches the rule: for elastic demand, a price *fall* increases TR. **(B)**.

Bài tập luyện tập

Average household income falls from \$60,000 to \$54,000 per year (a 10% decrease), and quantity demanded of a good rises from 150 to 165 units (a 10% increase). Calculate YED and classify the good.

Lời giải chi tiết

$YED = \dfrac{+10\%}{-10\%} = -1.0$. Since $YED < 0$, quantity demanded rises as income *falls* — this is an **inferior good** (e.g. a budget staple that consumers buy less of once they can afford better alternatives).

Bài tập luyện tập

The price of a manufactured good falls by 20%, and quantity supplied falls by 8%. Calculate PES and classify it.

(A) $PES = -2.5$; elastic

(B) $PES = 0.4$; inelastic

(C) $PES = 2.5$; elastic

(D) $PES = -0.4$; inelastic

Lời giải chi tiết

$PES = \dfrac{-8\%}{-20\%} = 0.4$. Since $0 < PES < 1$, supply is **relatively inelastic** — quantity supplied responds proportionally less than the price change. **(B)**.

Bài tập luyện tập

A monopolist faces demand $P = 100 - 4Q$ and $MC = 20 + 2Q$. Average cost at the profit-maximising output is \$40. Find Q^*, P^*, and profit.

Lời giải chi tiết

$MR = 100 - 8Q$ (twice the slope of demand). Set $MR = MC$: $100 - 8Q = 20 + 2Q \implies 80 = 10Q \implies Q^* = 8$.
$P^* = 100 - 4(8) = \$68$.

$$\text{Profit} = (P^* - AC) \times Q^* = (68 - 40) \times 8 = \$224.$$

Bài tập luyện tập

A monopolist faces demand $P = 56 - Q$ and $MC = 8 + Q$. Average cost at the profit-maximising output is \$25. Find Q^*, P^*, and profit.

(A) $Q^* = 16$; $P^* = \$40$; profit $= \$240$
(B) $Q^* = 16$; $P^* = \$40$; profit $= \$400$
(C) $Q^* = 12$; $P^* = \$44$; profit $= \$228$
(D) $Q^* = 16$; $P^* = \$32$; profit $= \$112$

Lời giải chi tiết

$MR = 56 - 2Q$. Set $MR = MC$: $56 - 2Q = 8 + Q \implies 48 = 3Q \implies Q^* = 16$.
$P^* = 56 - 16 = \$40$.

$$\text{Profit} = (40 - 25) \times 16 = \$240.$$

(A).

Bài tập luyện tập

A firm price-discriminates between adults ($P_1 = 50 - Q_1$) and children ($P_2 = 30 - 2Q_2$), with constant $MC = \$10$ in both segments. Find P_1 and P_2, and state which group is charged more and why.

Lời giải chi tiết

Adults: $MR_1 = 50 - 2Q_1$. Set $= MC = 10$: $50 - 2Q_1 = 10 \implies Q_1 = 20,\ P_1 = 50 - 20 = \$30$.
Children: $MR_2 = 30 - 4Q_2$. Set $= 10$: $30 - 4Q_2 = 10 \implies Q_2 = 5,\ P_2 = 30 - 10 = \$20$.
Elasticity check (using $PED = \frac{dQ}{dP} \times \frac{P}{Q}$): from $Q_1 = 50 - P_1$, at $(20, 30)$: $PED_1 = -1 \times \frac{30}{20} = -1.5$. From $Q_2 = 15 - 0.5P_2$, at $(5, 20)$: $PED_2 = -0.5 \times \frac{20}{5} = -2.0$.
Since $|PED_2| = 2.0 > |PED_1| = 1.5$, children's demand is the **more elastic** segment, and — consistent with the theory — they are charged the **lower** price ($20 vs. $30 for adults).

Bài tập luyện tập

A firm price-discriminates between the domestic market ($P_d = 80 - 2Q_d$) and the export market ($P_e = 50 - Q_e$), with constant $MC = \$20$ in both. Find P_d and P_e, and state which market is charged more and why.

Lời giải chi tiết

Domestic: $MR_d = 80 - 4Q_d$. Set $= MC = 20$: $80 - 4Q_d = 20 \implies Q_d = 15,\ P_d = 80 - 30 = \$50$.
Export: $MR_e = 50 - 2Q_e$. Set $= 20$: $50 - 2Q_e = 20 \implies Q_e = 15,\ P_e = 50 - 15 = \$35$.
Elasticity check: from $Q_d = 40 - 0.5P_d$, at $(15, 50)$: $PED_d = -0.5 \times \frac{50}{15} \approx -1.67$. From $Q_e = 50 - P_e$, at $(15, 35)$: $PED_e = -1 \times \frac{35}{15} \approx -2.33$.
Since $|PED_e| = 2.33 > |PED_d| = 1.67$, export demand is the **more elastic** segment, so the firm charges the **lower** price abroad ($35) than at home ($50) — a pattern often called "dumping" when a firm sells more cheaply in foreign markets than at home.

Bài tập luyện tập

A price-taking firm faces market price $P = \$20$ and $MC = 6 + 2Q$. Average cost at the profit-maximising output is exactly $20. Find Q^* and state what type of profit the firm earns, with reasoning.

Lời giải chi tiết

Since the firm is a price taker, $P = AR = MR = 20$. Set $MR = MC$: $20 = 6 + 2Q \implies 14 = 2Q \implies Q^* = 7$.

$$\text{Profit} = (P - AC) \times Q^* = (20 - 20) \times 7 = \$0.$$

Since $P = AC$ exactly, the firm earns only **normal profit** — it breaks even in the economic sense (covering all costs, including the opportunity cost of the entrepreneur's capital and time), with no supernormal profit to attract further entry and no loss to trigger exit. This is consistent with the long-run equilibrium condition for perfect competition.

Bài tập luyện tập

A price-taking firm faces market price $P = \$9$ and $MC = 3 + 3Q$. At the output where $MR = MC$, average variable cost is \$12. Determine the firm's short-run production decision, with reasoning.

Lời giải chi tiết

Since the firm is a price taker, $P = AR = MR = 9$. Set $MR = MC$: $9 = 3 + 3Q \implies 6 = 3Q \implies Q^* = 2$.
Comparing $P = \$9$ to $AVC = \$12$ at this output: since $P < AVC$, the firm cannot even cover its variable costs by producing — every unit sold would add to its losses beyond the fixed costs it must pay regardless. The firm should therefore **shut down immediately** ($Q = 0$) in the short run, limiting its loss to just its total fixed cost, rather than producing $Q^* = 2$ and losing even more.

Bài tập luyện tập

Price falls from \$25 to \$20 (a 20% decrease) and quantity demanded rises from 200 to 260 units (a 30% increase). Classify demand and state the effect on total revenue of the price fall.

(A) Elastic; TR rises from \$5,000 to \$5,200
(B) Inelastic; TR falls
(C) Unitary; TR unchanged
(D) Elastic; TR falls

Lời giải chi tiết

$PED = \dfrac{+30\%}{-20\%} = -1.5$, so $|PED| = 1.5 > 1$ — **relatively elastic**. $TR_0 = 25 \times 200 = \$5{,}000$. $TR_1 = 20 \times 260 = \$5{,}200$. Because demand is elastic, the price **fall** *raises* total revenue. **(A)**.

Bài tập luyện tập

The price of printers falls by 8%. As a result, quantity demanded of printer ink cartridges (a complement) rises by 6%. Calculate XED and classify the relationship.

(A) $XED = -0.75$; complements
(B) $XED = +0.75$; substitutes
(C) $XED = -1.33$; complements
(D) $XED = +1.33$; substitutes

Lời giải chi tiết

$XED = \dfrac{+6\%}{-8\%} = -0.75$. A **negative** XED confirms printers and ink cartridges are **complements** — a fall in the price of one raises quantity demanded of the other. **(A)**.

Bài tập luyện tập

A rise in price of 12% leads to a rise in quantity supplied of 30%. Calculate PES and classify.

(A) 2.5; elastic
(B) 0.4; inelastic
(C) 2.5; inelastic
(D) 0.4; elastic

Lời giải chi tiết

$PES = \dfrac{+30\%}{+12\%} = 2.5 > 1$ — **relatively elastic**. **(A)**.

Bài tập luyện tập

A monopolist faces demand $P = 100 - 2Q$ and has constant $MC = \$20$ (so, since demand is linear, $MR = 100 - 4Q$). Find the profit-maximising price, quantity, and total revenue.

Lời giải chi tiết

Set $MR = MC$: $100 - 4Q = 20 \implies 80 = 4Q \implies Q^* = 20$. $P^* = 100 - 2(20) = \$60$. $TR = 60 \times 20 = \$1{,}200$.

Bài tập luyện tập

Using the same monopolist as above (demand $P = 100 - 2Q$, constant $MC = \$20$, so $TC = 20Q$ with no fixed cost), calculate total profit at the profit-maximising output found above.

Lời giải chi tiết

$TC = 20 \times 20 = \$400$. Profit $= TR - TC = 1{,}200 - 400 = \$800$.

Bài tập luyện tập

A cinema charges adults \$15 and students \$9 for the identical film screening, with no difference in the cost of serving either group. This is an example of:

(A) First-degree price discrimination
(B) Second-degree price discrimination
(C) Third-degree price discrimination
(D) Predatory pricing

Lời giải chi tiết

Charging different, identifiable groups of consumers (adults vs. students, who plausibly have different PED) different prices for an identical product/cost is the definition of **third-degree** price discrimination. **(C)**.

Bài tập luyện tập

A perfectly competitive firm faces market price \$18. At its profit-maximising output (where $P = MC$), its average cost (AC) is exactly \$18. Describe the firm's profit position and the likely long-run entry/exit response. (Short response.)

Lời giải chi tiết

Since $P = AC$ exactly, the firm earns **zero economic (supernormal) profit** — only **normal profit**. There is no incentive for new firms to enter or existing firms to exit; the industry is already in **long-run equilibrium**.

Bài tập luyện tập

$D:\ Q_d = 180 - 3P$, $S:\ Q_s = -30 + 7P$. A specific tax of \$4/unit is imposed on producers. Find the pre-tax and post-tax equilibrium prices, and determine which side bears the larger burden.

Lời giải chi tiết

Pre-tax: $180 - 3P = -30 + 7P \implies 210 = 10P \implies P_e = 21,\ Q_e = 180 - 63 = 117$.
Post-tax: at consumer price P_c, firms receive $P_c - 4$, so $Q_s = -30 + 7(P_c - 4) = -58 + 7P_c$.
Setting $Q_d = Q_s$: $180 - 3P_c = -58 + 7P_c \implies 238 = 10P_c \implies P_c = 23.8$. Producer price $= 23.8 - 4 = 19.8$.
Consumer burden $= 23.8 - 21 = \$2.80$/unit. Producer burden $= 21 - 19.8 = \$1.20$/unit ($2.80 + 1.20 = \$4.00$ ✓). Demand ($dQ/dP = -3$) is **more inelastic** than supply ($dQ/dP = 7$) at equilibrium, so **consumers** bear the larger share of the tax burden — consistent with the tax-incidence rule.

Bài tập luyện tập

A beekeeper's bees pollinate neighbouring farmers' fruit trees at no charge to the farmers. This is best classified as:

(A) Negative production externality
(B) Positive production externality
(C) Negative consumption externality
(D) Positive consumption externality

Lời giải chi tiết

An unpriced benefit to a third party (the farmers) arising from the beekeeper's **production** activity is a **positive production externality**. **(B)**.

Bài tập luyện tập

Explain why a private lighthouse service would likely be under-provided if left entirely to a free market, using the concepts of non-excludability and non-rivalry. (Short response.)

Lời giải chi tiết

A lighthouse's beam is **non-excludable** (any ship within sight benefits regardless of whether its owner paid) and **non-rivalrous** (one ship using the light does not reduce its availability to others). A private firm therefore cannot charge individual users for the benefit received — free

riders benefit without paying — so private revenue is unlikely to cover the cost of building and operating it, even though the total social benefit may well exceed the cost. This is the classic free-rider problem that justifies public (or collectively-funded) provision of a pure public good.

Ôn tập nhanh — Unit 2: (1) luôn phân biệt **di chuyển** (do giá chính hàng hoá) và **dịch chuyển** (do yếu tố khác) của D/S; (2) $PED/YED/XED/PES$ — luôn ghi công thức $\%\Delta$ trước khi thay số, và nhớ dấu (+/-) có ý nghĩa phân loại; (3) bên **kém co giãn hơn** luôn chịu phần lớn hơn của thuế *và* nhận phần lớn hơn của trợ cấp; (4) bốn loại ngoại tác — luôn xác định Q_m vs Q_{opt} và tính đúng diện tích tam giác tổn thất; (5) doanh nghiệp luôn tối đa hoá lợi nhuận tại $MR = MC$; với cầu tuyến tính, MR dốc gấp đôi AR; (6) so sánh 4 cấu trúc thị trường theo: số doanh nghiệp, rào cản gia nhập, lợi nhuận dài hạn, và hiệu quả phân bổ/sản xuất.

IB DIPLOMA PROGRAMME • Unit 3

Macroeconomics

Mục tiêu Unit: Đo lường hoạt động kinh tế (GDP/GNI, GDP thực/danh nghĩa, chu kỳ kinh doanh); mô hình Tổng cầu–Tổng cung (AD–AS) và số nhân (HL); các mục tiêu kinh tế vĩ mô (tăng trưởng, thất nghiệp, lạm phát, phân phối thu nhập); và chính sách phía cầu (tài khoá, tiền tệ) và phía cung.

3.1 Measuring economic activity

3.1.1 GDP, GNI, and real vs nominal measures

Gross domestic product (GDP) measures the total market value of all final goods and services produced *within* a country's borders in a given period. **Gross national income (GNI)** adjusts GDP by adding income earned abroad by domestic residents/firms and subtracting income earned domestically by foreign residents/firms — GNI better captures the income *belonging to* a country's citizens, while GDP better captures output produced *within* its borders.

Nominal GDP is measured using **current** prices; it can rise simply because prices rose, even with no change in actual output. **Real GDP** is adjusted for inflation using a price index (the **GDP deflator**), and is the correct measure of genuine **change** in output/living standards over time:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP deflator}} \times 100.$$

Separating real growth from inflation

Nominal GDP rises from \$400bn to \$450bn over one year. The GDP deflator rises from 100 to 108 over the same period. Find real GDP in year 2 and the real growth rate.

$$\text{Real GDP (year 2)} = \frac{450}{108} \times 100 \approx \$416.7\text{bn}.$$

$$\text{Real growth rate} = \frac{416.7 - 400}{400} \times 100\% \approx 4.17\%.$$

Although nominal GDP grew by $\frac{450-400}{400} \times 100\% = 12.5\%$, much of that was simply inflation (prices rising 8%) — the economy's *genuine* increase in output was only about 4.17%.

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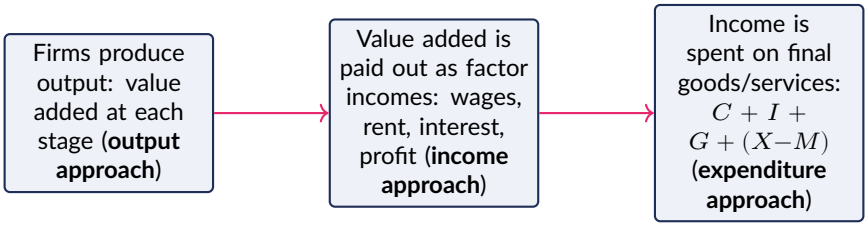
GDP đo tổng giá trị sản lượng cuối cùng sản xuất **trong lãnh thổ** một quốc gia; GNI cộng thêm thu nhập công dân nước đó kiếm được ở nước ngoài, trừ đi thu nhập người nước ngoài kiếm được trong nước. GDP **danh nghĩa** (nominal) dùng giá hiện hành, có thể tăng chỉ vì **lạm phát**; GDP **thực** (real) đã loại trừ lạm phát bằng chỉ số giảm phát GDP (GDP deflator), phản ánh đúng **sự thay đổi** sản lượng thực tế — luôn dùng GDP thực khi so sánh tăng trưởng qua các năm.

3.1.2 The three approaches to measuring GDP

A country's GDP can be calculated in three equivalent ways, each approaching the same underlying flow of economic activity from a different angle.



The three approaches trace the same flow of economic activity from three different points: the value added in production, the factor incomes it generates, and the expenditure that (eventually) purchases it.

Three ways to measure the same GDP

- **The output (product) approach**: sum the **value added** at every stage of production, across all industries/sectors of the economy. Value added (the value of a firm's output minus the value of the intermediate goods it bought from other firms) is used specifically to avoid **double-counting** the same intermediate goods multiple times as they pass through successive stages of production.
- **The income approach**: sum all **factor incomes** earned in producing that output — wages (the reward to labour), rent (the reward to land), interest (the reward to capital), and profit (the reward to enterprise) — the same four factors of production and their factor rewards introduced via the circular flow of income (Unit 1).
- **The expenditure approach**: sum all spending on final goods and services, $Y = C + I + G + (X - M)$ — precisely the same expression already used to define aggregate demand elsewhere in this unit.

Because every dollar spent on final output is simultaneously received by someone as income (wages, rent, interest, or profit), and every dollar of that income ultimately traces back to some unit of value added in production, the output, income, and expenditure approaches must, **in principle**, all yield exactly **the same** total GDP figure — they are three different ways of measuring the identical underlying flow of economic activity, not three different quantities. In practice, real-world national accounts show a small **statistical discrepancy** between the three approaches (due to data collection/timing imperfections), but the underlying identity holds conceptually.

Confirming the expenditure and income approaches match

An economy records the following expenditure-side data: $C = \$300$bn, $I = \$150$bn, $G = \$100$bn, $X = \$80$bn, $M = \$70$bn. Separately, the same economy's income-side statistics record: wages $= \$350$bn, rent $= \$40$bn, interest $= \$60$bn, profit $= \$110$bn. Calculate GDP using both approaches and compare.

Expenditure approach:

$$GDP = C + I + G + (X - M) = 300 + 150 + 100 + (80 - 70) = 300 + 150 + 100 + 10 = \$560\text{bn}.$$

Income approach:

$$GDP = \text{wages} + \text{rent} + \text{interest} + \text{profit} = 350 + 40 + 60 + 110 = \$560\text{bn}.$$

Both approaches give exactly \$560bn — confirming the identity that total spending on final output must equal total income generated in producing it, even though the two calculations use completely different underlying data.

Approach	Calculation (same \$560bn economy)
Output (value added by sector)	Agriculture \$80bn + Manufacturing \$250bn + Services \$230bn = \$560bn
Income (factor incomes)	Wages \$350bn + Rent \$40bn + Interest \$60bn + Profit \$110bn = \$560bn
Expenditure (spending)	C \$300bn + I \$150bn + G \$100bn + $(X - M)$ \$10bn = \$560bn

The same \$560bn of GDP, viewed through all three approaches: identical totals reached from entirely different underlying data.

(!) Lỗi thường gặp: When using the output approach, always sum *value added*, not total sales/-turnover, at each stage of production — summing the full sale price at every stage counts the value of intermediate goods (e.g. raw wheat, flour) multiple times as they pass through successive firms, substantially **overstating** true GDP.

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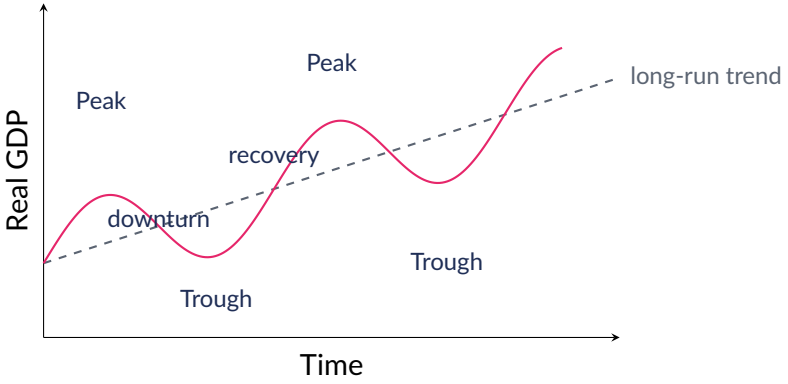
Có **ba phương pháp** tương đương để tính GDP của một quốc gia: (1) **phương pháp sản xuất/giá trị gia tăng** (output approach) — cộng giá trị gia tăng ở từng công đoạn sản xuất trong tất cả các ngành, tránh tính trùng giá trị hàng hoá trung gian; (2) **phương pháp thu nhập** (income approach) — cộng tất cả thu nhập các yếu tố sản xuất kiếm được (tiền lương, tiền thuê, lãi suất, lợi nhuận — ứng với bốn yếu tố sản xuất trong sơ đồ chu chuyển thu nhập ở Unit 1); (3) **phương pháp chi tiêu** (expenditure approach) — cộng toàn bộ chi tiêu cho hàng hoá/dịch vụ cuối cùng, $Y = C + I + G + (X - M)$ (chính là công thức tổng cầu). Về nguyên tắc, ba phương pháp này luôn cho **cùng một kết quả** GDP, vì mỗi đồng chi tiêu đồng thời là thu nhập của ai đó, bắt nguồn từ giá trị gia tăng trong sản xuất — trong thực tế có thể có chênh lệch thống kê nhỏ, nhưng về bản chất đây là một đại lượng duy nhất nhìn từ ba góc độ.

3.1.3 The business cycle

Real GDP does not grow smoothly; it fluctuates in a **business (trade) cycle** around the economy's long-run growth trend: **boom/peak** (output above trend, low unemployment, rising inflation risk), **downturn/recession** (falling output; a common technical definition is two consecutive quarters of negative real GDP growth), **trough** (the low point), and **recovery/expansion** (output rising back toward and beyond trend).



The business cycle: actual real GDP fluctuates (boom → downturn → trough → recovery) around the long-run growth trend.

The **output gap** measures the difference between actual and potential (full-employment) real GDP. A **positive (inflationary) output gap** ($Y_{actual} > Y_{fe}$) signals the economy is overheating, risking demand-pull inflation. A **negative (recessionary/deflationary) output gap** ($Y_{actual} < Y_{fe}$) signals spare capacity and higher cyclical unemployment.

Calculating an output gap

An economy's actual real GDP is \$980bn, while estimated potential GDP is \$1,000bn. Calculate the output gap in dollars and as a percentage, and classify it.

$$\text{Output gap} = 980 - 1000 = -\$20\text{bn}, \qquad \frac{-20}{1000} \times 100\% = -2\%.$$

This is a **negative (recessionary) output gap** of 2% — the economy is producing below its full-employment potential, implying spare capacity and above-average (cyclical) unemployment.

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Chu kỳ kinh doanh gồm 4 giai đoạn: đỉnh (peak/boom), suy thoái (downturn), đáy (trough), phục hồi (recovery) — dao động quanh xu hướng tăng trưởng dài hạn. **Chênh lệch sản lượng** (output gap) = GDP thực tế − GDP tiềm năng: dương là **khoảng cách lạm phát** (nền kinh tế quá nóng), âm là **khoảng cách suy thoái** (dư thừa năng lực sản xuất, thất nghiệp chu kỳ cao).

3.1.4 Consumer price index and inflation measurement

The **consumer price index (CPI)** tracks the cost of a fixed "basket" of goods and services representative of a typical household's spending, weighted by the share of the household budget spent on each category.

Basic CPI/inflation calculation

The cost of a representative CPI basket was \$240 last year and \$252 this year.

$$\text{Inflation rate} = \frac{252 - 240}{240} \times 100\% = 5.0\%.$$

Weighted-category inflation calculation

A CPI basket has three categories with weights: Food 40%, Housing 35%, Transport 25%. Over the year, the Food price index rises 6%, Housing rises 3%, and Transport rises 2%. Calculate the overall (weighted) inflation rate.

$$\begin{aligned}\text{Weighted inflation} &= (0.40 \times 6\%) + (0.35 \times 3\%) + (0.25 \times 2\%) \\ &= 2.4\% + 1.05\% + 0.5\% = 3.95\%.\end{aligned}$$

(!) Lỗi thường gặp: Do not simply average the three category inflation rates ($(6 + 3 + 2)/3 = 3.67\%$) — each category must be weighted by its *share of household spending*, since a good that takes up a larger share of the typical budget has a proportionally larger effect on overall inflation. The correct weighted answer (3.95%) differs from the simple (unweighted) average.

Limitations of CPI

CPI can misrepresent true cost-of-living changes because: the basket is fixed and updated only periodically, so it may not reflect **substitution** toward cheaper alternatives as relative prices change; it may not fully capture **quality improvements** in goods over time; it uses a single national "average" basket that may not reflect any specific household's actual spending pattern (e.g. low-income households spend a higher share on food/energy); and new products take time to be included.

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CPI đo chi phí "giỏ hàng hoá" tiêu biểu, có **trọng số** theo tỉ trọng chi tiêu từng nhóm hàng — khi tính lạm phát tổng hợp từ nhiều nhóm hàng, luôn phải nhân từng mức tăng giá với đúng trọng số rồi cộng lại, **không được** lấy trung bình cộng đơn giản. CPI có hạn chế: giỏ hàng cố định không phản ánh kịp hành vi thay thế của người tiêu dùng, khó đo chính xác cải thiện chất lượng sản phẩm, và không phản ánh đúng cho mọi nhóm thu nhập khác nhau.

3.2 The limitations of GDP as a measure of well-being

GDP is the standard headline measure of economic activity, but it was never designed to be — and is not — a complete measure of a population's well-being or quality of life. A rising GDP figure can coexist with stagnant or even falling genuine living standards, for several distinct reasons.

What GDP leaves out

- **Non-market and unpaid activity**: GDP counts only output that is bought and sold (or otherwise formally recorded). Unpaid household work (childcare, cooking, cleaning), subsistence production (growing food for one's own family rather than for sale), and unpaid volunteering all contribute directly to well-being but are **excluded** from GDP because no market transaction records them.
- **The informal (shadow/black-market) economy**: economic activity that occurs outside official record-keeping — to avoid tax, regulation, or because the activity is itself illegal — is not (fully) captured in official GDP statistics, even though real production and income are genuinely taking place.
- **Resource depletion and the environment**: GDP is a measure of the *flow* of output in a given period; it does not net off the depletion of a country's *stock* of natural capital (forests, minerals, fish stocks, clean air/water) used up in generating that output. A country can show a rising GDP figure while running down its natural-resource base in a way that threatens **sustainability** for future generations (Unit 1) — current output is, in effect, partly "borrowed" from the future.
- **Income distribution**: GDP (and GDP per capita, an average) says nothing about *how* that output/income is shared across the population. A rising average GDP per capita is fully consistent with rising inequality — the "typical" (median) household may see little or no improvement even as the headline average rises, if gains are concentrated among a narrow, already-wealthy group.
- **Quality-of-life factors**: GDP does not directly capture leisure time, work-life balance, workplace safety, or health outcomes. A country could raise measured GDP by having its workforce work substantially longer hours, even if this reduces overall well-being.

Because of these gaps, economists and international organisations have developed broader **composite measures** of development that combine GDP per capita with other indicators (e.g. health and education outcomes) — most notably the **Human Development Index (HDI)**, developed further in Unit 4. These composite measures do not replace GDP (which remains the standard measure of the size/output of an economy) but are used alongside it to give a fuller picture of genuine living standards.

Why identical GDP per capita can hide very different living standards

Country A and Country B report exactly the same GDP per capita. In Country A, most childcare, cooking, and eldercare is provided unpaid within the family/household and so is largely excluded from GDP. In Country B, most of these same services are bought in the market (paid childcare, restaurant meals, paid care homes) and so *are* counted in GDP. Explain why measured GDP could differ substantially between these two countries even if actual living standards/well-being are similar.

If Country A's households shifted toward Country B's pattern — paying for childcare, meals, and eldercare instead of providing them unpaid at home — measured GDP in Country A would **rise**, purely because the *same* underlying activity (care, meal preparation) had moved from an unrecorded, unpaid setting into a recorded, paid market transaction — not because any more care or food was actually being produced, and not because anyone's genuine well-being had improved. This shows that comparing GDP per capita *across* countries with very different shares of unpaid/informal activity can be misleading: a country with a large unpaid domestic/informal sector can have a *lower* measured GDP than an otherwise similar country, without its residents' actual living standards being any lower at all.

(!) Lỗi thường gặp: A rising GDP figure is not automatically evidence of a genuine improvement in living standards — always check *how* the extra output was generated (e.g. by monetising previously unpaid activity, by depleting natural capital, or by extending working hours) before treating GDP growth as a straightforward welfare gain.

VN **GIẢI THÍCH TIẾNG VIỆT**

GDP có nhiều **hạn chế** khi dùng làm thước đo phúc lợi (well-being): (1) không tính các hoạt động **phi thị trường/không trả công** (việc nhà, sản xuất tự cung tự cấp, tình nguyện); (2) không tính đầy đủ **kinh tế phi chính thức** (chợ đen, trốn thuế); (3) không trừ đi sự **suy giảm tài nguyên thiên nhiên/môi trường** — một quốc gia có thể có GDP tăng trong khi đang huỷ hoại nguồn lực bền vững (**sustainability**) cho tương lai; (4) không phản ánh **phân phối thu nhập** — GDP bình quân đầu người tăng không có nghĩa đa số người dân được hưởng lợi; (5) không đo trực tiếp **chất lượng cuộc sống** (thời gian nghỉ ngơi, cân bằng công việc-cuộc sống, sức khoẻ). Các thước đo tổng hợp như **Chỉ số Phát triển Con người (HDI)** — sẽ học kỹ hơn ở Unit 4 — được dùng bổ sung để khắc phục một phần những hạn chế này. Hai quốc gia có GDP bình quân đầu người bằng nhau vẫn có thể có mức sống thực tế rất khác biệt, tuỳ vào tỉ trọng hoạt động không được thị trường ghi nhận.

3.3 [HL ONLY] The multiplier

An initial injection of new spending (e.g. a rise in government spending or investment) raises national income by *more* than the initial injection itself, because that first round of new income is partly respent, generating further rounds of income and spending — this amplification is the **multiplier effect**.

$k = \dfrac{1}{1 - MPC} = \dfrac{1}{MPS}$ (closed economy, no government), $k = \dfrac{1}{MPS + MPT + MPM}$ (open econ

MPC: marginal propensity to consume; MPS: marginal propensity to save; MPT: marginal propensity to tax; MPM: marginal propensity to import (all measured out of an extra \$1 of income, and together with MPC must sum to 1 in the simplest closed model: $MPC + MPS = 1$; in an open economy with government, every extra \$1 of income is split among consumption, saving, tax, and imports).

The multiplier: closed vs. open economy

If $MPC = 0.8$ (so $MPS = 0.2$) in a closed economy with no government, the multiplier is

$$k = \frac{1}{1 - MPC} = \frac{1}{0.2} = 5.$$

In an open economy with $MPS = 0.2$, $MPT = 0.1$, $MPM = 0.15$:

$$k = \frac{1}{MPS + MPT + MPM} = \frac{1}{0.45} \approx 2.22.$$

A \$50m rise in government spending then raises equilibrium real GDP by approximately $50 \times 2.22 \approx \$111$m — much smaller than in the closed-economy case, because taxes and import spending also "leak" out of each further round of domestic spending.

Multiplier: a second worked calculation

$MPC = 0.75$, $MPT = 0.15$, $MPM = 0.10$. Find MPS, the multiplier, and the change in equilibrium real GDP from a \$120m rise in investment.

$$MPS = 1 - MPC = 1 - 0.75 = 0.25.$$
$$k = \frac{1}{MPS + MPT + MPM} = \frac{1}{0.25 + 0.15 + 0.10} = \frac{1}{0.50} = 2.$$
$$\Delta Y = \Delta I \times k = 120 \times 2 = \$240\text{m}.$$

Spending round	1	2	3	... (total, $MPC = 0.8$)
Extra spending (\$m)	100.00	80.00	64.00	... $\to 500$

Each round re-spends $MPC = 0.8$ of the previous round's income ($100 \to 80 \to 64 \to \ldots$), a geometric series summing to $100 \times k = 100 \times 5 = \$500$m — the same answer the multiplier formula gives directly.

(!) Lỗi thường gặp: A *larger* multiplier is not automatically "better" policy — a large multiplier also means the economy is more volatile: external shocks (e.g. a fall in export demand) get amplified through the same multiplier process, potentially causing a sharper recession. Also, do not confuse the multiplier (how much total output changes per \$1 of new injected spending) with the **accelerator** (a separate idea: how the level of *investment* responds to the *rate of change* of output/demand).

VN **GIẢI THÍCH TIẾNG VIỆT**

Số nhân (multiplier) $k = \dfrac{1}{\text{tổng tỉ lệ rò rỉ}} = \dfrac{1}{MPS + MPT + MPM}$ đo mức GDP thực tăng thêm gấp bao nhiêu lần so với khoản chi tiêu ban đầu tăng thêm — vì mỗi vòng chi tiêu tạo ra thu nhập mới, một phần được chi tiêu tiếp ở vòng sau. Nền kinh tế càng "rò rỉ" nhiều (tiết kiệm, thuế, nhập khẩu cao) thì số nhân càng **nhỏ**. Lỗi thường gặp: quên cộng *cả ba* tỉ lệ rò rỉ ($MPS + MPT + MPM$) mà chỉ dùng MPS — luôn kiểm tra đề bài có nền kinh tế mở (có T, M) hay đóng.

3.3.1 [HL ONLY] The tax multiplier and the balanced-budget multiplier

The multiplier formula developed above applies directly to a change in government spending (G), investment (I), or exports (X) — each of these is itself a component of AD, so the *entire* initial change is injected directly into the circular flow. A change in **taxes** (T) works differently, and requires its own, smaller multiplier.

A change in G (or I or X) is direct spending — the whole amount enters the circular flow of income immediately. A change in T instead affects households' **disposable income**, and only the fraction of that disposable-income change that households would have *consumed* (their MPC) actually changes spending — the rest of any tax cut, for instance, is partly saved (leaking straight back out) rather than fully spent. This is why the **tax multiplier** is smaller in magnitude than the ordinary spending multiplier, and carries the *opposite* sign to the change in T (a tax *cut* raises Y; a tax *rise* lowers Y):

$$k_{\text{spending}} = \frac{1}{1 - MPC} \quad \text{(simple closed economy)}, \qquad k_{\text{tax}} = \frac{-MPC}{1 - MPC} \quad \text{(simple closed economy)}.$$

Since $\left|\dfrac{-MPC}{1 - MPC}\right| < \left|\dfrac{1}{1 - MPC}\right|$ whenever $0 < MPC < 1$, a \$1 change in T always moves equilibrium Y by *less* than an equal-sized \$1 change in G.

[The balanced-budget multiplier] Suppose government spending *and* taxes both rise by the *same* dollar amount — a **balanced-budget** fiscal expansion (the budget balance itself does not change). Because the G increase is injected directly and in full, while the T increase only partially reduces consumption (via MPC), the direct G effect **outweighs** the smaller, indirect T effect — so equilibrium output still **rises**, even though the government's own budget position is unchanged. In this simple closed-economy case, the net rise in Y turns out to equal *exactly* the size of the (equal) change in G and T — a **balanced-budget multiplier** of exactly 1.

The tax multiplier and the balanced-budget multiplier

$MPC = 0.8$ in a simple closed economy (ignore other leakages for this example). The government raises G by \$50m *and* raises T by \$50m in the same year (a balanced-budget expansion). Find the separate effects of the ΔG and ΔT changes, and the net effect on equilibrium output.

Spending multiplier:

$$k = \frac{1}{1 - MPC} = \frac{1}{1 - 0.8} = \frac{1}{0.2} = 5.$$

Effect of $\Delta G = +\$50$m:

$$\Delta Y_G = 50 \times 5 = +\$250\text{m}.$$

Tax multiplier:

$$k_{\text{tax}} = \frac{-MPC}{1 - MPC} = \frac{-0.8}{0.2} = -4.$$

Effect of $\Delta T = +\$50$m:

$$\Delta Y_T = 50 \times (-4) = -\$200\text{m}.$$

Net effect:

$$\Delta Y = \Delta Y_G + \Delta Y_T = 250 + (-200) = +\$50\text{m}.$$

The net rise in equilibrium output, \$50m, is *exactly* equal to the size of the balanced-budget change itself (\$50m) — confirming that the balanced-budget multiplier equals 1 in this simple closed-economy case. Even though the government's budget balance did not change at all, real output still rose, because the direct spending injection ($+\$250$m) exceeded the smaller, indirect consumption reduction from the tax rise ($-\$200$m).

A tax cut alone (no change in G)

$MPC = 0.9$ in a simple closed economy. The government cuts taxes by \$30m, with no accompanying change in G. Find the tax multiplier and the resulting change in equilibrium output.

$$k_{\text{tax}} = \frac{-MPC}{1 - MPC} = \frac{-0.9}{0.1} = -9.$$

$$\Delta Y = \Delta T \times k_{\text{tax}} = (-30) \times (-9) = +\$270\text{m}.$$

A relatively small \$30m tax cut generates a comparatively large \$270m rise in equilibrium output here, because the high $MPC = 0.9$ makes *both* multipliers large in magnitude — a reminder that the tax multiplier, while always smaller than the spending multiplier at the same MPC, can still produce a substantial effect when MPC is high.

MPC	**Spending multiplier** $\frac{1}{1-MPC}$	**Tax multiplier** $\frac{-MPC}{1-MPC}$	**Ratio (tax:spending, magnitude)**
0.5	2.00	-1.00	0.50
0.6	2.50	-1.50	0.60
0.7	3.33	-2.33	0.70
0.8	5.00	-4.00	0.80
0.9	10.00	-9.00	0.90

At every MPC, the tax multiplier's magnitude equals MPC times the spending multiplier's magnitude — the tax multiplier is always smaller, but the gap (in proportional terms) narrows as MPC rises.

VN GIẢI THÍCH TIẾNG VIỆT

Số nhân thuế (tax multiplier) $= \frac{-MPC}{1 - MPC}$ luôn **nhỏ hơn về độ lớn** so với số nhân chi tiêu $\frac{1}{1 - MPC}$, vì thay đổi thuế chỉ tác động **gián tiếp** đến AD thông qua phần thu nhập khả dụng mà hộ gia đình sẽ *tiêu dùng* (MPC), trong khi thay đổi G tác động **trực tiếp và toàn phần**. **Số nhân ngân sách cân bằng** (balanced-budget multiplier): nếu G và T cùng tăng một lượng bằng nhau, sản lượng cân bằng vẫn **tăng** — đúng bằng đúng lượng thay đổi đó (số nhân ngân sách cân bằng luôn bằng 1 trong mô hình đơn giản đóng), vì hiệu ứng bơm trực tiếp từ G luôn lớn hơn hiệu ứng rút bớt gián tiếp từ T.

3.4 Aggregate demand and aggregate supply

3.4.1 Aggregate demand

Aggregate demand (AD) is the total planned spending on an economy's domestic output at each price level, over a given period:

$$AD = C + I + G + (X - M)$$

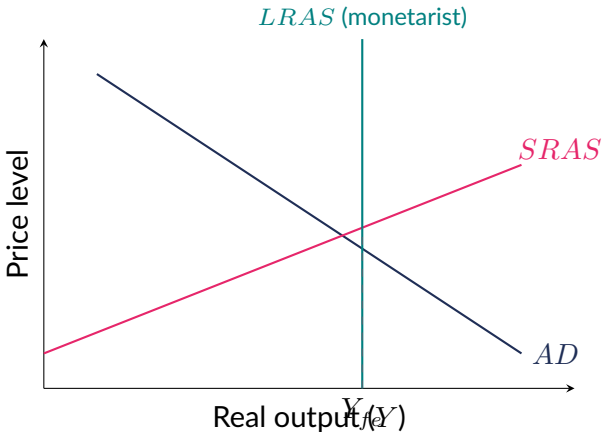
where C is household consumption, I is firms' investment spending, G is government spending, and $(X - M)$ is net exports. AD slopes downward for reasons distinct from an individual demand curve: a higher domestic price level reduces the real value of money and wealth (the **real balance effect**, lowering C), raises domestic interest rates as money demand rises (the **interest rate effect**, lowering C and I), and makes domestically produced goods relatively more expensive than foreign goods (the **international trade / exchange rate effect**, lowering net exports).

> Determinants that **shift** AD (at any given price level): consumer/business confidence, interest rates, household wealth, income taxes (affecting C), business expectations and the cost/availability of credit (affecting I), government fiscal policy (affecting G), and foreign income/exchange rates (affecting $X - M$).

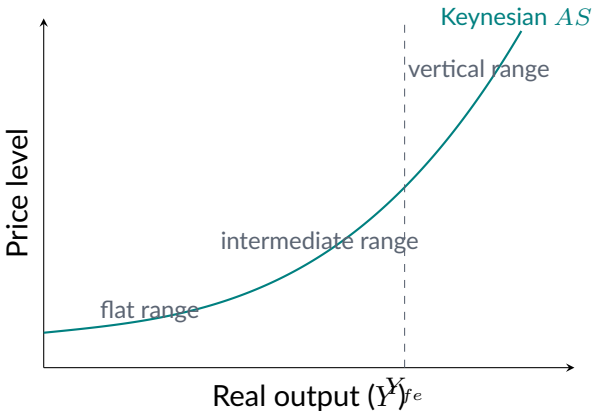
3.4.2 Aggregate supply: short run and long run

Short-run aggregate supply (SRAS) is upward sloping: at a higher price level, with input costs (especially wages) assumed to be relatively sticky in the short run, production becomes more profitable at the margin, so firms supply more. $SRAS$ shifts with changes in production costs (wages, raw material/energy prices, exchange rates affecting import costs) and indirect taxes/subsidies.

> [HL ONLY] Two views of **long-run aggregate supply ($LRAS$)**: the **monetarist/new classical** view draws $LRAS$ as **vertical** at potential output Y_{fe} — in the long run, wages and prices fully adjust, so output is determined only by the quantity/quality of factors of production, not by the price level; markets are assumed to self-correct toward Y_{fe} without government intervention. The **Keynesian** view draws AS with **three ranges**: nearly **flat** at very low output (large spare capacity, firms can raise output with little upward pressure on costs/prices), **upward sloping** as the economy approaches Y_{fe} (some sectors face constraints while others don't), and **vertical** once output reaches Y_{fe} — implying an economy *can* become "stuck" in an equilibrium below Y_{fe} (with persistent demand-deficient unemployment) unless demand is actively boosted, since wages (especially) may be "sticky downward" and fail to fall enough to self-correct the economy in a reasonable time frame.



The monetarist AD–AS model: short-run equilibrium (AD meets $SRAS$) can sit below, at, or above potential output Y_{fe} (vertical $LRAS$).



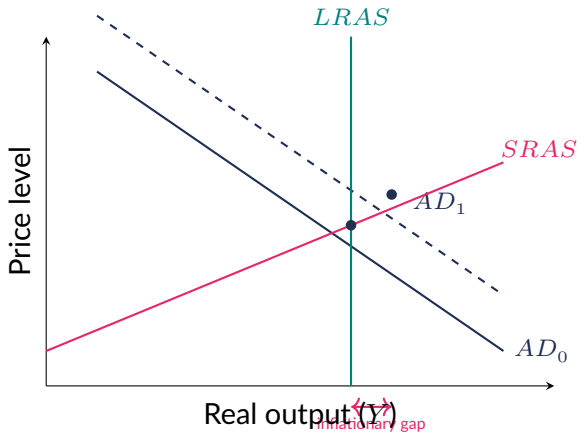
The Keynesian aggregate supply curve: flat at low output (spare capacity), upward-sloping approaching Y_{fe}, vertical beyond Y_{fe}.

VN **GIẢI THÍCH TIẾNG VIỆT**

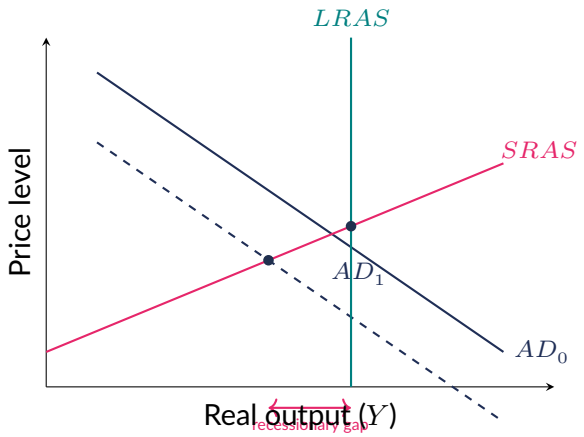
$AD = C + I + G + (X - M)$. AD dốc xuống không phải vì hiệu ứng thay thế như cầu cá nhân, mà do hiệu ứng của cải thực tế, hiệu ứng lãi suất, và hiệu ứng thương mại quốc tế. $SRAS$ dốc lên vì chi phí đầu vào (đặc biệt tiền lương) tương đối "cứng nhắc" trong ngắn hạn. $LRAS$ theo trường phái monetarist/new classical (HL) là đường thẳng đứng tại Y_{fe} — thị trường tự điều chỉnh. Trường phái Keynes cho rằng nền kinh tế có thể "mắc kẹt" dưới Y_{fe} nếu tiền lương không linh hoạt giảm — đây là lý do ủng hộ **intervention** bằng chính sách tài khoá/tiền tệ chủ động.

3.4.3 Macroeconomic equilibrium: inflationary and deflationary (recessionary) gaps

Short-run macroeconomic equilibrium occurs where AD intersects $SRAS$ (or the Keynesian AS curve). If this equilibrium lies *beyond* Y_{fe}, the economy has an **inflationary (positive) output gap**: unsustainably high demand pulls the price level up further as resources are stretched beyond full-employment capacity. If equilibrium lies *below* Y_{fe}, the economy has a **deflationary/recessionary (negative) output gap**: spare capacity and cyclical unemployment.



An inflationary (positive) output gap: AD_1 pushes short-run equilibrium beyond Y_{fe}, raising the price level further.



A recessionary (negative/deflationary) output gap: AD_1 leaves short-run equilibrium below Y_{fe}, with spare capacity and cyclical unemployment.

VN **GIẢI THÍCH TIẾNG VIỆT**

Cân bằng ngắn hạn là giao điểm của AD và $SRAS$. Nếu điểm này nằm **bên phải** $Y_{fe} \Rightarrow$ khoảng cách lạm phát (inflationary gap) — tổng cầu vượt quá năng lực bền vững, đẩy giá tiếp tục tăng. Nếu nằm **bên trái** $Y_{fe} \Rightarrow$ khoảng cách suy thoái (recessionary/deflationary gap) — dư thừa năng lực, thất nghiệp chu kỳ cao. Đây là cơ sở để chính phủ quyết định dùng chính sách **mở rộng** (expansionary) hay **thắt chặt** (contractionary).

3.5 Macroeconomic objectives

Governments pursue four core macroeconomic objectives, which frequently involve trade-offs against one another:

Khái niệm cốt lõi

1. **Economic growth**: a sustained rise in real GDP over time — distinguish **actual growth** (a rightward movement of $AD/SRAS$ equilibrium, closing a negative output gap) from **potential growth** (an outward shift of $LRAS$/the PPC, raising the economy's ceiling).
2. **Low unemployment**: keeping the share of the labour force without work, but actively seeking it, as low as sustainably possible.
3. **Low and stable inflation**: avoiding both high/volatile inflation and its opposite, deflation.
4. **Equity in income distribution**: ensuring the benefits of economic activity are not captured disproportionately by a small share of the population.

3.5.1 Unemployment: types, measurement, and costs

Types of unemployment:

- **Frictional**: short-term unemployment as workers move between jobs (searching, matching skills to vacancies) — considered largely unavoidable, even in a healthy labour market.
- **Structural**: caused by a long-run mismatch between workers' skills/location and available jobs, often from technological change, automation, or industry decline (e.g. a factory closes due to import competition, leaving workers whose specific skills no longer match available vacancies).
- **Seasonal**: predictable, regular fluctuations in demand for labour tied to the calendar (e.g. agriculture, tourism, retail during holiday seasons).
- **Cyclical (demand-deficient)**: caused by a negative output gap — when AD is too weak to employ all willing workers at prevailing wages; this is the type most directly targeted by demand-side policy.

Calculating the unemployment rate

A country's labour force is 25 million, of whom 23.5 million are employed. Calculate the unemployment rate.

Unemployed $= 25\text{m} - 23.5\text{m} = 1.5$ million.

$$\text{Unemployment rate} = \frac{1.5}{25} \times 100\% = 6.0\%.$$

(Note: the labour force excludes those not seeking work at all — e.g. full-time students, retirees — so the unemployment rate measures joblessness only among those actively participating in, or seeking to join, the labour force.)

Costs of unemployment

Personal/social costs: lost income, skill atrophy ("hysteresis" — long-term unemployment erodes future employability), and well-documented links to poorer physical/mental health. **Economic costs**: output permanently forgone (the economy operates inside its PPC), lower tax revenue, higher government spending on unemployment benefits, and a wider budget deficit. **Costs of measurement itself**: official statistics can understate true joblessness (e.g. discouraged workers who stop searching are not counted as "unemployed" in a labour-force survey) or overstate it (e.g. some claimant-count measures miss those working informally while still claiming benefits).

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Bốn loại thất nghiệp: **cọ xát** (frictional — tạm thời khi chuyển việc), **cơ cấu** (structural — kỹ năng không còn phù hợp do thay đổi công nghệ/ngành), **thời vụ** (seasonal), và **chu kỳ** (cyclical/demand-deficient — do tổng cầu yếu, đây là loại chính sách phía cầu nhắm tới). Tỉ lệ thất nghiệp $= \dfrac{\text{số người thất nghiệp}}{\text{lực lượng lao động}} \times 100\%$. Thất nghiệp gây tổn thất cả về kinh tế (sản lượng mất đi, ngân sách chính phủ) lẫn xã hội (sức khoẻ, kỹ năng bị mai một).

3.5.2 Inflation and deflation

Demand-pull inflation arises when AD grows faster than $LRAS$ (an inflationary output gap), pulling the price level up. **Cost-push inflation** arises from a rise in production costs (wages, energy, raw

materials, a weaker exchange rate raising import prices), shifting $SRAS$ **left** — reducing output *and* raising prices simultaneously (**stagflation** in severe cases).

Costs of inflation and deflation

Costs of (high) inflation: **menu costs** (the resource cost of continually updating prices), **shoe-leather costs** (time/effort spent minimising cash holdings as money loses value), redistribution from savers/lenders to borrowers (if inflation is unanticipated and interest rates do not adjust), erosion of **international competitiveness** (exports become relatively more expensive), and greater uncertainty discouraging investment. **Costs of deflation**: consumers may **postpone spending** expecting further price falls (worsening any downturn), the **real value of debt rises** even as nominal debt stays fixed (harming borrowers), and central banks can face a **liquidity trap** where nominal interest rates near zero leave little room for further monetary stimulus.

VN **GIẢI THÍCH TIẾNG VIỆT**

Lạm phát **do cầu kéo** (demand-pull) xảy ra khi AD tăng nhanh hơn $LRAS$; lạm phát **do chi phí đẩy** (cost-push) xảy ra khi chi phí sản xuất tăng, đẩy $SRAS$ sang trái — vừa giảm sản lượng vừa tăng giá (**lạm phát đình trệ** — stagflation — nếu nghiêm trọng). Lạm phát cao gây chi phí thực đơn (menu costs), chi phí "mòn giày" (shoe-leather costs), phân phối lại của cải bất lợi cho người tiết kiệm, giảm sức cạnh tranh quốc tế. Giảm phát (deflation) cũng nguy hiểm: người tiêu dùng trì hoãn chi tiêu, gánh nặng nợ thực tế tăng lên, ngân hàng trung ương có thể rơi vào "bẫy thanh khoản" khi lãi suất đã gần 0.

3.5.3 The costs of inflation in detail

Section 3.4 introduced the costs of inflation and deflation briefly; each cost of (unexpected or high) inflation is worth examining systematically, since exam questions frequently ask for named, explained costs rather than just a list.

The costs of inflation, expanded

- **Menu costs**: the real resources a firm must use up to continually update prices — reprinting menus/catalogues, relabelling shelves, reprogramming vending machines and point-of-sale/online systems — resources that could otherwise have been used productively elsewhere.
- **Shoe-leather costs**: the time and effort people spend trying to minimise how much low-interest cash they hold as inflation erodes its value — e.g. making more frequent trips to the bank to move money into interest-bearing accounts only as needed, rather than holding cash. The name refers, somewhat literally, to the "shoe leather" worn out walking to the bank more often.
- **Redistribution between debtors and creditors**: if inflation turns out higher than expected when a loan was agreed at a *fixed* nominal interest rate, the real value of the debt is eroded faster than anticipated — this benefits **borrowers** (they repay in currency worth less than expected) at the expense of **lenders/savers** (who receive repayments with less real purchasing power than they anticipated when they agreed to lend).
- **Increased uncertainty**: volatile or unpredictable inflation makes it harder for firms to plan long-term investment and harder for parties to agree long-term contracts (e.g. multi-year wage agreements or supply contracts), since neither side can be confident what a given nominal sum will really be worth by the time the contract is fulfilled — this uncertainty itself can discourage investment and long-run planning.
- **Loss of international competitiveness**: if a country's inflation rate persistently exceeds that

of its trading partners, its exports become relatively more expensive and imports relatively cheaper (assuming exchange rates do not fully offset the difference), harming export competitiveness and worsening the current account balance (developed further in Unit 4).

[Hyperinflation] In extreme cases, very rapid, sustained inflation (**hyperinflation**) can undermine money's basic functions as a reliable **store of value** and **medium of exchange** so severely that ordinary economic activity is badly disrupted — people may rush to spend money as soon as they receive it (since it loses value so quickly), resort to barter, or switch to using a more stable foreign currency instead of the domestic currency. Commonly-cited textbook examples of hyperinflation include Weimar Germany in the early 1920s and Zimbabwe in the late 2000s; in both cases, the extreme and rapid loss of confidence in the domestic currency severely disrupted normal economic life.

Unexpected inflation and the realised real interest rate

A borrower takes out a \$10,000 fixed-rate loan at a nominal interest rate of 4% when expected inflation is 2% (so the *expected* real interest rate is approximately $4\% - 2\% = 2\%$). Actual inflation over the year unexpectedly turns out to be 6% instead. Calculate the *realised* real interest rate, and state who gains and who loses.

$$\text{Realised real interest rate} \approx \text{nominal rate} - \text{actual inflation} = 4\% - 6\% = -2\%.$$

The realised real interest rate is **negative** (-2%), even though both parties expected a positive real return of about 2% when the loan was agreed. Because actual inflation (6%) turned out higher than expected (2%), the **borrower gains**: they repay the fixed \$10,000 (plus 4% nominal interest) using currency that has lost *more* purchasing power than either side anticipated, so the real burden of repayment is lower than promised. The **lender loses**: they receive repayment whose real purchasing power is less than they expected when they agreed to lend at 4% nominal — a direct illustration of unexpected inflation redistributing real wealth from creditors to debtors.

Nominal rate	Inflation rate	Real rate (≈)	Outcome for the saver
5%	2%	$+3\%$	Purchasing power rises
5%	5%	0%	Purchasing power unchanged
5%	8%	-3%	Purchasing power falls

At a fixed 5% nominal interest rate, whether a saver's real purchasing power rises, stays flat, or falls depends entirely on how inflation compares to that nominal rate (the Fisher equation, Section 3.7).

(!) Lỗi thường gặp: Exam answers often lose credit by treating "the cost of inflation" as a single, undifferentiated idea. *Anticipated* inflation (correctly built into wage negotiations, loan interest rates, and pricing in advance) is far less costly than *unanticipated* inflation (which catches lenders, savers, and long-term contracts by surprise) — always specify *which* cost is meant (menu costs, shoe-leather costs, redistribution, competitiveness) rather than referring to "the cost of inflation" generically.

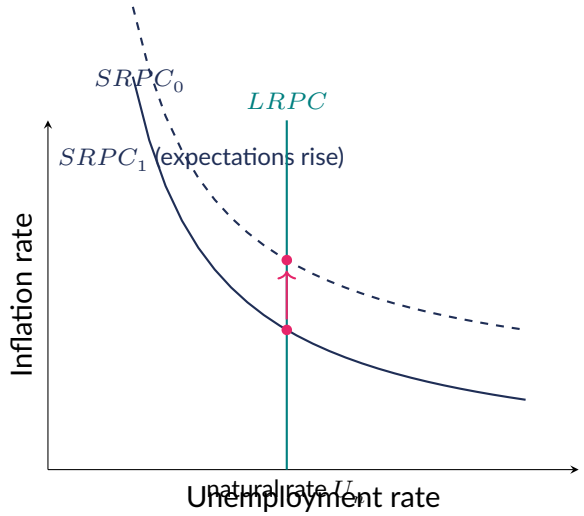
VN **GIẢI THÍCH TIẾNG VIỆT**

Các chi phí của lạm phát (khi lạm phát cao/ngoài dự kiến) gồm: **chi phí thực đơn** (menu costs

— nguồn lực để cập nhật giá liên tục), **chi phí mòn giày** (shoe-leather costs — thời gian/công sức giảm thiểu giữ tiền mặt), **phân phối lại của cải** giữa người đi vay và người cho vay (lạm phát ngoài dự kiến làm giảm giá trị thực của nợ, có lợi cho người đi vay, bất lợi cho người cho vay/tiết kiệm với lãi suất cố định), **gia tăng bất ổn** làm doanh nghiệp ngần ngại đầu tư dài hạn, và **giảm sức cạnh tranh quốc tế** nếu lạm phát trong nước liên tục cao hơn các đối tác thương mại. Trong trường hợp cực đoan (**siêu lạm phát** — hyperinflation, ví dụ kinh điển: Đức thời Weimar đầu thập niên 1920, Zimbabwe cuối thập niên 2000), tiền có thể mất chức năng lưu trữ giá trị và trao đổi, gây rối loạn nghiêm trọng hoạt động kinh tế (đổi hàng trực tiếp, chuyển sang dùng ngoại tệ).

3.5.4 [HL ONLY] The Phillips curve

The **short-run Phillips curve (SRPC)** shows an inverse (trade-off) relationship between unemployment and inflation: expansionary demand-side policy can lower unemployment but tends to raise inflation, and vice versa. The **long-run Phillips curve (LRPC)** is **vertical** at the **natural rate of unemployment** (the unemployment rate consistent with stable, expected inflation — essentially the sum of frictional and structural unemployment, with cyclical unemployment at zero): once inflation expectations fully adjust, there is *no* permanent trade-off, so persistently expansionary policy raises inflation without any lasting reduction in unemployment — the SRPC itself **shifts outward** as expectations catch up.



The Phillips curve: along a fixed $SRPC$, lower unemployment trades off against higher inflation; the $LRPC$ is vertical at the natural rate U_n — persistent expansionary policy shifts $SRPC_0 \rightarrow SRPC_1$ as inflation expectations rise, without any lasting fall in unemployment.

Interpreting the Phillips curve

An economy is already operating at its natural rate of unemployment. The government pursues additional expansionary demand-side policy. Explain the likely short-run and long-run effects using the Phillips curve.

Short run: moving along the existing $SRPC$, unemployment can temporarily fall *below* the natural rate as higher AD raises output and hiring, at the cost of higher inflation. **Long run:** as workers and firms adjust their inflation expectations upward to match the now-higher actual inflation, wage bargaining and price-setting catch up, and unemployment drifts back to the natural rate — but at a permanently **higher** inflation rate ($SRPC$ shifts outward/up). The

economy ends up back on the vertical $LRPC$ at U_n, with no lasting employment gain but a lasting rise in inflation — the standard case for viewing the long-run Phillips curve as vertical.

VN **GIẢI THÍCH TIẾNG VIỆT**

Đường Phillips ngắn hạn ($SRPC$) cho thấy đánh đổi giữa thất nghiệp và lạm phát trong ngắn hạn. Đường Phillips dài hạn ($LRPC$) thẳng đứng tại tỉ lệ thất nghiệp tự nhiên — khi kỳ vọng lạm phát điều chỉnh kịp, không còn đánh đổi bền vững: cố gắng giữ thất nghiệp dưới mức tự nhiên chỉ khiến lạm phát tăng liên tục mà không giảm được thất nghiệp lâu dài.

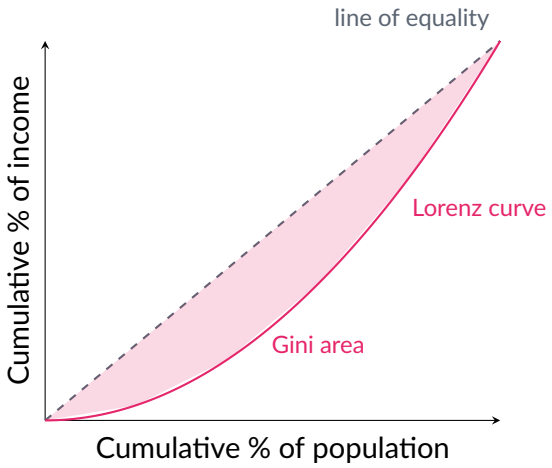
3.5.5 Equity in income distribution

Khái niệm cốt lõi

The **Lorenz curve** plots the cumulative % of total income (vertical axis) against the cumulative % of the population, ranked from poorest to richest (horizontal axis). A perfectly equal distribution is the 45° diagonal line; the further the actual Lorenz curve bows below this line, the more unequal the distribution. The **Gini coefficient** summarises this in a single number:

$$\text{Gini} = \frac{\text{Area between the line of equality and the Lorenz curve}}{\text{Total area under the line of equality}} \in [0, 1].$$

Gini $\to 0$: greater equity. Gini $\to 1$: greater inequality.



The Lorenz curve and the Gini coefficient: the shaded area (between the diagonal line of equality and the actual Lorenz curve), divided by the total area under the diagonal, gives the Gini coefficient.

Reading a Gini coefficient

For a country's Lorenz curve, the area between the curve and the line of perfect equality is estimated at 1,500 (index units), and the total area under the line of equality is 5,000. Calculate the Gini coefficient and interpret it.

$$\text{Gini} = \frac{1500}{5000} = 0.30.$$

A Gini coefficient of 0.30 indicates a moderate degree of income inequality — closer to the "greater equity" end (0) than the "greater inequality" end (1) of the scale, roughly comparable

to some of the more equal high-income economies in the real world.

Redistribution tools

Governments narrow income inequality through: **progressive taxation** (average tax rate rises with income — e.g. higher marginal income-tax bands), **transfer payments** (unemployment benefits, pensions, child benefits — funded by general taxation, redistributing income without any corresponding production), **minimum wage** legislation, and **provision of merit goods** (public education, public healthcare) which raises the *real* income of lower-income households disproportionately, since these services would otherwise take up a larger share of a poorer household's budget.

VN **GIẢI THÍCH TIẾNG VIỆT**

Đường Lorenz và hệ số Gini đo mức độ bất bình đẳng thu nhập — Gini càng gần 0 càng công bằng, càng gần 1 càng bất bình đẳng. Công cụ tái phân phối: **thuế luỹ tiến** (progressive tax — tỉ lệ thuế tăng theo thu nhập), **trợ cấp chuyển giao** (transfer payments — trợ cấp thất nghiệp, lương hưu), **lương tối thiểu**, và cung cấp hàng hoá thiết yếu công (giáo dục, y tế công) — đặc biệt có lợi cho nhóm thu nhập thấp vì các khoản này chiếm tỉ trọng lớn hơn trong ngân sách của họ.

3.6 Demand-side and supply-side policies

3.6.1 Fiscal policy

Fiscal policy uses government spending (G) and taxation (T) to influence AD. **Expansionary fiscal policy** (higher G and/or lower T) raises AD to fight recession/unemployment (closing a negative output gap); **contractionary fiscal policy** (lower G and/or higher T) lowers AD to cool an overheating economy (closing a positive/inflationary output gap).

Discretionary fiscal policy involves deliberate, active changes to G/T (e.g. a new infrastructure programme). **Automatic stabilisers** operate without any new legislation: in a downturn, tax revenue automatically falls (as incomes fall) and welfare/unemployment-benefit spending automatically rises — both cushion the fall in disposable income and AD without any active government decision; the reverse happens automatically in a boom.

Budget balance and the national debt

A government's spending is \$420bn and its tax revenue is \$390bn this year. Classify the budget position and describe the effect on national debt.

Since $G(\$420\text{bn}) > T(\$390\text{bn})$, the government runs a **budget deficit** of $420 - 390 = \$30$bn this year. This deficit must be financed by government borrowing, which adds \$30bn to the stock of accumulated **national (government) debt**. A government running *persistent* deficits sees its debt-to-GDP ratio rise over time unless nominal GDP growth outpaces the rate of new borrowing.

(!) **Lỗi thường gặp:** **[HL ONLY]** **Crowding out**: if a government finances a budget deficit by borrowing heavily in domestic financial markets, this extra demand for loanable funds can push up interest rates, discouraging ("crowding out") private-sector investment that would otherwise have taken place — partially offsetting the intended expansionary effect of the fiscal stimu-

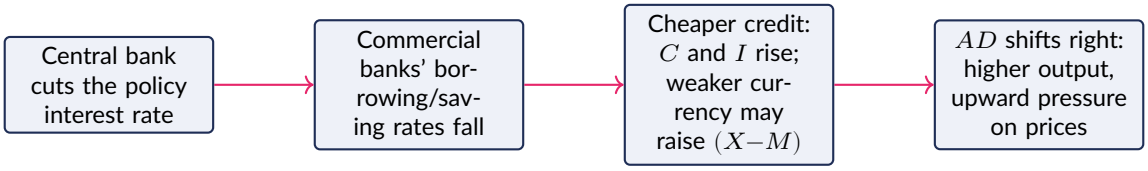
lus on AD. Crowding out is a standard argument used to evaluate/limit the effectiveness of expansionary fiscal policy, particularly when the economy is already close to full employment (leaving less "spare" saving available to be borrowed without raising interest rates).

VN **GIẢI THÍCH TIẾNG VIỆT**

Chính sách tài khoá **mở rộng** (tăng G/giảm T) chống suy thoái; **thắt chặt** (giảm G/tăng T) chống lạm phát. **Ổn định tự động** (automatic stabilisers — thuế, trợ cấp thất nghiệp) hoạt động ngay cả khi chính phủ không ra quyết định mới. Thâm hụt ngân sách ($G > T$) làm tăng **nợ công**. Hiệu ứng **chèn lấn** (crowding out — HL): chính phủ vay nợ nhiều có thể đẩy lãi suất lên, làm giảm đầu tư tư nhân, một phần triệt tiêu tác dụng kích thích tổng cầu của chính sách tài khoá mở rộng.

3.6.2 Monetary policy

Monetary policy — usually set by an independent central bank — primarily uses the **policy interest rate** (and, in some contexts, direct control of the money supply or "quantitative easing") to influence AD.



The monetary policy transmission mechanism: an interest-rate cut works through borrowing costs, consumption/investment, and the exchange rate to raise AD (a rate rise works in reverse, contracting AD).

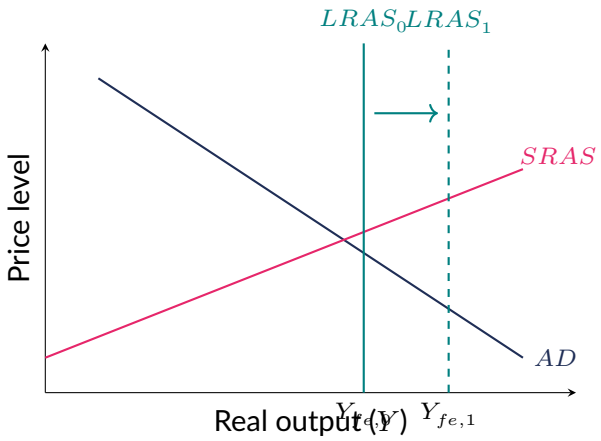
VN **GIẢI THÍCH TIẾNG VIỆT**

Chính sách tiền tệ chủ yếu dùng **lãi suất chính sách**: giảm lãi suất → chi phí vay giảm → tiêu dùng (C) và đầu tư (I) tăng, đồng thời tiền tệ có thể yếu đi làm xuất khẩu ròng tăng → AD dịch phải (mở rộng); tăng lãi suất có tác dụng ngược lại (thắt chặt). Ngân hàng trung ương độc lập giúp chính sách tiền tệ tránh bị chi phối bởi chu kỳ bầu cử ngắn hạn.

3.6.3 Supply-side policies

Unlike demand-side policies, **supply-side policies** aim to shift $LRAS$ (and the economy's PPC) **rightward**, raising the economy's sustainable long-run potential rather than just managing short-run demand.

Interventionist supply-side policies rely on active government spending/provision: investment in education and training (raising labour productivity/human capital), infrastructure spending (transport, energy, digital networks), and direct support for research and development or targeted industries. **Market-based** supply-side policies instead aim to remove obstacles to private-sector efficiency: deregulation, privatisation, trade liberalisation, labour-market reform (e.g. easing hiring/firing rules), and tax incentives for investment/entrepreneurship.



A successful supply-side policy shifts $LRAS$ rightward from $LRAS_0$ to $LRAS_1$: potential output rises without necessarily requiring higher prices, unlike a purely demand-side expansion.

(!) Lỗi thường gặp: Supply-side policies typically act with a much **longer time lag** than demand-side policy (e.g. new infrastructure or education investment takes years to raise productive capacity), so they are poorly suited to managing a sudden cyclical downturn on their own — a complete evaluation should note that demand-side and supply-side policy usually work *together*: demand-side tools manage the business cycle in the short-to-medium run, while supply-side policy raises the sustainable ceiling in the long run.

VN **GIẢI THÍCH TIẾNG VIỆT**

Chính sách phía cung (supply-side) không nhằm dịch chuyển AD mà dịch chuyển $LRAS$ sang phải — nâng năng lực sản xuất dài hạn. Nhóm **can thiệp** (interventionist): đầu tư giáo dục, hạ tầng, R&D. Nhóm **theo thị trường** (market-based): tự do hoá, tư nhân hoá, giảm rào cản lao động, ưu đãi thuế. Chính sách phía cung thường có **độ trễ dài** hơn nhiều so với chính sách phía cầu, nên hai nhóm chính sách thường được phối hợp: phía cầu quản lý chu kỳ ngắn hạn, phía cung nâng trần dài hạn.

3.7 The costs and benefits of economic growth

Economic growth is usually a policy priority, but it is not automatically or unambiguously beneficial — a complete evaluation weighs its costs against its benefits.

Khái niệm cốt lõi

Benefits of growth: rising average living standards (higher real GDP per capita, more goods/services available); typically lower unemployment (more output requires more workers); higher government tax revenue *without* raising tax rates (funding public services, or a fiscal deficit reduction); and — if growth is broadly shared — reduced absolute poverty.
Costs of growth: growth driven by unsustainable extraction of natural resources threatens **sustainability** for future generations; rapid growth can create demand-pull inflationary pressure (an inflationary output gap) if it outpaces $LRAS$; growth is not automatically evenly distributed — inequality can *widen* even as average income rises (an **equity** concern), if the gains are captured disproportionately by owners of capital rather than labour; and growth (particularly industrial/manufacturing-led growth) is frequently associated with negative production externalities (pollution, congestion) that reduce **economic well-being** even as measured output rises.

Weighing growth's costs and benefits

Country Z's real GDP grows by 6% annually for a decade, driven almost entirely by expanding coal-fired heavy industry. Over the same period, income inequality (measured by the Gini coefficient) rises from 0.32 to 0.44, and air-pollution-related hospital admissions double. Evaluate whether this represents a genuine improvement in economic well-being.

The 6% annual growth substantially raises average income and (likely) formal employment — a real, measurable benefit by the narrow metric of real GDP. However, the rising Gini coefficient (0.32 → 0.44) shows this growth was *not* broadly shared — a meaningful **equity** deterioration, meaning the "average" income gain overstates the improvement experienced by a typical (median) household. The doubling of pollution-related hospital admissions is a direct, measurable cost to **economic well-being** not captured in GDP at all (a classic negative production externality, Unit 2), and heavy reliance on coal-fired industry raises **sustainability** concerns for the country's long-run resource base and climate exposure. A complete evaluation would conclude that Country Z's growth, while real by the GDP metric, does not straightforwardly represent an equivalent improvement in genuine economic well-being once distribution, health, and sustainability are accounted for — directly echoing the growth-vs-development distinction developed further in Unit 4.

VN **GIẢI THÍCH TIẾNG VIỆT**

Lợi ích tăng trưởng: mức sống trung bình cao hơn, thất nghiệp thấp hơn, ngân sách chính phủ tăng mà không cần tăng thuế suất. Chi phí tăng trưởng: có thể đe doạ **sustainability** nếu dựa vào khai thác tài nguyên không bền vững, có thể gây lạm phát cầu kéo nếu vượt quá $LRAS$, có thể **không được chia sẻ đều** (bất bình đẳng tăng dù thu nhập trung bình tăng), và thường đi kèm ngoại tác tiêu cực (ô nhiễm, tắc nghẽn) làm giảm phúc lợi thực tế dù GDP đo được vẫn tăng. Luôn đánh giá tăng trưởng theo **cả hai chiều** lợi ích và chi phí, không mặc định "tăng trưởng luôn tốt".

3.8 Poverty

Absolute poverty means being unable to afford a fixed, minimum basket of goods/services necessary for survival (e.g. the World Bank's international poverty line, a fixed real-income threshold applied across countries and updated only for inflation, not relative living standards). **Relative poverty** means having an income substantially below the *typical* income in one's own society (a common definition: below 50% or 60% of median national income) — a relative-poverty threshold *rises* as a country's overall income rises, even if no one's absolute material conditions worsen.

Absolute vs relative poverty over time

Country W's median household income rises from $20,000 to $30,000 over ten years. A household earning $11,000 at the start of the period still earns $11,000 (unchanged in real terms) at the end. Using a relative-poverty line of 50% of median income, determine whether this household's relative poverty status changes, even though its own real income has not changed at all.

Year 1: 50% of median income $= 0.5 \times 20{,}000 = \$10{,}000$. The household's $11,000 income is *above* this line — **not** in relative poverty.
Year 10: 50% of median income $= 0.5 \times 30{,}000 = \$15{,}000$. The same household's (unchanged) $11,000 income is now *below* this line — now classified as being **in relative poverty**.

This illustrates a key feature of relative-poverty measures: a household can fall into (or out of) relative poverty purely because the rest of society's income has changed, even with no change whatsoever in the household's own real living standard — a common point of confusion, and a reason relative and absolute poverty measures can tell very different stories about the same economy.

The poverty trap

A **poverty trap** describes a self-reinforcing cycle in which poverty itself creates conditions that make escaping poverty difficult — e.g. low income prevents investment in education/nutrition/healthcare, which lowers future earning potential, perpetuating low income into the next generation (an **intergenerational** poverty trap). Government responses include targeted transfer payments (cash or in-kind), free/subsidised public education and healthcare (raising human capital directly), and microfinance (small loans enabling asset/business investment that would otherwise be unaffordable) — all aiming to break the self-reinforcing cycle rather than simply providing temporary income relief.

VN **GIẢI THÍCH TIẾNG VIỆT**

Nghèo tuyệt đối (absolute poverty) là không đủ khả năng chi trả cho mức sống tối thiểu cố định (ví dụ ngưỡng nghèo quốc tế của World Bank). **Nghèo tương đối** (relative poverty) là thu nhập thấp hơn đáng kể so với mức thu nhập **trung vị** của chính xã hội đó (thường dùng ngưỡng 50% hoặc 60% thu nhập trung vị) — ngưỡng này **tăng theo** khi xã hội giàu lên, nên một hộ gia đình có thể "rơi vào nghèo tương đối" dù thu nhập thực tế của họ không hề giảm. **Bẫy nghèo** (poverty trap) là vòng luẩn quẩn: nghèo → thiếu đầu tư giáo dục/y tế → thu nhập tương lai thấp → tiếp tục nghèo, kể cả sang thế hệ sau.

3.9 Central bank independence and policy coordination

An **independent central bank** sets monetary policy free from direct government/political control, typically pursuing a clear mandate (e.g. a numerical inflation target). The standard argument for independence: elected governments face short-run political incentives (e.g. stimulating the economy before an election) that can conflict with sound long-run monetary management, and an independent central bank can pursue price stability without that short-term political pressure, helping keep inflation expectations well-anchored (reinforcing the argument for a stable natural rate of unemployment along the vertical $LRPC$).

Coordinating fiscal and monetary policy

An economy faces a negative output gap. The government wants to run expansionary fiscal policy (raising G), while the independent central bank is simultaneously raising interest rates because it is separately focused on an inflation target being slightly exceeded. Explain the tension this creates and one way policy coordination could resolve it.

Expansionary fiscal policy pushes AD to the **right** (fighting the recessionary gap), while contractionary monetary policy (higher interest rates) pushes AD to the **left** (fighting inflation) — the two policies work in *opposite* directions on AD, potentially cancelling much of each other's intended effect while still each imposing their own side-costs (higher government debt from the fiscal expansion; higher borrowing costs for households/firms from the monetary tightening). Better coordination — e.g. the central bank confirming its inflation concern is primarily driven by a temporary cost-push shock (better addressed by targeted supply-side measures

than by broad demand-side tightening) rather than genuine excess demand — could allow both institutions to avoid working against each other, though central bank *independence* means the government cannot simply direct the bank to change its stance, only communicate and coordinate around it.

VN **GIẢI THÍCH TIẾNG VIỆT**

Ngân hàng trung ương **độc lập** giúp chính sách tiền tệ tránh bị chi phối bởi động cơ chính trị ngắn hạn (ví dụ kích thích kinh tế trước bầu cử), hỗ trợ neo giữ kỳ vọng lạm phát ổn định. Tuy nhiên, độc lập cũng có thể gây ra **xung đột phối hợp**: nếu chính phủ theo đuổi chính sách tài khoá mở rộng trong khi ngân hàng trung ương theo đuổi chính sách tiền tệ thắt chặt cùng lúc, hai chính sách có thể triệt tiêu lẫn nhau về tác động lên AD trong khi vẫn gánh chịu chi phí riêng của mỗi chính sách (nợ công tăng, chi phí vay tăng).

3.10 Real vs. nominal interest rates

Just as GDP must be adjusted for inflation to reveal genuine changes in output (Section 3.1), interest rates must be adjusted for inflation to reveal the genuine (real) return to saving or the genuine (real) cost of borrowing.

The (approximate) **Fisher equation**:

$$\text{Real interest rate} \approx \text{Nominal interest rate} - \text{Inflation rate}.$$

The **nominal** interest rate is the rate actually quoted by a bank/lender. The **real** interest rate measures the true growth in *purchasing power* a saver earns (or a borrower must give up), after removing the effect of inflation eroding the value of money over time.

Calculating and interpreting the real interest rate

A savings account pays a nominal interest rate of 3% per year, while inflation is running at 5% per year. Calculate the real interest rate and interpret it.

$$\text{Real interest rate} \approx 3\% - 5\% = -2\%.$$

Despite earning a *positive* nominal return (the account balance grows by 3% in dollar terms), the saver's real **purchasing power** actually **falls** by about 2% over the year, because prices rose faster (5%) than the nominal interest earned (3%) — a classic cost of inflation for savers (Section 3.3), and a reason central banks pursuing an inflation target usually aim to keep real interest rates from becoming persistently and substantially negative for extended periods.

Real interest rates and the effectiveness of monetary policy

A central bank cuts its nominal policy rate from 4% to 1% to fight a recession, while inflation simultaneously falls from 3% to -1% (the economy tips into mild deflation). Calculate the real interest rate before and after, and comment on whether monetary policy became more or less stimulative.

Before: real rate $\approx 4\% - 3\% = 1\%$. **After**: real rate $\approx 1\% - (-1\%) = 1\% - (-1) = 2\%$.
Even though the *nominal* rate fell sharply (from 4% to 1%, a large apparent easing), the **real** interest rate actually **rose** (from 1% to 2%), because inflation fell even faster than the nominal

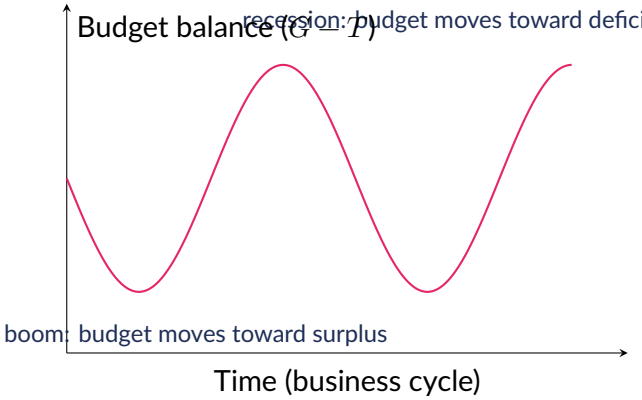
rate — monetary policy became *less*, not more, stimulative in real terms. This is a version of the **liquidity trap** concern (Section 3.3): once nominal rates are already low, a central bank has limited room to cut them further, and if deflation sets in, the real interest rate can actually rise even as the central bank appears to be easing policy — a key reason deflation is considered dangerous and difficult for conventional monetary policy to counteract.

VN **GIẢI THÍCH TIẾNG VIỆT**

Phương trình Fisher (gần đúng): **lãi suất thực** ≈ **lãi suất danh nghĩa** − **tỉ lệ lạm phát**. Lãi suất danh nghĩa là con số ngân hàng công bố; lãi suất thực phản ánh đúng sức mua thực tế người gửi tiết kiệm nhận được (hoặc người vay phải trả). Nếu lạm phát cao hơn lãi suất danh nghĩa, lãi suất thực sẽ **âm** — người gửi tiết kiệm thực chất bị mất sức mua dù số dư tài khoản vẫn tăng. Khi giảm phát xảy ra, lãi suất thực có thể **tăng** ngay cả khi ngân hàng trung ương đang cắt giảm lãi suất danh nghĩa — đây là nguồn gốc của rủi ro "bẫy thanh khoản".

3.11 Automatic stabilisers over the business cycle

Section 3.5 introduced automatic stabilisers conceptually; their effect can be seen directly by tracking the budget balance through a full business cycle.



Automatic stabilisers cause the budget balance to move counter-cyclically *without any new policy decision*: deficits widen automatically in a downturn (falling tax revenue, rising benefit spending) and narrow automatically in a boom.

Cyclical vs. structural budget balance

A government's actual budget balance is a deficit of $40bn this year. Economists estimate that if the economy were operating exactly at potential output (zero output gap), automatic stabilisers alone would produce a balance $25bn more favourable (i.e. a deficit of only $15bn) than the current actual figure. Decompose the $40bn deficit into its cyclical and structural components, and explain the policy relevance of this distinction.

The **cyclical component** of the deficit is $25bn — the portion caused purely by the current negative output gap (depressed tax revenue, elevated benefit spending) that would automatically disappear once the economy returns to potential output. The **structural component** is the remaining $40 - 25 = \$15$bn — the deficit that would *persist even at full employment*, reflecting the underlying gap between the government's planned spending and revenue independent of the business cycle.

This distinction matters because it tells policymakers *what kind of deficit they are dealing with*: the cyclical $25bn does not require any new discretionary policy action (it should resolve on its own as the economy recovers, aided by automatic stabilisers), whereas the structural $15bn

will **not** disappear on its own and requires deliberate policy choices (raising taxes and/or cutting spending, or accepting a persistently higher national debt) even after the economy fully recovers.

VN **GIẢI THÍCH TIẾNG VIỆT**

Cân bằng ngân sách thực tế có thể tách thành **thành phần chu kỳ** (cyclical — do khoảng cách sản lượng hiện tại gây ra, sẽ tự biến mất khi kinh tế phục hồi nhờ bộ ổn định tự động) và **thành phần cơ cấu** (structural — tồn tại ngay cả khi kinh tế đạt sản lượng tiềm năng, cần chính sách chủ động để xử lý). Phân biệt hai thành phần này rất quan trọng: thâm hụt chu kỳ không đáng lo (sẽ tự cải thiện), nhưng thâm hụt cơ cấu đòi hỏi hành động chính sách rõ ràng (tăng thuế/giảm chi hoặc chấp nhận nợ công tăng lâu dài).

Bài tập luyện tập

A bank offers a nominal savings rate of 6% while inflation is 2%. Calculate the real interest rate and state whether the saver's purchasing power rises or falls.

(A) Real rate 4%; purchasing power rises
(B) Real rate 8%; purchasing power rises
(C) Real rate -4%; purchasing power falls
(D) Real rate 4%; purchasing power falls

Lời giải chi tiết

Real rate $\approx 6\% - 2\% = 4\%$. Since this is positive, the saver's purchasing power **rises** — the nominal return exceeds inflation. **(A)**.

Bài tập luyện tập

A government's actual budget deficit is \$60bn. Economists estimate the cyclical component (due to the current negative output gap) is \$22bn. Calculate the structural component, and explain why it would not disappear even in a full economic recovery.

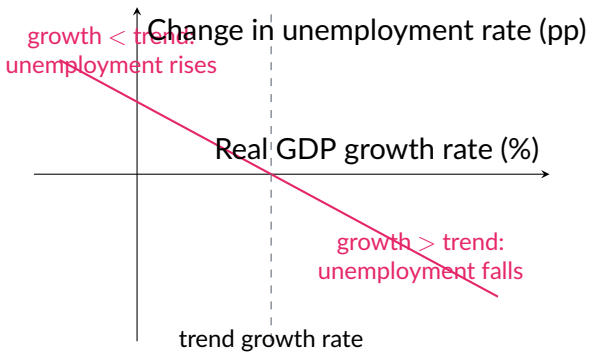
Lời giải chi tiết

Structural component $= 60 - 22 = \$38$bn. This portion of the deficit reflects a persistent gap between planned government spending and revenue that exists *independent of the business cycle* — it would remain even if the economy returned fully to potential output (closing the output gap and eliminating the cyclical \$22bn), because it is not caused by temporarily depressed tax revenue or elevated benefit spending, but by the government's underlying fiscal settings (tax rates and spending levels) themselves. Addressing it requires deliberate discretionary policy (tax rises, spending cuts, or accepting sustained additional borrowing), not simply waiting for economic recovery.

3.12 Growth, unemployment, and the deflationary spiral

3.12.1 The growth–unemployment relationship

Because producing more output generally requires employing more workers, a economy's rate of **actual growth** and its rate of **cyclical unemployment** tend to move in opposite directions — though not one-for-one, since firms can also raise output by raising existing workers' hours or productivity without hiring at all.



A stylised growth–unemployment relationship: when real GDP growth exceeds the economy's long-run trend rate, unemployment tends to fall; growth below trend allows unemployment to rise even without an outright recession.

Applying a growth–unemployment rule of thumb

An economy's long-run trend growth rate (the rate needed just to keep the unemployment rate constant, given labour-force and productivity growth) is estimated at 2.5%. If real GDP grows by only 1% this year, would you expect unemployment to rise, fall, or stay constant? What if real GDP instead grows by 4%?

At **1% growth** (below the 2.5% trend), output is expanding *more slowly* than the labour force and productivity are growing, so fewer new workers (relative to the growing pool of job-seekers) are needed — unemployment would be expected to **rise**, even though the economy is still technically growing (not in a recession). At **4% growth** (above the 2.5% trend), the economy is creating jobs faster than the labour force and productivity growth alone would require, so unemployment would be expected to **fall**. This distinction — between an outright recession (negative growth) and merely below-trend growth — is a common source of confusion: unemployment can rise even while real GDP is still positive and growing, simply because growth is running below the economy's trend rate.

VN **GIẢI THÍCH TIẾNG VIỆT**

Thất nghiệp có xu hướng **giảm** khi tăng trưởng GDP thực vượt **tốc độ tăng trưởng xu hướng** (trend growth rate — mức tăng trưởng cần thiết chỉ để giữ tỉ lệ thất nghiệp không đổi, do lực lượng lao động và năng suất vẫn tăng theo thời gian), và có xu hướng **tăng** khi tăng trưởng thấp hơn xu hướng — ngay cả khi GDP vẫn tăng trưởng dương (chưa suy thoái theo định nghĩa kỹ thuật). Đây là lý do một nền kinh tế có thể "tăng trưởng nhưng vẫn thất nghiệp tăng" nếu tốc độ tăng trưởng quá chậm.

3.12.2 The deflationary spiral

A particularly dangerous macroeconomic scenario combines a negative output gap with falling prices, potentially becoming self-reinforcing.

The deflationary spiral mechanism

A negative output gap causes prices to fall (deflation). Consumers, expecting prices to fall *further*, delay spending (Section 3.3's cost of deflation) — this fall in current consumption **reduces** AD **further**, deepening the negative output gap, which puts *even more* downward pressure on prices, reinforcing consumers' expectation of further price falls — a self-reinforcing **deflationary spiral**. Falling prices also raise the *real* value of existing debt (Section 3.3), which can cause debt-laden households/firms to cut spending sharply to service that now-heavier real debt burden, reinforcing the spiral yet further. Breaking a deflationary spiral is notoriously difficult with conventional monetary policy once nominal interest rates approach zero

(the liquidity trap, Section 3.7), often requiring aggressive, sustained fiscal expansion and/or unconventional monetary tools (e.g. quantitative easing) to restore confidence and spending.

VN **GIẢI THÍCH TIẾNG VIỆT**

Vòng xoáy giảm phát (deflationary spiral): khoảng cách sản lượng âm → giá giảm → người tiêu dùng kỳ vọng giá còn giảm tiếp nên trì hoãn chi tiêu → AD giảm thêm → khoảng cách sản lượng càng âm hơn → giá giảm thêm — một vòng lặp tự củng cố. Giá giảm cũng làm tăng **giá trị thực** của nợ hiện có, khiến hộ gia đình/doanh nghiệp mắc nợ phải cắt giảm chi tiêu mạnh hơn để trả nợ, càng làm vòng xoáy trầm trọng hơn. Đây là lý do giảm phát được xem là nguy hiểm hơn nhiều so với lạm phát vừa phải, và rất khó phá vỡ chỉ bằng chính sách tiền tệ thông thường khi lãi suất đã gần 0.

Bài tập luyện tập

An economy's trend growth rate is 3%. This year real GDP grows 1.5%. Would you expect the unemployment rate to rise or fall, and why might this surprise someone who only checks whether GDP growth is positive or negative?

Lời giải chi tiết

Since growth (1.5%) is **below** the trend rate (3%), unemployment would be expected to **rise**, even though real GDP is still growing (positive, not a recession by the standard two-consecutive-quarters-of-negative-growth definition). This can surprise someone checking only the sign of GDP growth, because it shows that "positive growth" alone does not guarantee falling — or even stable — unemployment; what matters is growth *relative to trend*, not simply whether growth is positive.

Bài tập luyện tập

Explain, step by step, how a negative output gap could turn into a self-reinforcing deflationary spiral, and state one policy response specifically suited to breaking it. (Short response.)

Lời giải chi tiết

A negative output gap causes falling prices; consumers expecting further price falls postpone spending, which further reduces AD, deepening the negative output gap and reinforcing further price falls — a self-reinforcing cycle, worsened further by the rising real burden of existing debt as prices fall. Since this scenario often coincides with nominal interest rates already near zero (limiting conventional monetary policy, Section 3.7's liquidity trap), a well-suited policy response is aggressive, sustained **expansionary fiscal policy** (e.g. large public investment spending) and/or unconventional monetary tools such as **quantitative easing**, both aimed at directly restoring AD and consumer/business confidence when conventional interest-rate cuts alone are no longer sufficient.

3.13 [HL ONLY] A fully algebraic AD--AS problem

While AD–AS questions are usually diagram-based, the underlying logic can also be solved algebraically — useful for building genuine intuition about *why* the diagram looks the way it does.

Solving an AD–AS system algebraically

An economy is described by $AD:\ Y = 200 - 4P$ and $SRAS:\ Y = 40 + 6P$ (where Y is real output and P is the price level index). Potential output is $Y_{fe} = 160$.

Step 1 — short-run equilibrium. Set $AD = SRAS$:

$$200 - 4P = 40 + 6P \implies 160 = 10P \implies P^* = 16.$$

$$Y^* = 200 - 4(16) = 200 - 64 = 136.$$

Step 2 — compare to potential output. Since $Y^* = 136 < Y_{fe} = 160$, the economy has a **negative (recessionary) output gap** of $136 - 160 = -24$, or $\frac{-24}{160} \times 100\% = -15\%$.

Step 3 — policy to close the gap. Suppose the government wants AD to shift right so that the new short-run equilibrium occurs exactly at $Y_{fe} = 160$. If the new AD curve takes the form $AD_1:\ Y = 200 + k - 4P$ (a parallel shift of size k), find k.

Setting $AD_1 = SRAS$ at $Y = 160$: first find the price level at $Y = 160$ on $SRAS$: $160 = 40 + 6P \implies P = 20$. Then substitute into AD_1: $160 = 200 + k - 4(20) = 200 + k - 80 = 120 + k \implies k = 40$.

A rightward shift of AD by 40 (e.g. from a demand-side stimulus) is required to close the gap fully, and doing so raises the price level from $P^* = 16$ to $P = 20$ — a reminder that even successfully closing a recessionary gap via demand-side policy along an upward-sloping $SRAS$ still raises the price level somewhat, exactly as the AD–AS diagram shows visually.

VN **GIẢI THÍCH TIẾNG VIỆT**

Có thể giải hệ AD–$SRAS$ hoàn toàn bằng đại số: đặt $AD = SRAS$ để tìm cân bằng ngắn hạn (P^*, Y^*), so sánh Y^* với Y_{fe} để xác định khoảng cách sản lượng, rồi tính độ dịch chuyển AD cần thiết để đưa Y^* về đúng Y_{fe} (thay $Y = Y_{fe}$ vào $SRAS$ để tìm P tương ứng, sau đó thay ngược vào phương trình AD mới để giải ẩn số dịch chuyển). Kỹ năng này giúp hiểu bản chất đại số đằng sau đồ thị AD–AS, thường xuất hiện trong đề Paper 3 (HL).

Bài tập luyện tập

[HL ONLY] $AD:\ Y = 300 - 5P$, $SRAS:\ Y = 60 + 7P$, $Y_{fe} = 220$. Find the short-run equilibrium, the output gap, and classify it.

Lời giải chi tiết

$300 - 5P = 60 + 7P \implies 240 = 12P \implies P^* = 20$. $Y^* = 300 - 5(20) = 200$.

Output gap $= 200 - 220 = -20$ ($\frac{-20}{220} \times 100\% \approx -9.1\%$) — a **negative (recessionary) output gap**.

Bài tập luyện tập

[HL ONLY] Using the system in the previous question, find the price level that would prevail if Y were exactly at $Y_{fe} = 220$ on the given $SRAS$ curve.

(A) $P = 20.9$

(B) $P = 22.9$

(C) $P = 25$

(D) $P = 18$

Lời giải chi tiết

Substitute $Y = 220$ into $SRAS$: $220 = 60 + 7P \implies 160 = 7P \implies P \approx 22.9$. **(B).**

3.14 Conflicts between macroeconomic objectives

The four macroeconomic objectives (Section 3.3) cannot always be pursued simultaneously — a defining feature of real-world macroeconomic policy is managing genuine trade-offs, not simply "achieving" every objective at once.

Growth vs. inflation: rapid demand-led growth risks pushing the economy beyond Y_{fe}, causing demand-pull inflation (an inflationary output gap). **Unemployment vs. inflation**: the short-run Phillips curve trade-off (Section 3.6) — expansionary policy lowering unemployment typically raises inflation, and vice versa. **Growth vs. equity**: growth is not automatically evenly shared, and can sometimes widen income inequality even as average income rises (Section 3.7). **Growth vs. the current account**: strong domestic demand growth often pulls in more imports (raising M), which can worsen the current account balance even while raising real GDP and employment. **Growth vs. sustainability**: growth driven by unsustainable resource extraction raises current output at the expense of future productive capacity (Unit 1).

Weighing a genuine four-way policy conflict

A government considers a large fiscal stimulus. Analyse its likely effect on *each* of the four macroeconomic objectives, and explain why no single policy tool can optimise all four simultaneously.

Growth: the stimulus raises AD, likely raising real GDP toward (or beyond) Y_{fe} — a clear short-run benefit for the growth objective. **Unemployment**: higher AD raises employment, reducing cyclical unemployment — a benefit. **Inflation**: if the stimulus pushes the economy beyond Y_{fe} (an inflationary output gap), demand-pull inflation risk rises — a cost. **Equity/current account**: depending on *how* the stimulus is spent (e.g. broad-based infrastructure investment benefiting many regions/skill levels vs. spending concentrated in already-prosperous sectors) and on how much of the additional spending leaks into imports (worsening the current account, Unit 4), the equity and external-balance effects could go either way.
No single fiscal stimulus decision can simultaneously guarantee strong growth, zero inflation risk, improved equity, *and* an improved current account — real-world policy-making requires **prioritising** among objectives (often explicitly, e.g. a central bank with a primary inflation-target mandate) and accepting genuine trade-offs, which is precisely why macroeconomic policy debates are rarely settled by economics alone and typically involve normative judgements about which objectives matter most in a given context.

VN **GIẢI THÍCH TIẾNG VIỆT**

Bốn mục tiêu kinh tế vĩ mô thường **không thể đạt được đồng thời**: tăng trưởng nhanh có thể gây lạm phát cầu kéo; đánh đổi thất nghiệp–lạm phát theo đường Phillips ngắn hạn; tăng trưởng không tự động được chia đều (có thể làm bất bình đẳng tăng); tăng trưởng mạnh thường kéo theo nhập khẩu tăng, làm xấu cán cân vãng lai; tăng trưởng dựa vào khai thác tài nguyên không bền vững đánh đổi tương lai lấy hiện tại. Đây là lý do hoạch định chính sách vĩ mô luôn phải **ưu tiên** một số mục tiêu và chấp nhận đánh đổi ở các mục tiêu khác — không có công cụ chính sách nào tối ưu hoá đồng thời cả bốn mục tiêu.

Bài tập luyện tập

A government pursues aggressive expansionary monetary policy to reduce unemployment quickly. State *two* other macroeconomic objectives this could put at risk, and briefly explain the mechanism for each.

Lời giải chi tiết

Inflation: aggressive monetary easing raises AD; if pushed beyond what $LRAS$ can sustainably support, this risks demand-pull inflation, directly conflicting with the low-and-stable-inflation objective (and the short-run Phillips-curve trade-off predicts exactly this pattern). **Current account balance**: lower interest rates typically depreciate the currency (Unit 4) and stimulate domestic spending, both of which can raise import demand — while a weaker currency can help exports, if the stimulus effect on import demand dominates, the current account could still deteriorate, especially in the short run before trade volumes fully adjust (recall the J-curve, Unit 4).

3.15 Practice problems

Bài tập luyện tập

Nominal GDP rises from \$600bn to \$654bn, while the GDP deflator rises from 100 to 109. Find real GDP in year 2 and the real growth rate.

(A) Real GDP $= \$600$bn; growth $= 0\%$

(B) Real GDP $= \$654$bn; growth $= 9\%$

(C) Real GDP $\approx \$600$bn; growth $\approx 0\%$ (rounded)

(D) Real GDP $\approx \$599.6$bn; growth $\approx -0.1\%$

Lời giải chi tiết

Real GDP (year 2) $= \frac{654}{109} \times 100 = \$600.0$bn. Real growth $= \frac{600 - 600}{600} \times 100\% \approx 0\%$ — despite nominal GDP rising 9%, essentially *all* of that increase was inflation (the deflator also rose 9%), so genuine (real) output barely changed. **(A)**/**(C)** (both correctly describe $\approx 0\%$ real growth; the closest precise match is (A)).

Bài tập luyện tập

A CPI basket has weights: Housing 50%, Food 20%, Other 30%. Prices rise: Housing 2%, Food 10%, Other 4%. Calculate the weighted inflation rate.

(A) 4.2%

(B) 5.33% (simple average)

(C) 16%

(D) 2%

Lời giải chi tiết

Weighted inflation $= (0.50 \times 2\%) + (0.20 \times 10\%) + (0.30 \times 4\%) = 1.0\% + 2.0\% + 1.2\% = 4.2\%$. **(A)**. The simple (unweighted) average, $(2 + 10 + 4)/3 \approx 5.33\%$, is a common but incorrect shortcut (option B) — it ignores that Housing, the category with the smallest price rise, carries the *largest* budget weight (50%), pulling the true weighted figure below the simple average.

Bài tập luyện tập

An economy's actual real GDP is \$1,050bn against potential GDP of \$1,000bn. Classify the output gap and state one likely macroeconomic consequence.

Lời giải chi tiết

Output gap $= \dfrac{1050-1000}{1000} \times 100\% = +5\%$ — a **positive (inflationary) output gap**. A likely consequence is **demand-pull inflation**, as the economy operates beyond sustainable full-employment capacity, putting upward pressure on wages and prices; policymakers might respond with contractionary demand-side policy to cool the economy back toward Y_{fe}.

Bài tập luyện tập

$MPC = 0.9$ in a closed economy with no government. Find the multiplier and the change in equilibrium real GDP from a \$40m fall in investment.

(A) $k = 9$; $\Delta Y = -\$360$m

(B) $k = 10$; $\Delta Y = -\$400$m

(C) $k = 1.9$; $\Delta Y = -\$76$m

(D) $k = 0.9$; $\Delta Y = -\$36$m

Lời giải chi tiết

$MPS = 1 - 0.9 = 0.1$. $k = 1/MPS = 1/0.1 = 10$. $\Delta Y = \Delta I \times k = -40 \times 10 = -\$400$m. **(B).**

Bài tập luyện tập

An open economy has $MPC = 0.7$, $MPT = 0.2$, $MPM = 0.05$. Calculate the multiplier and the required change in G to close a \$150m negative output gap.

Lời giải chi tiết

$MPS = 1 - 0.7 = 0.3$. Sum of leakages $= MPS + MPT + MPM = 0.3 + 0.2 + 0.05 = 0.55$. $k = 1/0.55 \approx 1.82$.

$$\Delta G = \frac{\text{Gap}}{k} = \frac{150}{1.82} \approx \$82.5\text{m}.$$

A rise in government spending of approximately \$82.5m, once multiplied through the economy ($\approx 82.5 \times 1.82 \approx 150$), would be sufficient to close the \$150m gap.

Bài tập luyện tập

A labour force of 40 million includes 2.8 million unemployed. Calculate the unemployment rate, and explain one reason this rate might understate true joblessness.

Lời giải chi tiết

Unemployment rate $= \dfrac{2.8}{40} \times 100\% = 7.0\%$. This can **understate** true joblessness because **discouraged workers** — people who want a job but have stopped actively searching after repeated failure — are classified as outside the labour force entirely (neither employed nor officially "unemployed"), so they do not appear in the numerator or denominator of the standard measure, even though they represent genuine unused labour capacity.

Bài tập luyện tập

Classify each scenario as demand-pull or cost-push inflation: (a) a sharp, sustained rise in global oil prices raises transport and production costs economy-wide; (b) a large tax cut combined with very low interest rates causes consumer spending to surge beyond the economy's capacity.

Lời giải chi tiết

(a) **Cost-push** — rising input costs shift $SRAS$ left, raising prices while (all else equal) reducing output, unrelated to any change in AD. (b) **Demand-pull** — the tax cut and low interest rates both raise components of AD (C, and possibly I), pushing AD beyond sustainable capacity and pulling the price level up.

Bài tập luyện tập

Diagram-drawing prompt. Draw and fully label an AD–AS diagram (monetarist $LRAS$) showing an economy in a recessionary (negative) output gap. Then show, with a second AD curve and clear labelling, the effect of successful expansionary fiscal policy that fully closes the gap.

Lời giải chi tiết

A correct diagram has real output on the horizontal axis and the price level on the vertical axis, with an upward-sloping $SRAS$, a vertical $LRAS$ at Y_{fe}, and an initial AD_0 intersecting $SRAS$ at a point *left* of Y_{fe} (the recessionary gap, ideally marked with a labelled horizontal gap between the equilibrium output and Y_{fe}). A new curve AD_1, drawn parallel and to the *right* of AD_0, should intersect $SRAS$ exactly at Y_{fe} — at a higher price level than the original equilibrium (since even closing a recessionary gap along an upward-sloping $SRAS$ raises the price level somewhat) — with an arrow showing the shift from AD_0 to AD_1 clearly labelled "expansionary fiscal policy" (e.g. higher G or lower T).

Bài tập luyện tập

Using the short-run and long-run Phillips curves, explain why a government that repeatedly tries to hold unemployment permanently below the natural rate through expansionary policy is likely to end up with only higher inflation and no lasting employment gain. (Short response.)

Lời giải chi tiết

Each round of expansionary policy moves the economy along the current $SRPC$, temporarily lowering unemployment below the natural rate at the cost of higher inflation. But as workers and firms observe actual inflation running above what they previously expected, they revise their inflation expectations upward — shifting the entire $SRPC$ outward. Once expectations catch up, unemployment drifts back toward the natural rate, but now at the new, higher inflation rate. If the government repeats this process, the pattern recurs — unemployment keeps returning to the natural rate (U_n, along the vertical $LRPC$) while inflation ratchets progressively higher, with no permanent reduction in unemployment achieved.

Bài tập luyện tập

A government's spending is \$310bn and tax revenue is \$335bn. State the budget position, and explain one economic argument for why running this position during a boom might be

appropriate policy.

Lời giải chi tiết

Since $T(\$335\text{bn}) > G(\$310\text{bn})$, the government runs a **budget surplus** of \$25bn. Running a surplus during a **boom** (positive output gap) is a form of appropriate **contractionary** fiscal policy: it withdraws net spending power from the economy, helping cool excess demand and restrain demand-pull inflation, while also allowing the government to pay down debt accumulated during previous downturns — consistent with counter-cyclical fiscal management across the business cycle.

Bài tập luyện tập

[HL ONLY] Explain the mechanism of "crowding out" and state one condition under which it is likely to be a more serious concern. (Short response.)

Lời giải chi tiết

When a government finances a budget deficit through borrowing, it increases the demand for loanable funds in domestic financial markets; if the supply of loanable (saved) funds does not rise correspondingly, the increased demand pushes up the equilibrium interest rate. A higher interest rate raises the cost of borrowing for private firms and households, discouraging some private investment and consumption spending that would otherwise have occurred — partially or fully offsetting the intended expansionary effect of the government's own extra spending. Crowding out is a more serious concern when the economy is already **close to full employment** (little spare saving capacity to absorb the extra government borrowing without interest rates rising) than when there is significant spare capacity and high private saving (as in a deep recession), where crowding out tends to be much weaker.

Bài tập luyện tập

Classify each policy as interventionist supply-side or market-based supply-side: (a) a government-funded national vocational-training programme; (b) removing restrictions on foreign firms entering the domestic telecommunications market; (c) a large public investment in a national high-speed rail network; (d) reducing corporate tax rates to attract private investment.

Lời giải chi tiết

(a) **Interventionist** (direct government spending on human capital). (b) **Market-based** (removing a regulatory barrier to increase competition). (c) **Interventionist** (direct public infrastructure investment). (d) **Market-based** (using tax incentives to encourage private-sector activity rather than government spending/provision directly).

Bài tập luyện tập

A country's Lorenz curve area (between the curve and the line of equality) is 2,100, with total area under the line of equality equal to 5,000. A decade later, after a major expansion of progressive taxation and welfare transfers, the area shrinks to 1,400. Calculate the Gini coefficient in both years and interpret the change.

Lời giải chi tiết

Year 1: Gini $= 2100/5000 = 0.42$. Year 2: Gini $= 1400/5000 = 0.28$. The Gini coefficient **fell** from 0.42 to 0.28, indicating a meaningful **reduction in income inequality** (movement toward greater **equity**) — consistent with the stated expansion of progressive taxation (which reduces post-tax income differences) and welfare transfers (which directly raise the incomes of lower-income households) over the decade.

Bài tập luyện tập

Explain why "actual growth" and "potential growth" require different types of policy to achieve, using the concept of **change**. (Short response.)

Lời giải chi tiết

Actual growth is a rise in real GDP toward the economy's *existing* potential (closing a negative output gap) — this is best achieved through **demand-side** policy (expansionary fiscal or monetary policy), which raises AD to better utilise already-available productive capacity. **Potential growth** is a rise in the economy's *ceiling itself* (Y_{fe}/$LRAS$/the PPC shifting outward) — this requires **supply-side** policy (raising the quantity or quality of factors of production, or improving technology), since simply raising demand cannot, by itself, expand an economy's underlying productive capacity. Both represent the central concept of **change**, but at different "layers" of the economy — closing a gap to an existing ceiling, versus raising the ceiling itself.

Bài tập luyện tập

An economy has $MPC = 0.6$, no government or trade sector (closed economy). Complete the multiplier calculation for a \$200m rise in investment, and calculate the total addition to income after three spending rounds only (not the full multiplier total).

Lời giải chi tiết

$MPS = 1 - 0.6 = 0.4$. Full multiplier: $k = 1/0.4 = 2.5$, so eventually $\Delta Y = 200 \times 2.5 = \$500$m. **Round-by-round** (each round re-spends $MPC = 0.6$ of the previous): Round 1 $= \$200$m; Round 2 $= 200 \times 0.6 = \$120$m; Round 3 $= 120 \times 0.6 = \$72$m. Sum of first three rounds $= 200 + 120 + 72 = \$392$m — approaching, but still less than, the eventual full total of \$500m (the remaining rounds contribute the final \$108m as the geometric series continues toward its limit).

Bài tập luyện tập

Paper 1-style extended response. "A central bank is deciding between raising interest rates sharply to control inflation, versus a more gradual approach." Using at least three named central concepts, evaluate the trade-offs involved.

Lời giải chi tiết

A strong answer addresses: (1) **Change** — a sharp rate rise contracts AD quickly, potentially causing a rapid change from boom to recession (a "hard landing"), whereas a gradual approach allows the economy to adjust more smoothly, reducing volatility; (2) **Intervention** — both options are active monetary intervention, but they differ in intensity and the resulting distribution of costs (a sharp rise imposes concentrated short-run pain — job losses, business failures —

in exchange for a faster return to price stability); (3) **Equity/economic well-being** — a sharp rate rise disproportionately affects debtors (mortgage holders, indebted firms) facing quickly rising repayment costs and workers who lose jobs in the resulting slowdown, raising equity concerns, whereas gradualism spreads the adjustment cost more evenly over time but risks allowing inflation expectations to become more entrenched (potentially requiring an even larger rate rise, and more pain, later); (4) a complete answer reaches a **normative conclusion**, e.g. that the appropriate choice depends on how far inflation is above target, how well-anchored inflation expectations currently are, and how much short-run pain society is willing to accept for a faster return to the inflation target.

Bài tập luyện tập

State whether each of the following is best classified as an automatic stabiliser or discretionary fiscal policy: (a) unemployment benefit payments automatically rising as a recession causes lay-offs; (b) a government announces a new $5bn one-off infrastructure spending package; (c) income tax revenue automatically falling as household incomes fall in a downturn.

Lời giải chi tiết

(a) **Automatic stabiliser** — benefit spending rises without any new legislation, simply because more people qualify as the downturn deepens. (b) **Discretionary fiscal policy** — a deliberate, active new spending decision by the government. (c) **Automatic stabiliser** — tax revenue falls mechanically as the existing tax system is applied to lower incomes, again without any new policy decision.

Bài tập luyện tập

A country's real GDP grows 5% annually for eight years, driven by rapid, largely unregulated deforestation for export timber. Using the concepts of **sustainability** and **economic well-being**, explain why this growth path might overstate the true improvement in living standards. (Short response.)

Lời giải chi tiết

Real GDP counts the market value of timber extracted and sold, but does not subtract the loss of the forest as a productive and environmental asset (soil erosion, biodiversity loss, reduced future timber-producing capacity, and potential climate effects) — so measured growth overstates the *net* change in the country's total wealth and **economic well-being**. Because the growth is driven by depleting a resource faster than it can regenerate (Unit 1), it is not **sustainable**: future GDP could fall sharply once the forest resource is exhausted, meaning the current high growth rate borrows against future living standards rather than representing a genuinely durable improvement.

Bài tập luyện tập

A country's median household income is $25,000. Using a relative-poverty threshold of 60% of median income, calculate the poverty line. A household earning $14,000 — is it in relative poverty?

(A) Poverty line \$15,000; household is in relative poverty

(B) Poverty line \$10,000; household is not in relative poverty

(C) Poverty line \$15,000; household is not in relative poverty

(D) Poverty line \$25,000; household is in relative poverty

Lời giải chi tiết

Poverty line $= 0.6 \times 25{,}000 = \$15{,}000$. Since the household's income (\$14,000) is below \$15,000, it **is** classified as being in relative poverty. **(A)**.

Bài tập luyện tập

Explain, using the concept of a **poverty trap**, why a one-off cash transfer to a poor household might have a smaller lasting impact than an equivalent amount spent on free public education for that household's children. (Short response.)

Lời giải chi tiết

A one-off cash transfer raises the household's income and consumption temporarily, but once spent, provides no lasting change to the household's future earning capacity — the underlying poverty trap mechanism (low income limiting investment in human capital, which limits future income) remains largely intact. Free public education, by contrast, directly raises the *children's* future human capital and earning potential, which can durably increase the household's income for the rest of that generation and potentially break the **intergenerational** transmission of poverty — even though it may cost the same amount upfront, its effect operates on the root cause of the poverty trap rather than only its symptom.

Bài tập luyện tập

State whether each policy is best associated with an independent central bank or an elected government's fiscal authority: (a) setting a numerical inflation target and adjusting the policy interest rate to hit it; (b) deciding the annual budget for public healthcare spending; (c) engaging in quantitative easing during a severe recession.

Lời giải chi tiết

(a) **Independent central bank** — interest-rate setting to hit an inflation target is the core function of monetary policy. (b) **Elected government's fiscal authority** — spending allocation decisions across public services are a fiscal (budgetary) policy choice, made through the democratic/political process. (c) **Independent central bank** — quantitative easing (large-scale asset purchases to inject money into the financial system) is a monetary-policy tool used when conventional interest-rate cuts are insufficient (e.g. rates already near zero).

Bài tập luyện tập

An economy simultaneously runs expansionary fiscal policy (a large rise in G) and contractionary monetary policy (a rise in the policy interest rate). Explain the net effect on AD and why policymakers might end up in this situation despite it appearing contradictory. (Short response.)

Lời giải chi tiết

The two policies push AD in **opposite** directions — expansionary fiscal policy shifts AD right, contractionary monetary policy shifts AD left — so the net effect on AD is smaller (and could even be roughly neutral) than either policy would produce alone, while the economy still bears each policy's side-costs (rising government debt from the fiscal expansion, higher borrowing costs for households/firms from the rate rise). This situation can arise because fiscal policy and (independent) monetary policy are set by different institutions pursuing different mandates/objectives (the government may prioritise growth/employment ahead of an election, while the central bank independently prioritises its inflation target) without full coordination between them.

Bài tập luyện tập

[HL ONLY] $MPC = 0.70$, $MPT = 0.20$, $MPM = 0.10$ in an open economy. A negative demand shock reduces exports by \$90m. Calculate the resulting fall in equilibrium real GDP.

(A) $k \approx 1.67$; $\Delta Y \approx -\$150$m

(B) $k = 2$; $\Delta Y = -\$180$m

(C) $k \approx 2.86$; $\Delta Y \approx -\$257$m

(D) $k = 1.9$; $\Delta Y = -\$171$m

Lời giải chi tiết

$MPS = 1 - 0.70 = 0.30$. Sum of leakages $= MPS + MPT + MPM = 0.30 + 0.20 + 0.10 = 0.60$. $k = 1/0.60 \approx 1.67$.

$$\Delta Y = \Delta X \times k = -90 \times 1.67 \approx -\$150\text{m}.$$

(A).

Bài tập luyện tập

Explain why a government might prefer supply-side policy over demand-side policy to address **structural** unemployment specifically, even though both could theoretically raise employment. (Short response.)

Lời giải chi tiết

Structural unemployment arises from a mismatch between workers' skills/location and available jobs (Section 3.3), not from insufficient aggregate demand — so expansionary demand-side policy (raising AD) mainly risks generating demand-pull inflationary pressure without addressing the underlying skills/location mismatch, since the structurally unemployed may still lack what employers in growing sectors need even if overall demand rises. Supply-side policy targeted specifically at the structural problem (e.g. retraining programmes raising **occupational mobility**, relocation support raising **geographic mobility** — Unit 1) addresses the root cause directly, making it the more appropriate (though typically slower-acting) tool for this specific type of unemployment.

Bài tập luyện tập

Paper 1-style extended response. "A country experiencing both rising inflation and rising structural unemployment simultaneously is deciding how to prioritise its policy response." Using at least three named central concepts, evaluate the policy trade-offs involved.

Lời giải chi tiết

A strong answer should note: (1) **Change** — this combination (sometimes resembling mild stagflation) suggests the underlying problem may be at least partly a **cost-push** or structural supply-side issue rather than pure excess demand, since a pure demand-pull inflation would typically coincide with *falling*, not rising, unemployment; (2) **Intervention** — purely contractionary demand-side policy (to fight inflation) would further raise unemployment (moving along a short-run Phillips-curve-like trade-off), while purely expansionary demand-side policy (to fight unemployment) risks worsening already-rising inflation — showing why demand-side policy alone poorly suits this specific combination; (3) **Efficiency** — a more effective approach targets the *supply side* directly: interventionist policies (retraining, relocation support) to address the structural unemployment at its root, combined with, if needed, only modest, carefully calibrated demand-side adjustment to keep inflation anchored, rather than large swings in either direction; (4) **Equity** — a full answer should note that whichever policy mix is chosen, the burden should be evaluated across different groups (e.g. workers in declining industries versus savers/borrowers affected by interest-rate changes) rather than assuming a uniform impact; (5) a complete evaluation reaches a **normative conclusion**, e.g. recommending supply-side measures as the primary tool with only measured, closely-monitored demand-side adjustment alongside it, rather than a single large demand-side intervention in either direction.

Bài tập luyện tập

Nominal GDP is \$820bn; the GDP deflator is 105 (base year 100). Calculate real GDP.

(A) \$781.0bn
(B) \$861.0bn
(C) \$820.0bn
(D) \$715.0bn

Lời giải chi tiết

Real GDP $= \dfrac{820}{105} \times 100 \approx \$781.0$bn. **(A)**.

Bài tập luyện tập

Explain why a country experiencing both a positive output gap *and* a current account deficit faces a particularly difficult policy choice if it wants to use contractionary demand-side policy to address both. (Short response.)

Lời giải chi tiết

A positive (inflationary) output gap and a current account deficit *can*, in this specific case, actually be addressed by the *same* policy direction: contractionary demand-side policy (e.g. higher interest rates or reduced government spending) lowers AD, which both cools inflationary pressure (helping the output gap) *and* reduces import demand (helping narrow the current account deficit, an **expenditure-reducing** approach, Unit 4) — so in this particular combination, the objectives are actually aligned rather than conflicting. The genuinely difficult case arises when the two objectives point in *opposite* policy directions (e.g. a negative output gap combined with a current account deficit, where expansionary policy needed for growth would further worsen the external deficit) — a useful reminder that whether macro objectives conflict depends on the *specific combination* of circumstances a country faces, not a fixed, universal rule.

Bài tập luyện tập

Diagram-drawing prompt. Draw a Phillips curve diagram showing an economy starting at the natural rate of unemployment on a short-run Phillips curve $SRPC_0$. Show the effect of one round of unexpected expansionary policy (a movement along $SRPC_0$), then the subsequent adjustment (a shift to $SRPC_1$ and a return to the natural rate at higher inflation).

Lời giải chi tiết

A correct diagram has unemployment on the horizontal axis and inflation on the vertical axis, with a downward-sloping $SRPC_0$ and a vertical $LRPC$ at the natural rate U_n. The starting point sits where $SRPC_0$ crosses $LRPC$ (at U_n, some initial inflation rate). An arrow moves *along* $SRPC_0$ to a point with lower unemployment and higher inflation (the short-run effect of unexpected expansionary policy). A second arrow then shows the economy moving to a *new* short-run Phillips curve $SRPC_1$ (shifted up/right relative to $SRPC_0$, reflecting higher inflation expectations), arriving back at unemployment $= U_n$ but at a *higher* inflation rate than the original starting point — illustrating no lasting employment gain, only higher inflation, consistent with a vertical $LRPC$.

Bài tập luyện tập

An economy records: $C = \$220$bn, $I = \$90$bn, $G = \$70$bn, $X = \$55$bn, $M = \$45$bn. Separately, its income-side statistics record wages $= \$240$bn, rent $= \$30$bn, interest $= \$45$bn, profit $= \$75$bn. Calculate GDP using the expenditure approach and confirm it matches the income approach.

(A) \$390bn
(C) \$400bn
(B) \$380bn
(D) \$410bn

Lời giải chi tiết

Expenditure approach: $GDP = 220 + 90 + 70 + (55 - 45) = 220 + 90 + 70 + 10 = \$390$bn. Income approach: $GDP = 240 + 30 + 45 + 75 = \$390$bn. The two approaches match exactly. **(A)**.

Bài tập luyện tập

A farmer grows wheat and sells it to a miller for \$50m (the farmer buys no intermediate inputs, so the farmer's value added is the full \$50m). The miller processes the wheat into flour and sells it to a baker for \$80m. The baker bakes bread from the flour and sells the finished bread to consumers for \$130m. Using the output (value-added) approach, calculate each stage's value added and the total contribution to GDP. Then explain why simply summing the value of all sales at every stage (\$50m + \$80m + \$130m) would misstate the economy's true output.

Lời giải chi tiết

Value added at each stage: farmer $= \$50$m (no purchased inputs); miller $= 80 - 50 = \$30$m; baker $= 130 - 80 = \$50$m. Total value added $= 50 + 30 + 50 = \$130$m — exactly equal to the final retail value of the bread (\$130m), which is the correct contribution to GDP from this production chain. Simply summing the raw sales value at every stage ($50 + 80 + 130 = \$260$m) would **double-count** the wheat's \$50m value (counted once when the farmer sells it, and again as part of the miller's \$80m sale) and the flour's \$80m value (counted again as part

of the baker's \$130m sale) — the output approach avoids this by counting only the *extra* value each firm itself adds, not the full sale price of intermediate goods that were already counted upstream.

Bài tập luyện tập

An economy's income-side statistics record: wages = \$400bn, rent = \$50bn, interest = \$70bn, profit = \$100bn. Its expenditure-side statistics record C = \$350bn, I = \$120bn, G = ?, X = \$90bn, M = \$80bn. Using the fact that both approaches must give the same GDP, find the missing value of G.

Lời giải chi tiết

Income approach: $GDP = 400 + 50 + 70 + 100 = \$620$bn. Expenditure approach must also equal \$620bn: $620 = 350 + 120 + G + (90 - 80) = 350 + 120 + G + 10 = 480 + G$. Solving, $G = 620 - 480 = \$140$bn.

Bài tập luyện tập

Country M has a substantial share of economic activity taking place in the informal (unrecorded, tax-avoiding) economy, alongside its officially measured GDP. Explain why official GDP statistics might understate the true size of economic activity in Country M, and state one practical consequence for government policy.

Lời giải chi tiết

Informal-economy activity (unregistered businesses, cash-in-hand work, unreported income) involves genuine production and income, but because it deliberately avoids official record-keeping (often to evade tax or regulation), it is not captured in national income statistics compiled from formal business/tax records — so official GDP **understates** the economy's true productive activity. A practical policy consequence: government tax-revenue forecasts and unemployment statistics based on official GDP/labour-market data may be inaccurate (e.g. some people counted as "unemployed" may actually be working informally), which can lead to poorly targeted fiscal planning or an incomplete picture of the true state of the labour market.

Bài tập luyện tập

Country X and Country Y report identical GDP per capita. In Country X, the average working week is short and workers enjoy generous paid leisure time. In Country Y, the average working week is very long, with little leisure time, and this longer working time is itself a significant contributor to Country Y's measured output. Using the concept of economic well-being, explain why identical GDP per capita might mask very different levels of well-being between the two countries.

Lời giải chi tiết

GDP per capita measures only the market value of output produced; it does not directly record how many hours of work (and how much lost leisure time) were required to produce that output. Country Y's workers achieve the same measured GDP per capita as Country X's workers only by working substantially longer hours, meaning they sacrifice far more leisure time, rest, and time for family/personal life to reach the same output figure. Even though the two coun-

tries look identical by the GDP-per-capita metric, Country X's residents likely enjoy meaningfully higher overall **economic well-being**, since well-being depends on quality-of-life factors (leisure, work-life balance) that GDP does not capture at all.

Bài tập luyện tập

[HL ONLY] $MPC = 0.75$ in a simple closed economy. The government raises G by \$80m and raises T by \$80m in the same year. Calculate the separate effects of the ΔG and ΔT changes and the net effect on equilibrium output, and confirm the balanced-budget multiplier equals 1.

Lời giải chi tiết

Spending multiplier: $k = \dfrac{1}{1-0.75} = \dfrac{1}{0.25} = 4$. Effect of $\Delta G = +80$: $\Delta Y_G = 80 \times 4 = +\$320$m.
Tax multiplier: $k_{\text{tax}} = \dfrac{-0.75}{0.25} = -3$. Effect of $\Delta T = +80$: $\Delta Y_T = 80 \times (-3) = -\$240$m.
Net effect: $\Delta Y = 320 + (-240) = +\$80$m — exactly equal to the size of the balanced-budget change (\$80m), confirming a balanced-budget multiplier of 1.

Bài tập luyện tập

[HL ONLY] $MPC = 0.6$ in a simple closed economy. The government cuts taxes (T) by \$100m (so $\Delta T = -\$100$m), with no change in G. Calculate the tax multiplier and the resulting change in equilibrium output.

(A) $\Delta Y \approx +\$150$m
(B) $\Delta Y \approx -\$150$m
(C) $\Delta Y = +\$60$m
(D) $\Delta Y \approx +\$166.7$m

Lời giải chi tiết

Tax multiplier: $k_{\text{tax}} = \dfrac{-MPC}{1-MPC} = \dfrac{-0.6}{0.4} = -1.5$. $\Delta Y = \Delta T \times k_{\text{tax}} = (-100) \times (-1.5) = +\$150$m. **(A)**. A \$100m tax *cut* raises equilibrium output by \$150m — less than the \$250m a \$100m rise in G would generate at the same MPC (since $k = 1/(1-0.6) = 2.5$), illustrating that the tax multiplier is smaller in magnitude than the spending multiplier.

Bài tập luyện tập

[HL ONLY] $MPC = 0.8$ in a simple closed economy. The government raises G by \$60m and raises T by \$40m in the same year (an *unbalanced* change, since G rises by more than T). Calculate the net change in equilibrium output, and explain why it is not simply equal to the \$20m difference between the two changes.

Lời giải chi tiết

Spending multiplier: $k = \dfrac{1}{1-0.8} = 5$. Effect of $\Delta G = +60$: $\Delta Y_G = 60 \times 5 = +\$300$m.
Tax multiplier: $k_{\text{tax}} = \dfrac{-0.8}{0.2} = -4$. Effect of $\Delta T = +40$: $\Delta Y_T = 40 \times (-4) = -\$160$m.
Net effect: $\Delta Y = 300 + (-160) = +\$140$m.
The budget balance itself moves by only $\Delta G - \Delta T = 60 - 40 = \$20$m (a slightly larger deficit,

or smaller surplus, than before), but equilibrium output rises by \$140m — far more than \$20m — because *both* the full \$60m spending rise and the (smaller, partial) consumption effect of the \$40m tax rise pass through their own separate multiplier processes; the net output effect is not simply the "leftover" budget change, but the sum of two distinct multiplied effects working in opposite directions.

Bài tập luyện tập

A country's labour force is 25 million, of whom 1.5 million are unemployed. Calculate the unemployment rate.

(A) 6%
(C) 1.5%
(B) 5%
(D) 16.7%

Lời giải chi tiết

Unemployment rate $= \dfrac{1.5}{25} \times 100\% = 6.0\%$. **(A).**

Bài tập luyện tập

A country's labour force is 18 million, of whom 17.1 million are employed. Calculate the number unemployed and the unemployment rate.

Lời giải chi tiết

Unemployed $= 18 - 17.1 = 0.9$ million. Unemployment rate $= \dfrac{0.9}{18} \times 100\% = 5.0\%$.

Bài tập luyện tập

A country's labour force is 32 million, of whom 29.44 million are employed. Calculate the unemployment rate.

Lời giải chi tiết

Unemployed $= 32 - 29.44 = 2.56$ million. Unemployment rate $= \dfrac{2.56}{32} \times 100\% = 8.0\%$.

Bài tập luyện tập

A borrower takes out a \$20,000 fixed-rate loan at a nominal interest rate of 5%, when expected inflation is 3% (expected real interest rate $\approx 2\%$). Actual inflation over the year unexpectedly turns out to be 7%. Calculate the realised real interest rate, and state who gains and who loses.

Lời giải chi tiết

Realised real interest rate $\approx 5\% - 7\% = -2\%$. Since actual inflation (7%) exceeded what both parties expected (3%), the **borrower gains** (repaying the loan with currency that has lost more purchasing power than anticipated) and the **lender loses** (receiving repayment worth less in real terms than expected when the loan was agreed).

Bài tập luyện tập

A saver deposits \$8,000 in a savings account paying a nominal interest rate of 3% per year, while actual inflation over the year is 5%. Calculate the real interest rate and state whether the saver's purchasing power rises or falls.

(A) Real rate -2%; purchasing power falls
(B) Real rate 2%; purchasing power rises
(C) Real rate 8%; purchasing power rises
(D) Real rate -5%; purchasing power falls

Lời giải chi tiết

Real interest rate $\approx 3\% - 5\% = -2\%$. Since this is negative, the saver's purchasing power **falls** — inflation (5%) outpaces the nominal return (3%). **(A)**.

Bài tập luyện tập

A government bond promises a fixed nominal return of 6% per year, agreed when expected inflation was 4% (expected real return $\approx 2\%$). If inflation unexpectedly falls to 1% instead of the expected 4%, calculate the realised real return, and state who gains and who loses this time.

Lời giải chi tiết

Realised real return $\approx 6\% - 1\% = 5\%$. Since the realised real return (5%) is *higher* than what both parties expected when the bond was issued (2%), the **lender/bondholder gains** (receiving more real purchasing power than anticipated) and the **borrower/bond issuer loses** (having to repay more real value than expected) — the opposite direction of redistribution compared to when inflation turns out higher than expected, confirming that unexpected *disinflation* redistributes real wealth from debtors to creditors.

Bài tập luyện tập

An economy's actual real GDP is \$915bn, while estimated potential GDP is \$900bn. Calculate the output gap in dollars and as a percentage, classify it, and state one likely policy response.

Lời giải chi tiết

Output gap $= 915 - 900 = \$15$bn, or $\dfrac{15}{900} \times 100\% \approx 1.67\%$. This is a **positive (inflationary) output gap** — the economy is producing beyond its estimated full-employment potential, risking demand-pull inflation. A likely policy response is **contractionary** demand-side policy (e.g. higher interest rates, or lower G/higher T) to cool AD back toward Y_{fe} and contain inflationary pressure.

Bài tập luyện tập

An economy is currently at its natural rate of unemployment with stable inflation of 2%. Ahead of an upcoming election, the government implements a temporary, one-off expansionary fiscal stimulus, intending to return policy to neutral immediately afterward. Using the short-run and long-run Phillips curve framework, explain the likely short-run and eventual long-run effects on unemployment and inflation. (Short response.)

Lời giải chi tiết

Short run: the stimulus raises AD, moving the economy along the existing $SRPC$ — unemployment falls temporarily below the natural rate as output and hiring rise, while inflation rises above its previous stable 2% rate. **Adjustment**: once workers and firms observe this higher actual inflation, they revise their inflation expectations upward, shifting the $SRPC$ outward. **Long run**: as the government withdraws the stimulus and returns policy to neutral, and expectations fully adjust, unemployment drifts back to the natural rate (on the vertical $LRPC$) — but inflation settles at a *permanently higher* rate than the original 2%, since the temporary boost to demand leaves no lasting reduction in unemployment once expectations catch up. This illustrates a standard concern with using discretionary demand-side policy for short-term political timing (e.g. around elections): the short-run employment gain is temporary, but the inflationary cost can persist even after the stimulus itself is withdrawn.

Bài tập luyện tập

A country's labour force is 40 million, of whom 2.8 million are unemployed. Calculate the unemployment rate.

(A) 7%
(C) 14%
(B) 2.8%
(D) 70%

Lời giải chi tiết

Unemployment rate $= \dfrac{2.8}{40} \times 100\% = 7\%$. **(A)**.

Bài tập luyện tập

An economy records $C = \$420$bn, $I = \$180$bn, $G = \$150$bn, $X = \$95$bn, $M = \$115$bn. Separately, income-side data show wages$= \$500$bn, rent$= \$60$bn, interest$= \$70$bn, profit$= \$100$bn. Verify both approaches give the same GDP.

Lời giải chi tiết

Expenditure: $GDP = 420 + 180 + 150 + (95 - 115) = 420 + 180 + 150 - 20 = \$730$bn.
Income: $GDP = 500 + 60 + 70 + 100 = \$730$bn. Both approaches match at **$730bn**.

Bài tập luyện tập

An economy's actual real GDP is \$1,045bn, while potential GDP is \$1,000bn. Calculate the output gap (in dollars and %) and classify it.

Lời giải chi tiết

Output gap $= 1045 - 1000 = +\$45$bn $= \dfrac{45}{1000} \times 100\% = +4.5\%$ — a **positive (inflationary) output gap**: the economy is producing beyond its estimated full-employment potential.

Bài tập luyện tập

$MPC = 0.75$ in a closed economy with no government. Find the multiplier and the change in equilibrium real GDP from a \$60m rise in investment.

(A) $k = 4$; $\Delta Y = \$240$m
(C) $k = 4$; $\Delta Y = \$135$m
(B) $k = 0.75$; $\Delta Y = \$45$m
(D) $k = 3$; $\Delta Y = \$180$m

Lời giải chi tiết

$k = \dfrac{1}{1 - 0.75} = 4$. $\Delta Y = 60 \times 4 = \$240$m. **(A)**.

Bài tập luyện tập

$MPC = 0.6$. Government raises G by \$80m *and* raises T by \$80m simultaneously. Find the net change in equilibrium output, and confirm the balanced-budget multiplier.

Lời giải chi tiết

$k = \dfrac{1}{1 - 0.6} = 2.5$. $\Delta Y_G = 80 \times 2.5 = +\$200$m. $k_{\text{tax}} = \dfrac{-0.6}{0.4} = -1.5$. $\Delta Y_T = 80 \times (-1.5) = -\$120$m. Net $\Delta Y = 200 - 120 = +\$80$m — exactly equal to the \$80m balanced-budget change, confirming a balanced-budget multiplier of 1.

Bài tập luyện tập

A saver deposits money in a fixed-rate account paying 3% nominal interest, expecting inflation of 2% (expected real return $\approx 1\%$). Actual inflation turns out to be 1% instead. Calculate the realised real interest rate, and state who gains.

Lời giải chi tiết

Realised real interest rate $\approx 3\% - 1\% = +2\%$, *higher* than the 1% originally expected. Since actual inflation (1%) was lower than expected (2%), the **saver/lender gains** — receiving more real purchasing power than anticipated — while the borrower correspondingly pays back more in real terms than expected.

Bài tập luyện tập

An economy is at the natural rate of unemployment. The central bank unexpectedly and permanently raises the growth rate of the money supply, permanently boosting AD growth. According to the long-run Phillips curve framework, the most likely eventual (long-run) outcome is:

(A) Permanently lower unemployment and permanently higher inflation
(C) Both unemployment and inflation return to their original levels
(B) Unemployment returns to the natural rate; inflation permanently higher
(D) Permanently lower inflation and permanently lower unemployment

Lời giải chi tiết

Once inflation expectations fully adjust, the economy returns to the natural rate of unemployment on the vertical $LRPC$, but at a permanently higher rate of money-supply growth and inflation — there is no permanent trade-off in the long run. **(B)**.

Bài tập luyện tập

Two countries have identical measured GDP per capita. Country P has a very large informal/-subsistence agricultural sector; Country Q conducts almost all economic activity through formal, monetised markets. Explain why actual living standards might differ substantially despite identical measured GDP. (Short response.)

Lời giải chi tiết

Much of Country P's real production and consumption (subsistence farming, informal trade, unpaid household labour) is **not captured** in official GDP statistics, so its true economic activity/living standard is likely **understated** relative to its measured GDP figure. Country Q's GDP, by contrast, captures nearly all of its actual activity since it passes through formal, recorded markets. Comparing measured GDP per capita alone could therefore understate Country P's true living standard relative to Country Q's.

Bài tập luyện tập

A CPI basket has two categories: Housing (weight 55%) rising 4% over the year, and Transport (weight 45%) rising 10%. Calculate the weighted overall inflation rate.

Lời giải chi tiết

Weighted inflation $= (0.55 \times 4\%) + (0.45 \times 10\%) = 2.2\% + 4.5\% = 6.7\%$.

Bài tập luyện tập

Explain, using progressive income tax as an example, how automatic stabilisers reduce the size of swings in the business cycle without any new legislation being passed. (Short response.)

Lời giải chi tiết

Under a progressive income tax, when incomes **fall** in a downturn, households automatically move into lower tax brackets and pay less tax in absolute terms, cushioning the fall in disposable income and consumption relative to the fall in pre-tax income. In a boom, **rising** incomes automatically pull in more tax revenue (and can push some households into higher brackets), automatically dampening the rise in disposable income/consumption — all without government needing to pass any new legislation each time economic conditions change.

Ôn tập nhanh — Unit 3: (1) GDP thực (đã trừ lạm phát) mới phản ánh đúng tăng trưởng — luôn dùng GDP deflator để quy đổi; (2) số nhân $k = \frac{1}{MPS + MPT + MPM}$ (đừng quên MPT, MPM trong nền kinh tế mở); (3) AD dịch phải/trái do $C, I, G, (X-M)$ thay đổi; $LRAS$ theo trường phái monetarist là đường thẳng đứng, theo Keynes có 3 đoạn; (4) khoảng cách sản lượng dương = lạm phát, âm = suy thoái; (5) đường Phillips ngắn hạn có đánh đổi, dài hạn thẳng đứng tại tỉ lệ thất nghiệp tự nhiên; (6) chính sách phía cầu (tài khoá, tiền tệ) quản lý chu kỳ ngắn hạn; chính sách phía cung nâng $LRAS$ trong dài hạn — luôn phân biệt rõ hai nhóm này khi đánh giá.

The Global Economy

Mục tiêu Unit: Lợi ích thương mại quốc tế (lợi thế tuyệt đối/so sánh, tính toán lợi ích thương mại), các công cụ bảo hộ (thuế quan, hạn ngạch) và tác động phúc lợi; tỷ giá hối đoái (thả nổi/cố định) và tính toán; điều kiện Marshall–Lerner và hiệu ứng đường cong chữ J (HL); tỷ lệ thương mại — terms of trade (HL); cán cân thanh toán; hội nhập kinh tế; và phát triển kinh tế bền vững — trọng tâm khái niệm **interdependence**.

4.1 International trade

4.1.1 Absolute and comparative advantage

Countries trade because they face different **opportunity costs** of production. A country has an **absolute advantage** in a good if it can produce *more* output per unit of resource than another country. A country has a **comparative advantage** in a good if it can produce it at a *lower opportunity cost* than another country — and it is comparative advantage, **not** absolute advantage, that is the true basis for mutually beneficial trade. This is the clearest classroom illustration of **interdependence**: even a country with no absolute advantage in anything can still gain from trade.

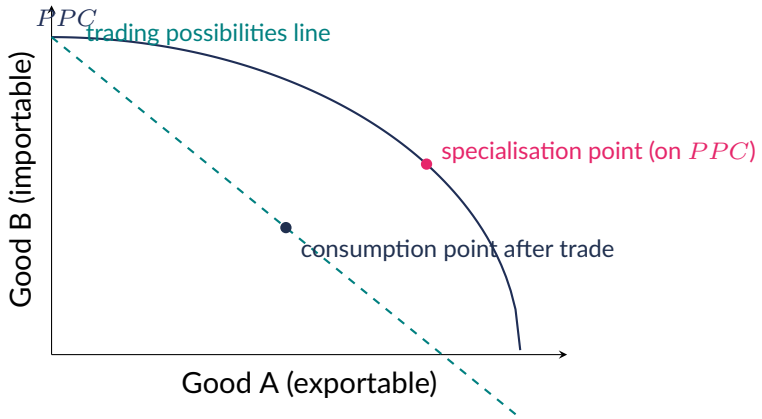
Identifying comparative advantage

Per worker-hour, Country A can produce 10 units of Cloth or 5 units of Wine; Country B can produce 6 units of Cloth or 6 units of Wine.

$$\text{A's OC of 1 Cloth} = \tfrac{5}{10} = 0.5 \text{ Wine}, \qquad \text{A's OC of 1 Wine} = \tfrac{10}{5} = 2 \text{ Cloth}.$$

$$\text{B's OC of 1 Cloth} = \tfrac{6}{6} = 1 \text{ Wine}, \qquad \text{B's OC of 1 Wine} = \tfrac{6}{6} = 1 \text{ Cloth}.$$

A has the lower opportunity cost of Cloth ($0.5 < 1$) $\Rightarrow$ A has comparative advantage in **Cloth**. B has the lower opportunity cost of Wine ($1 < 2$) $\Rightarrow$ B has comparative advantage in **Wine**. Both gain by specialising and trading at any exchange rate between 0.5 and 1 Wine per Cloth.



The trading possibilities curve: by specialising fully in its comparative-advantage good (moving to a point *on* the PPC) and trading at the world price ratio, a country can reach a consumption point that lies *outside* its own PPC — impossible

without trade.

[HL ONLY] Quantifying the gains from trade

Using the comparative-advantage example above (Country A: 10 Cloth or 5 Wine; Country B: 6 Cloth or 6 Wine, per worker-hour), suppose **without trade** each country splits its resources evenly: A produces/consumes 5 Cloth and 2.5 Wine; B produces/consumes 3 Cloth and 3 Wine. With trade, each specialises completely (A produces 10 Cloth; B produces 6 Wine) and they trade 4 Cloth for 3 Wine (an exchange rate of 1 Cloth $= 0.75$ Wine, within the mutually beneficial range of 0.5–1). Calculate each country's consumption after trade and their gains.

Country A keeps $10 - 4 = 6$ Cloth and receives 3 Wine: consumption $= (6$ Cloth, 3 Wine$)$ vs. autarky $(5,\ 2.5)$ — gains **+1 Cloth, +0.5 Wine**.
Country B keeps $6 - 3 = 3$ Wine and receives 4 Cloth: consumption $= (4$ Cloth, 3 Wine$)$ vs. autarky $(3,\ 3)$ — gains **+1 Cloth, +0 Wine** (at least as well off, strictly better in Cloth).
Both countries consume *more of at least one good, and no less of the other* than they could without trade — the concrete meaning of "gains from trade".

VN **GIẢI THÍCH TIẾNG VIỆT**

Lợi thế so sánh (comparative advantage) — không phải lợi thế tuyệt đối — mới là cơ sở cho thương mại có lợi cho cả hai bên: mỗi quốc gia nên chuyên môn hoá sản xuất hàng hoá có **chi phí cơ hội thấp hơn**, sau đó trao đổi để cả hai cùng tiêu dùng nhiều hơn mức có thể đạt được nếu tự cung tự cấp (điểm tiêu dùng nằm **ngoài** PPC riêng của từng nước — nhờ "đường khả năng trao đổi", trading possibilities curve).

A full numeric comparative-advantage and gains-from-trade example

Country A: with 1 hour of labour can produce *either* 4 units of Cloth *or* 2 units of Wine. Country B: with 1 hour of labour can produce *either* 3 units of Cloth *or* 6 units of Wine.

Step 1 — opportunity costs.

$$\text{A's OC of 1 Cloth} = \tfrac{2}{4} = 0.5 \text{ Wine}, \qquad \text{A's OC of 1 Wine} = \tfrac{4}{2} = 2 \text{ Cloth}.$$

$$\text{B's OC of 1 Cloth} = \tfrac{6}{3} = 2 \text{ Wine}, \qquad \text{B's OC of 1 Wine} = \tfrac{3}{6} = 0.5 \text{ Cloth}.$$

Step 2 — comparative advantage. Country A has the lower opportunity cost of Cloth (0.5 Wine vs. B's 2 Wine) $\Rightarrow$ A has comparative advantage in **Cloth**. Country B has the lower opportunity cost of Wine (0.5 Cloth vs. A's 2 Cloth) $\Rightarrow$ B has comparative advantage in **Wine**.

Step 3 — mutually beneficial terms of trade. Any Cloth-for-Wine exchange rate strictly between the two countries' domestic opportunity costs benefits both — i.e. strictly between 0.5 and 2 units of Wine per unit of Cloth (e.g. a rate of 1 Cloth $= 1$ Wine works for both).

Step 4 — gains from specialisation. Suppose each country has 10 labour-hours, initially split evenly (5/5) between the two goods. **Pre-trade:** A produces $5 \times 4 = 20$ Cloth and $5 \times 2 = 10$ Wine ($20C + 10W$); B produces $5 \times 3 = 15$ Cloth and $5 \times 6 = 30$ Wine ($15C + 30W$). Combined world pre-trade output: 35 Cloth $+40$ Wine. **After full specialisation** according to comparative advantage: A uses all 10 hours on Cloth $= 10 \times 4 = 40$ Cloth, 0 Wine; B uses all 10 hours on Wine $= 10 \times 6 = 60$ Wine, 0 Cloth. Combined world output after specialisation: 40 Cloth $+60$ Wine — a gain of 5 more Cloth and 20 more Wine than before trade, purely from specialising according to comparative advantage.

Step 5 — a concrete trade. At the rate 1 Cloth $= 1$ Wine, suppose A keeps 20 of its 40 Cloth for itself and trades the other 20 Cloth to B in exchange for 20 Wine. **Country A** ends with

20 Cloth +20 Wine (compared with its pre-trade 20 Cloth +10 Wine — a gain of 10 extra Wine at no cost in Cloth). **Country B** gives up 20 Wine and receives 20 Cloth, ending with 20 Cloth +40 Wine (compared with its pre-trade 15 Cloth +30 Wine — a gain of 5 extra Cloth and 10 extra Wine). **Both** countries are better off than under self-sufficiency, confirming the mutual gains from trade based on comparative — not absolute — advantage.

Straight-line, per-hour PPCs for Country A (max 4 Cloth or 2 Wine — slope $= 0.5$ Wine/Cloth) and Country B (max 3 Cloth or 6 Wine — slope $= 2$ Wine/Cloth), matching the worked example above. A's flatter PPC (lower opportunity cost of Cloth) confirms its comparative advantage in Cloth; B's steeper PPC confirms its comparative advantage in Wine.

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Ví dụ số đầy đủ: Nước A (1 giờ công → 4 Vải hoặc 2 Rượu): chi phí cơ hội 1 Vải $= 0.5$ Rượu; Nước B (1 giờ công → 3 Vải hoặc 6 Rượu): chi phí cơ hội 1 Vải $= 2$ Rượu. Vì $0.5 < 2$, A có lợi thế so sánh về **Vải**; B có lợi thế so sánh về **Rượu** (chi phí cơ hội 1 Rượu của B $= 0.5$ Vải < 2 Vải của A). Với 10 giờ công mỗi nước, trước khi trao đổi (chia đều 5/5): tổng sản lượng thế giới $= 35$ Vải $+40$ Rượu. Sau khi chuyên môn hoá hoàn toàn theo lợi thế so sánh: A sản xuất 40 Vải, B sản xuất 60 Rượu — tổng $= 40$ Vải $+60$ Rượu, tăng thêm 5 Vải và 20 Rượu so với trước. Trao đổi theo tỷ lệ 1 Vải $= 1$ Rượu (A đổi 20 Vải lấy 20 Rượu của B): A có 20 Vải $+20$ Rượu (lợi hơn trước $+10$ Rượu); B có 20 Vải $+40$ Rượu (lợi hơn trước $+5$ Vải, $+10$ Rượu) — **cả hai nước đều có lợi hơn** so với khi tự cung tự cấp, minh chứng cho lợi ích thương mại dựa trên lợi thế so sánh chứ không phải lợi thế tuyệt đối.

4.2 Trade protection

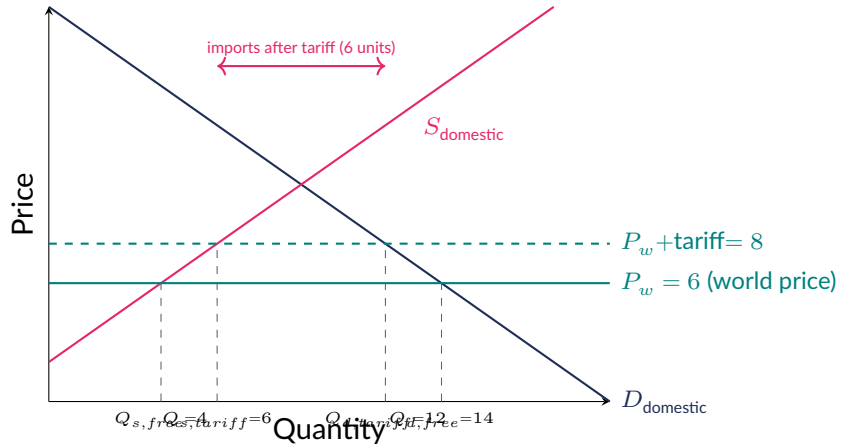
Trade protection tools:

Khái niệm cốt lõi

- **Tariffs**: a tax on imports, raising the domestic price of the imported good.
- **Quotas**: a direct quantity limit on imports.
- **Subsidies to domestic producers**: lower domestic producers' costs, making them more competitive against imports without directly taxing trade.
- **Administrative/technical barriers**: complex customs procedures, product standards, or licensing requirements that raise the effective cost of importing.

Common arguments *for* protection: protecting infant industries (temporarily, to let them achieve economies of scale/experience), protecting domestic employment, national security

(self-sufficiency in strategic goods), anti-dumping (retaliating against another country selling below cost), and correcting a persistent trade deficit — weighed against the efficiency losses of protection and the risk of retaliation, which undermines the gains from **interdependence**.



A tariff of \$2/unit on $D : P = 20 - Q$, $S : P = 2 + Q$, world price $P_w = 6$: the domestic price rises to \$8; domestic production rises $4 \to 6$; domestic consumption falls $14 \to 12$; imports shrink from 10 to 6 units.

Quantifying a tariff's effects and welfare loss

Using the figure above: $D : P = 20 - Q$, $S : P = 2 + Q$, world price $P_w = \$6$ (free trade), tariff $= \$2$/unit.

Free trade (at $P_w = 6$): $Q_d = 20 - 6 = 14$; $Q_s = 6 - 2 = 4$; imports $= 14 - 4 = 10$.
With tariff (domestic price $= P_w +$ tariff $= 8$): $Q_d = 20 - 8 = 12$; $Q_s = 8 - 2 = 6$; imports $= 12 - 6 = 6$.
Tariff revenue $=$ tariff $\times$ imports $= 2 \times 6 = \$12$.

Production distortion loss $= \frac{1}{2} \times (6 - 4) \times 2 = \$2$, Consumption distortion loss $= \frac{1}{2} \times (14 - 12) \times 2 = \$2$.

$$\text{Total deadweight (welfare) loss} = \$2 + \$2 = \$4.$$

The tariff raises domestic production ($+2$), lowers domestic consumption (-2), cuts imports (-4), raises government revenue (\$12), and destroys \$4 of total welfare — inefficient domestic production expands (production distortion) while consumers are priced out of units they valued above the world price (consumption distortion).

Comparing an equivalent quota to the tariff above

Instead of the \$2 tariff, suppose the government restricts imports directly to a **quota** of 6 units (the same import quantity the tariff produced). Compare the price/quantity outcome and explain who captures the \$12 gap this time.

With imports capped at exactly 6 units, total available supply at any price $P \geq P_w$ is $Q_s(P) + 6$ (domestic supply plus the quota). Equilibrium requires $D = S +$quota: $20 - Q = (Q - 2) + 6 \implies 20 - Q = Q + 4 \implies 16 = 2Q \implies Q = 8$... *(using the supply curve shifted right by the quota amount, $S_{quota} : P = (Q - 6) + 2$)*: solving $20 - Q = (Q - 6) + 2 \implies 20 - Q = Q - 4 \implies 24 = 2Q \implies Q = 12$, $P = 8$ — **identical** price (\$8) and quantity (\$12) to the tariff case, with domestic production again 6 and imports again 6, exactly as intended. The key difference: the \$12 gap between the world price and domestic price on each of the 6 imported

units (the "quota rent") goes to **whoever holds the import licence** — not automatically to the government, unless it specifically auctions the licences (in which case the outcomes become financially equivalent to the tariff).

VN **GIẢI THÍCH TIẾNG VIỆT**

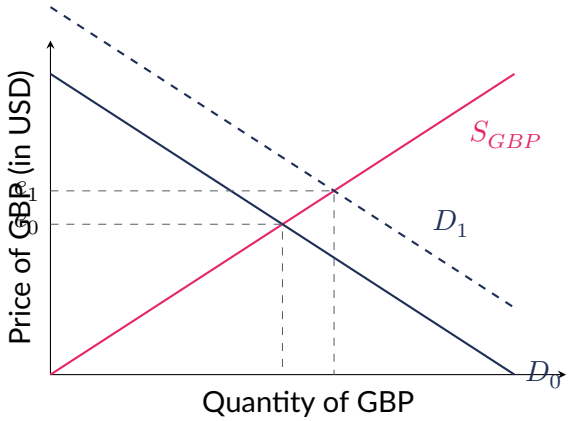
Thuế quan (tariff) làm tăng giá trong nước, tăng sản lượng nội địa, giảm tiêu dùng nội địa, giảm nhập khẩu, tạo doanh thu thuế cho chính phủ nhưng gây tổn thất phúc lợi ròng (hai tam giác: méo mó sản xuất + méo mó tiêu dùng). Hạn ngạch (quota) có thể tạo ra **cùng hiệu ứng giá/lượng** như thuế quan tương đương, nhưng phần chênh lệch giá không tự động vào ngân sách nhà nước — nó trở thành "tiền thuê hạn ngạch" (quota rent) cho ai nắm giữ giấy phép nhập khẩu, trừ khi chính phủ đấu giá giấy phép đó.

4.3 Exchange rates

4.3.1 Floating, fixed, and managed exchange rate systems

Under a **floating** exchange rate, the price of one currency in terms of another is determined purely by market demand and supply of currencies, with no central bank intervention. Under a **fixed** exchange rate, the central bank commits to holding the currency at a specific rate, buying or selling its own currency (using foreign reserves) whenever necessary to defend that rate. A **managed float** sits between the two: the exchange rate mostly floats, but the central bank occasionally intervenes to smooth excessive volatility or nudge the rate in a desired direction.

Currency **appreciation** (floating regime) or **revaluation** (fixed regime, a deliberate policy change) makes exports more expensive to foreign buyers and imports cheaper at home; **depreciation** (floating) or **devaluation** (fixed) does the reverse.



A rise in demand for GBP (e.g. higher UK interest rates attracting capital inflows) shifts $D_0 \rightarrow D_1$, **appreciating** the pound from e_0 to e_1.

Determinants of currency demand/supply (floating rates): relative interest rates (higher domestic rates attract capital inflows, raising currency demand), relative inflation rates (higher domestic inflation erodes competitiveness, reducing currency demand over time), speculation, and — most fundamentally — the demand for a country's exports and its residents' demand for imports.

Calculating an appreciation

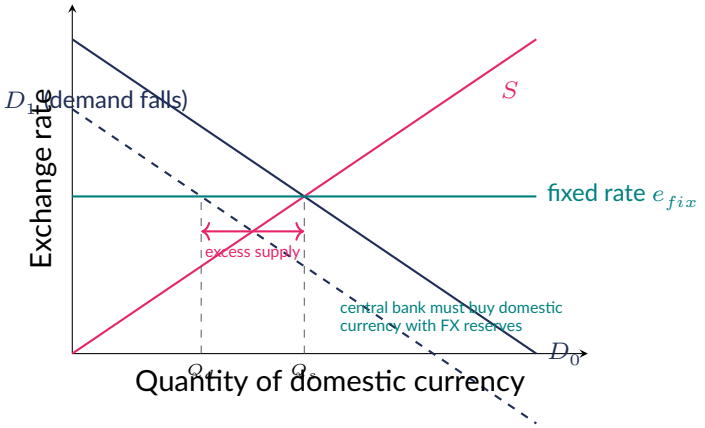
GBP/USD moves from 1.20 to 1.32.

$$\%\Delta e = \frac{1.32 - 1.20}{1.20} \times 100\% = 10\% \text{ appreciation of GBP.}$$

UK exports become roughly 10% more expensive in USD terms; UK imports become roughly 10% cheaper in GBP terms (holding foreign-currency prices constant).

4.3.2 Fixed exchange rates and central bank intervention

To defend a fixed rate against depreciation pressure (excess supply of the domestic currency at the fixed rate), a central bank must **buy** its own currency using its stock of foreign currency **reserves** — a strategy that is only sustainable as long as reserves last. To defend against appreciation pressure (excess demand for the domestic currency), the central bank instead **sells** its own currency (buying foreign currency, building reserves) — a strategy with no natural reserve limit, though it can fuel excess domestic money-supply growth and inflation if not "sterilised".



Defending a fixed rate against depreciation pressure: after demand falls to D_1, there is excess supply of the domestic currency at e_{fix}; the central bank must buy up the surplus using foreign reserves.

How long can reserve intervention last?

A central bank must spend \$800m of its foreign-currency reserves each month buying its own currency to defend a fixed exchange rate against sustained depreciation pressure. It currently holds \$9.6bn in reserves. Assuming the intervention continues at this rate, how many months can it be sustained?

$$\frac{\$9{,}600\text{m}}{\$800\text{m/month}} = 12 \text{ months.}$$

This finite horizon is the central practical weakness of fixed exchange rates under sustained one-way pressure: without a change in fundamentals (or a policy response, e.g. raising interest rates to attract capital inflows), the central bank will eventually exhaust its reserves and be forced to devalue.

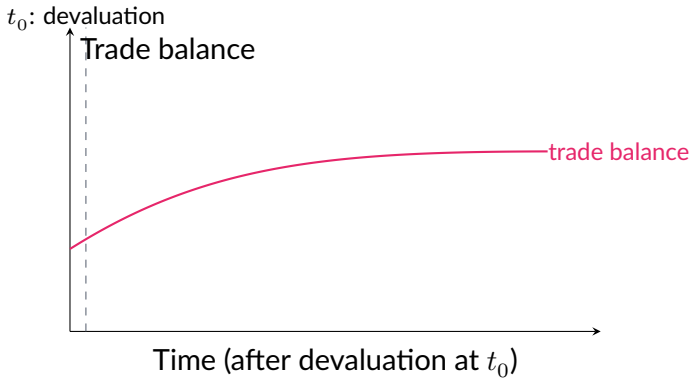
VN **GIẢI THÍCH TIẾNG VIỆT**

Tỷ giá thả nổi (floating) do cung–cầu ngoại tệ quyết định; tỷ giá cố định (fixed) do ngân hàng trung ương neo giữ, phải can thiệp mua/bán ngoại tệ dự trữ để bảo vệ mức tỷ giá đã cam kết. Nếu đồng nội tệ chịu áp lực giảm giá kéo dài, ngân hàng trung ương phải liên tục dùng **dự trữ**

ngoại hối để mua vào nội tệ — chiến lược này có **giới hạn** vì dự trữ ngoại hối là hữu hạn. Đồng nội tệ **lên giá** (appreciation/revaluation) khiến hàng xuất khẩu đắt hơn, hàng nhập khẩu rẻ hơn — ngược lại với **giảm giá** (depreciation/devaluation).

4.3.3 [HL ONLY] The Marshall–Lerner condition and the J-curve

The **Marshall–Lerner condition**: a depreciation/devaluation improves the current account balance *only if* $|PED_x| + |PED_m| > 1$ (the sum of the price elasticities of demand for exports and imports). If demand for exports and imports is jointly **inelastic**, a weaker currency can initially *worsen* the trade balance, because the *value* of trade changes immediately (import prices rise in domestic-currency terms) while the *volumes* traded barely respond at first.



The J-curve: the trade balance typically first **worsens** after a devaluation (existing contracts are slow to adjust), before **improving** beyond its original level as import/export volumes fully respond over time — tracing a "J" shape.

Applying the Marshall–Lerner condition

The Japanese yen depreciates by 15% against the US dollar. Japan's exports to the US have $PED = 0.4$ and its imports from the US have $PED = 0.5$. Predict the effect on Japan's trade balance.

$$|PED_x| + |PED_m| = 0.4 + 0.5 = 0.9 < 1.$$

The Marshall–Lerner condition is **not satisfied** — a yen depreciation is predicted to **worsen**, not improve, Japan's trade balance with the US, since both export and import volumes respond only weakly, while the yen-value of imports (now costing more per unit in yen) rises more than any gain in export revenue. In the very short run this may appear as the initial dip of a **J-curve**, but with such low combined elasticities, a lasting improvement is unlikely unless elasticities rise significantly as buyers/sellers have more time to adjust.

VN **GIẢI THÍCH TIẾNG VIỆT**

Điều kiện Marshall–Lerner (HL): phá giá tiền tệ chỉ cải thiện cán cân thương mại khi tổng độ co giãn cầu xuất khẩu và nhập khẩu $|PED_x| + |PED_m| > 1$; nếu không, cán cân có thể **xấu đi**. Hiệu ứng đường cong chữ J: ngay sau khi phá giá, cán cân thương mại thường xấu đi trước (do hợp đồng cũ chưa kịp điều chỉnh khối lượng), rồi mới cải thiện dần khi khối lượng xuất–nhập khẩu phản ứng đầy đủ theo thời gian.

4.3.4 [HL ONLY] Terms of trade

The **terms of trade (ToT)** measure the quantity of imports a country can buy per unit of exports sold — how favourably a country's exports exchange for its imports:

$$ToT = \frac{\text{Index of average export prices}}{\text{Index of average import prices}} \times 100.$$

$ToT > 100$ (relative to the base period): terms of trade have **improved** (each unit of exports now buys more imports). $ToT < 100$: terms of trade have **worsened**.

Calculating and interpreting the terms of trade

A country's export price index rises from 100 to 112, while its import price index rises from 100 to 105 (same base year).

$$ToT = \frac{112}{105} \times 100 \approx 106.7.$$

The terms of trade have **improved** by approximately 6.7% — the same volume of exports now buys about 6.7% more imports than in the base year.

Worsening terms of trade for a commodity exporter

A commodity-exporting country's export price index *falls* by 5% (a global commodity price slump) while its import price index *rises* by 3%. Calculate the new terms-of-trade index and comment.

Export index $= 100 - 5 = 95$. Import index $= 100 + 3 = 103$.

$$ToT = \frac{95}{103} \times 100 \approx 92.2.$$

Terms of trade have **worsened** substantially (index falls from 100 to about 92.2): the country must now export roughly 8% more just to afford the same quantity of imports as before — a common vulnerability for economies that depend heavily on a narrow range of commodity exports, since world commodity prices are volatile and outside any single small country's control (a recurring theme in Section 4.5, Economic development).

(!) Lỗi thường gặp: An **improvement** in the terms of trade is not automatically "good news" for the whole economy: if it results from a fall in *export volumes* due to weak global demand (rather than a genuine rise in export prices reflecting higher-value goods), the country could still be earning less total export revenue even as its terms-of-trade index rises. Always distinguish the terms-of-trade *price ratio* from the overall *value* of trade (price × quantity).

VN **GIẢI THÍCH TIẾNG VIỆT**

Tỷ lệ thương mại (terms of trade — HL) đo số lượng hàng nhập khẩu đổi được từ mỗi đơn vị hàng xuất khẩu: $ToT = \frac{\text{chỉ số giá xuất khẩu}}{\text{chỉ số giá nhập khẩu}} \times 100$. ToT tăng là **cải thiện** (mỗi đơn vị xuất khẩu đổi được nhiều nhập khẩu hơn); ToT giảm là **xấu đi**. Các nước xuất khẩu hàng hoá thô (commodity) thường có ToT biến động mạnh do giá hàng hoá thế giới lên xuống thất thường — một điểm yếu cấu trúc quan trọng khi phân tích phát triển kinh tế.

4.3.5 [HL ONLY] Real exchange rates and international competitiveness

The **nominal exchange rate** is simply the price of one currency in terms of another, as quoted in currency markets — on its own, it can be a misleading guide to a country's true international price competitiveness, because it says nothing about how domestic prices are moving *relative to* prices in trading-partner countries. The **real exchange rate** corrects for this: it adjusts the nominal exchange rate for the relative price levels (inflation rates) of the domestic economy and its trading partners, capturing whether a country's goods are becoming more or less expensive than foreign goods once *both* nominal exchange-rate movements *and* relative inflation are taken into account. A **real appreciation** means domestic goods have become more expensive relative to foreign goods (a loss of price competitiveness); a **real depreciation** means domestic goods have become cheaper relative to foreign goods (a gain in price competitiveness) — and either can occur even when the nominal exchange rate itself does not move at all, purely because of a gap between domestic and foreign inflation rates.

With the nominal exchange rate unchanged, domestic prices rising to an index of 115 while trading-partner prices rise only to 105 (base $= 100$) is a **real appreciation** of about $115/105 \approx 9.5\%$ — the same worked example below, shown as a simple price-index comparison.

Real appreciation with an unchanged nominal exchange rate

A country's nominal exchange rate against its trading partners is unchanged over one year. Over that same year, the domestic price level rises by 15%, while the average price level among its trading partners rises by only 5%. Explain what happens to this country's real exchange rate and international price competitiveness, even though the nominal exchange rate itself has not moved.

Domestic prices have risen by a factor of 1.15; foreign (trading-partner) prices have risen by a factor of only 1.05. Comparing the two:

$$\frac{1.15}{1.05} \approx 1.095.$$

Domestic goods have become roughly **9.5% more expensive relative to foreign goods** — this is a **real appreciation** of approximately 9.5%, even though the *nominal* exchange rate never changed. Domestic exporters' goods are now less price-competitive abroad, and imports look relatively cheaper to domestic consumers than before. This shows why a country with persistently higher inflation than its trading partners can suffer a real loss of competitiveness even under a fixed (or simply unmoving) nominal exchange rate — the loss of competitiveness is hidden from anyone looking only at the nominal rate.

VN **GIẢI THÍCH TIẾNG VIỆT**

Tỷ giá hối đoái thực (real exchange rate) điều chỉnh tỷ giá danh nghĩa theo **chênh lệch lạm phát** giữa hai quốc gia. Ngay cả khi tỷ giá danh nghĩa không đổi, nếu lạm phát trong nước cao hơn đáng kể so với các đối tác thương mại, hàng hoá trong nước sẽ trở nên **đắt hơn tương đối** — đây là hiện tượng **lên giá thực** (real appreciation), làm giảm sức cạnh tranh giá quốc tế của hàng xuất khẩu, dù tỷ giá danh nghĩa vẫn giữ nguyên.

(!) Lỗi thường gặp: Do not assume an unchanged nominal exchange rate means unchanged competitiveness. Always check relative inflation rates too: a country whose domestic inflation persistently exceeds its trading partners' inflation is undergoing a real appreciation (a real loss of competitiveness) even while its nominal exchange rate sits perfectly still.

4.4 The balance of payments

The **balance of payments (BOP)** is a systematic record of all economic transactions between a country's residents and the rest of the world over a period, split into two main accounts:

Current account	Trade in goods (visible exports/imports) + trade in services (invisible) + primary income (e.g. interest, profit, dividends flowing across borders) + secondary income/current transfers (e.g. remittances, foreign aid).
Capital & financial account	Capital transfers, plus financial flows: foreign direct investment (FDI), portfolio investment (shares/bonds), other investment (bank lending), and changes in official reserve assets.

By construction (double-entry accounting), the overall BOP must balance: **current account** + **capital & financial account** + **errors and omissions** $= 0$.

Calculating the current account balance

Trade in goods balance: $-\$50$bn. Trade in services balance: $+\$20$bn. Primary income balance: $+\$5$bn. Secondary income (current transfers): $-\$3$bn.

$$\text{Current account} = -50 + 20 + 5 - 3 = -\$28\text{bn (a current account deficit).}$$

This deficit must be matched by a net inflow of approximately \$28bn on the financial/capital account (e.g. foreign investment into the country, or a fall in official reserves).

Using the overall balance identity

A country records a current account of $-\$18$bn and a financial/capital account of $+\$21$bn. Find the errors-and-omissions term required for the BOP to balance, and explain what a persistently large such term usually indicates.

$$-18 + 21 + x = 0 \implies x = -\$3\text{bn.}$$

A large errors-and-omissions term generally reflects the practical difficulty of accurately recording every cross-border transaction (timing differences between recorded flows, valuation issues, unrecorded/informal capital movements) rather than a genuine additional economic surplus or deficit.

Correcting a persistent current account deficit

Persistent current account **deficits** (a country spending more abroad than it earns) can be addressed through **expenditure switching** policies — shifting domestic and foreign demand away from imports toward domestically produced goods, e.g. a depreciation/devaluation (if the Marshall–Lerner condition holds) or protectionist tariffs — or **expenditure reducing** policies — contractionary demand-side policy that lowers overall spending, including spending on imports. Both trade off short-run **economic well-being** (lower consumption, possibly lower growth) against restoring external balance; supply-side policies that raise long-run export competitiveness are a slower but less costly complementary approach.

VN **GIẢI THÍCH TIẾNG VIỆT**

Cán cân thanh toán (BOP) gồm tài khoản vãng lai (current account: hàng hoá, dịch vụ, thu nhập sơ cấp, chuyển giao thứ cấp) và tài khoản vốn–tài chính (capital & financial account: FDI, đầu tư gián tiếp, dự trữ ngoại hối). Về nguyên tắc, tổng BOP luôn cân bằng (có thêm sai số thống kê). Thâm hụt tài khoản vãng lai có thể được khắc phục bằng **chuyển hướng chi tiêu** (expenditure switching — phá giá, thuế quan) hoặc **giảm chi tiêu** (expenditure reducing — chính sách thắt chặt tổng cầu).

4.5 Economic integration

Economic integration deepens **interdependence** between countries through progressively closer trade and policy links.

The spectrum of economic integration: each stage adds deeper economic ties (and a greater loss of independent national policy) than the one before it.

- **Preferential trade agreement (PTA)**: members give each other lower (but not necessarily zero) tariffs than non-members.
- **Free trade area (FTA)**: members eliminate tariffs between themselves, but each keeps its *own* tariffs against non-members.
- **Customs union**: an FTA plus a **common external tariff** applied uniformly to all non-members.
- **Common market**: a customs union plus free movement of factors of production (labour, capital) between members.
- **Monetary union**: a common market plus a shared single currency (and typically a shared central bank/monetary policy) — members gain lower transaction costs and exchange-rate certainty with each other, but sacrifice independent national monetary policy.

[HL ONLY] Trade creation vs. trade diversion

Before joining a customs union, a country imports a good from the world's lowest-cost producer at \$10/unit (no significant tariff). After joining the union (adopting a common external tariff on non-members of \$5/unit, but zero tariff on union partners), the country switches to

importing from a union partner whose production cost is \$12/unit — higher than the original \$10 world price, but still cheaper than the now-tariffed world price of \$15 ($10 + \$5$). Identify whether this is trade creation or trade diversion, and state the welfare implication.

This is **trade diversion**: the union causes the country to switch from a more efficient producer (world price \$10) to a *less* efficient one (union partner, \$12) — purely because of the tariff preference, not genuine cost advantage. Although the country's *consumers* pay less than before the union (\$12 vs. the pre-union world price plus any pre-existing tariff), **global** resources are now used less efficiently: \$2/unit of real resources are wasted compared to sourcing from the true lowest-cost producer. (Contrast **trade creation**: if union membership instead lets the country import from a union partner *more* efficient than domestic production — replacing costlier domestic output with a genuinely cheaper source — that raises efficiency and is unambiguously welfare-improving.)

VN **GIẢI THÍCH TIẾNG VIỆT**

Hội nhập kinh tế làm sâu sắc thêm tính **phụ thuộc lẫn nhau** (interdependence): từ khu vực mậu dịch ưu đãi (PTA), khu vực mậu dịch tự do (FTA), liên minh thuế quan (customs union, có thuế quan chung với bên ngoài), thị trường chung (common market, thêm tự do di chuyển lao động/vốn), đến liên minh tiền tệ (monetary union, dùng chung đồng tiền — đánh đổi lấy việc mất chính sách tiền tệ độc lập). **Tạo lập thương mại** (trade creation) — chuyển từ nhà sản xuất trong nước kém hiệu quả sang đối tác hiệu quả hơn trong khối — làm tăng phúc lợi. **Chuyển hướng thương mại** (trade diversion) — chuyển từ nhà cung cấp thế giới hiệu quả nhất sang đối tác trong khối kém hiệu quả hơn chỉ vì ưu đãi thuế quan — làm giảm hiệu quả sử dụng nguồn lực toàn cầu.

4.6 Economic development

4.6.1 Growth vs. development

Economic growth is a rise in the quantity of output (real GDP). **Economic development** is broader: it includes rising **economic well-being** — health, education, freedom, environmental quality, and economic security — not just GDP per capita.

Khái niệm cốt lõi

The **Human Development Index (HDI)** combines income (GNI per capita), health (life expectancy at birth), and education (expected and mean years of schooling) into a single composite score between 0 and 1, addressing the limits of using GDP/GNI alone as a measure of a nation's progress. Other single/composite indicators used alongside HDI include life expectancy, literacy rates, access to clean water/sanitation, and (increasingly) environmental sustainability indices.

Comparing GDP per capita and HDI

Country X has GDP per capita \$18,000 and HDI 0.72; Country Y has GDP per capita \$9,500 and HDI 0.79. What does this comparison suggest, and what is one limitation of relying on either indicator alone?

Despite roughly half the GDP per capita of Country X, Country Y has a *higher* HDI — suggesting Y converts income into broader **economic well-being** more effectively (better health outcomes, more education), perhaps through more equitable distribution or stronger public in-

vestment, whereas X's higher income may be less evenly shared or less effectively converted into human development. **Limitation of GDP per capita alone:** it ignores distribution, non-market welfare, and **sustainability**. **Limitation of HDI alone:** it still omits inequality within the population and environmental degradation — neither single indicator alone gives a complete picture of development.

(!) Lỗi thường gặp: A country can have rising GDP per capita while HDI stagnates or falls (e.g. income growth concentrated in a small elite, or environmental degradation harming health outcomes) — never treat GDP *growth* and *development* as automatically the same thing; always distinguish growth (a quantitative rise in output) from development (a broader, qualitative improvement in well-being).

VN **GIẢI THÍCH TIẾNG VIỆT**

Tăng trưởng kinh tế (growth) là tăng *số lượng* sản lượng (GDP thực); phát triển kinh tế (development) rộng hơn — bao gồm cả y tế, giáo dục, môi trường, tự do. Chỉ số HDI kết hợp thu nhập, tuổi thọ, giáo dục — khắc phục hạn chế của việc chỉ dùng GDP/GNI. Một quốc gia có thể tăng GDP đầu người nhưng HDI không cải thiện (thu nhập tập trung vào thiểu số, ô nhiễm môi trường) — luôn phân biệt rõ "tăng trưởng" và "phát triển" trên bài thi.

4.6.2 Barriers to development and strategies

Common barriers to growth and development

- **Commodity dependence**: over-reliance on a narrow range of primary-commodity exports exposes a country to volatile terms of trade (Section 4.4) and unstable export revenue.
- **External debt burdens**: large foreign-currency debt repayments can crowd out domestic investment in health, education, and infrastructure.
- **Capital flight**: domestic savings/investment leaving the country (often toward perceived safer or higher-return foreign assets) instead of funding domestic development.
- **Weak institutions**: corruption, insecure property rights, and political instability all deter both domestic and foreign investment.
- **Low levels of human capital**: limited access to education and healthcare constrains labour productivity and long-run growth potential.

Sources/strategies for development

Trade-based strategies (export-oriented growth, attracting foreign direct investment) exploit comparative advantage and access to larger world markets, but can leave a country exposed to global demand/price swings. **Aid** (bilateral or multilateral) can fund development directly, especially where domestic saving/tax capacity is limited, but can create dependency or be misallocated if institutions are weak. **Debt relief/restructuring** can free up resources previously devoted to debt service. **Market-based (Washington Consensus-style) reforms** (trade liberalisation, privatisation, deregulation) aim to raise efficiency and attract investment; **interventionist strategies** (import substitution, state-led industrial policy, public investment in infrastructure/education) aim to build domestic productive capacity directly — real-world development strategy usually blends elements of both, and evaluating which mix is appropriate for a given country is a core normative/analytical skill in this unit.

Sustainable development

Sustainable development requires balancing current development against the needs of future generations — the central concepts of **sustainability** and **equity** apply not just *within* a generation (addressing current poverty and inequality) but *across* generations (not depleting natural capital, degrading ecosystems, or building up debt burdens that constrain future development options). This connects directly back to Unit 1's PPC growth analysis and Unit 2's treatment of externalities and common-pool resources.

VN **GIẢI THÍCH TIẾNG VIỆT**

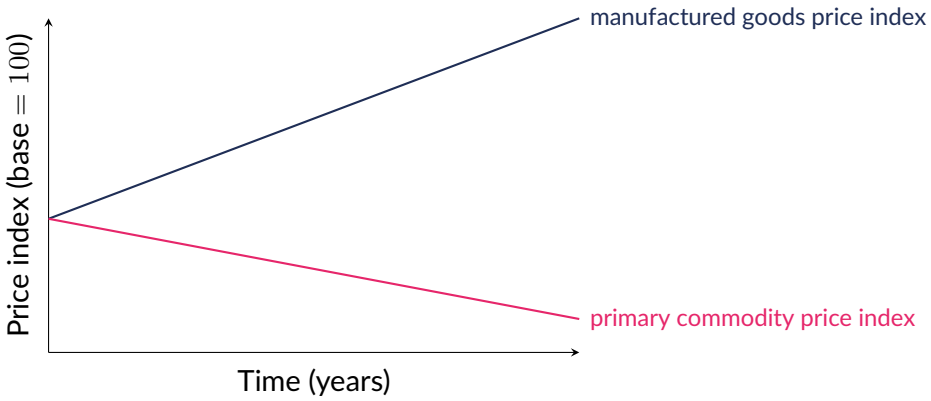
Rào cản phát triển thường gặp: phụ thuộc xuất khẩu hàng hoá thô (dễ tổn thương trước biến động tỷ lệ thương mại), nợ nước ngoài lớn, chảy máu vốn (capital flight), thể chế yếu (tham nhũng, bất ổn chính trị), nguồn nhân lực thấp. Chiến lược phát triển: dựa vào thương mại/FDI, viện trợ, xoá/giãn nợ, cải cách theo hướng thị trường (tự do hoá, tư nhân hoá) hoặc can thiệp nhà nước (thay thế nhập khẩu, đầu tư công) — hầu hết chiến lược thực tế đều kết hợp cả hai hướng. Phát triển bền vững đòi hỏi cân bằng nhu cầu hiện tại với khả năng đáp ứng nhu cầu của các thế hệ tương lai.

4.6.3 The Prebisch–Singer hypothesis and commodity dependency

The Prebisch–Singer hypothesis

The **Prebisch–Singer hypothesis** (named after economists Raúl Prebisch and Hans Singer) proposes — as a hypothesis to be evaluated, not a settled universal law — that countries which rely heavily on exporting primary commodities (agricultural goods, raw materials) may face a long-run tendency for their terms of trade to **deteriorate** relative to countries that export manufactured goods. Two reasons are commonly given: (1) global demand for many primary commodities tends to grow more **slowly** than demand for manufactured goods as world incomes rise — a low **income elasticity of demand (YED)** for many primary commodities relative to manufactures (linking back to the YED concept from Unit 2), so commodity export revenue tends to grow more slowly over time even as the world economy expands; and (2) primary-commodity markets are often highly competitive, with many small producers and little individual pricing power, while markets for manufactured goods more often feature branding, product differentiation, and greater market/pricing power for the producing firms and countries.

Some developing economies have drawn a clear policy implication from this hypothesis: pursuing **diversification** away from raw commodity exports and/or **import-substitution** or **export-oriented industrialisation** strategies to move up the value chain, rather than remaining a pure commodity exporter indefinitely. It remains important to note that the Prebisch–Singer hypothesis is a **debated, contested** hypothesis in development economics — evidence across different commodities and time periods is mixed — rather than a universally accepted law of long-run price behaviour.



An illustrative pattern consistent with the Prebisch–Singer hypothesis: the price index of manufactured goods trending upward over time, while the price index of primary commodities trends downward (or grows much more slowly) — a hypothesised long-run deterioration in the terms of trade of commodity-dependent exporters. Real-world commodity prices are typically far more volatile year to year than this simplified illustrative trend suggests.

Value capture along a commodity value chain

Country M exports 90% raw, unprocessed coffee beans. Country N processes and exports roasted, packaged, branded coffee. Using the Prebisch–Singer hypothesis, explain why Country N might capture substantially more value from the same underlying coffee harvest, and suggest one policy Country M could pursue.

Raw commodity prices (like Country M's unprocessed beans) are typically set in highly competitive global markets, where no single exporter has much individual pricing power, and where — according to the Prebisch–Singer hypothesis — long-run price growth has historically been weaker than for manufactured/processed goods. Country N's processed, roasted, and **branded** coffee carries substantial additional value added (processing, marketing, brand reputation) and typically faces less intense head-to-head price competition, allowing Country N to capture a larger, and more resilient, share of the value that final consumers pay for a cup of coffee. **Policy for Country M**: pursue value-addition strategies — e.g. encouraging (or directly investing in) domestic roasting, processing, and branding industries, attracting FDI specifically into processing capacity rather than only raw cultivation, or investing in agricultural technology and export diversification — rather than continuing to export only raw, unprocessed beans.

VN **GIẢI THÍCH TIẾNG VIỆT**

Giả thuyết Prebisch–Singer (một giả thuyết, không phải quy luật tuyệt đối) cho rằng các nước phụ thuộc xuất khẩu hàng hoá thô (nông sản, nguyên liệu) có thể đối mặt xu hướng tỷ lệ thương mại **xấu đi** dài hạn so với các nước xuất khẩu hàng chế tạo — do (1) cầu hàng hoá thô tăng chậm hơn cầu hàng chế tạo khi thu nhập thế giới tăng (co giãn cầu theo thu nhập — YED — thấp), và (2) thị trường hàng hoá thô thường cạnh tranh gay gắt, ít quyền lực định giá, trong khi hàng chế tạo/thương hiệu có nhiều quyền lực định giá hơn. Hàm ý chính sách: đa dạng hoá xuất khẩu, công nghiệp hoá thay thế nhập khẩu hoặc hướng xuất khẩu để leo lên chuỗi giá trị, thay vì chỉ xuất khẩu nguyên liệu thô. Đây vẫn là một giả thuyết còn gây tranh cãi trong kinh tế học phát triển.

4.7 Foreign direct investment and external finance

Foreign direct investment (FDI) occurs when a firm from one country establishes lasting business operations (a controlling stake, typically defined as 10% or more ownership) in another country — e.g. building a factory, acquiring a majority stake in a local firm. FDI is recorded in the financial account

of the balance of payments and is a major channel through which **interdependence** links national economies together.

Benefits and costs of FDI for a host (recipient) country

Benefits: an injection of capital the host country may lack domestically; technology and management-know-how transfer (often raising the productivity of the wider domestic economy, not just the foreign-owned firm); direct job creation; and — since FDI typically brings longer-term commitment than short-term portfolio investment — it is generally considered a more stable source of external finance for the balance of payments.
Costs: profits may be repatriated abroad rather than reinvested domestically (limiting the long-run growth benefit to the host economy); foreign firms may crowd out struggling domestic competitors; the host country may face pressure to weaken labour or environmental regulation to remain "competitive" for FDI (a race-to-the-bottom concern); and heavy reliance on FDI in a narrow sector leaves a country exposed if global conditions in that sector — or the foreign firm's home-country conditions — change.

FDI and the balance of payments

A multinational firm invests \$400m building a new factory in a developing country (recorded as an FDI inflow on the financial account). Over the following years, the factory generates \$60m/year in profit, of which 70% is repatriated to the parent company abroad (recorded as an income outflow on the current account) and 30% is reinvested locally. Calculate the annual repatriated profit outflow, and explain its effect on the host country's current account.

$$\text{Repatriated profit} = 0.70 \times \$60\text{m} = \$42\text{m/year}.$$

This \$42m/year appears as a **primary income outflow** on the host country's current account (Section 4.3), **worsening** the current account balance each year the factory operates — even though the *initial* \$400m FDI inflow was a one-off financial-account benefit. This illustrates why FDI's balance-of-payments effect should be assessed over the *full lifetime* of the investment, not just its initial inflow: a large FDI inflow can eventually generate a persistent stream of income outflows once the investment becomes profitable.

VN **GIẢI THÍCH TIẾNG VIỆT**

Đầu tư trực tiếp nước ngoài (FDI) là khi doanh nghiệp nước ngoài thiết lập hoạt động kinh doanh lâu dài (thường từ 10% cổ phần trở lên) tại một quốc gia khác — được ghi nhận trong tài khoản tài chính của BOP. Lợi ích: vốn, chuyển giao công nghệ/quản lý, tạo việc làm, ổn định hơn đầu tư gián tiếp ngắn hạn. Chi phí: lợi nhuận có thể được chuyển về nước ngoài (repatriation) thay vì tái đầu tư trong nước — xuất hiện dưới dạng **dòng thu nhập ra** trên tài khoản vãng lai, có thể làm xấu đi cán cân vãng lai theo thời gian dù dòng vốn FDI ban đầu là một khoản "bơm vào" tích cực.

4.8 Debt, debt relief, and migration

4.8.1 External debt and debt relief

Many developing economies borrow from foreign governments, multilateral institutions (e.g. the IMF, World Bank), or private international lenders to fund development. **Debt servicing** (interest plus principal repayments) can become a heavy, recurring drain on government budgets — particularly if debt is denominated in a foreign currency and the domestic currency later depreciates, mechanically raising the domestic-currency cost of the same foreign-currency debt.

The effect of depreciation on foreign-currency debt burden

A country owes $500m of debt, denominated in US dollars, when its exchange rate is 10 units of domestic currency per USD. The exchange rate then depreciates to 14 units of domestic currency per USD (with the dollar-denominated debt unchanged). Calculate the change in the domestic-currency value of the debt.

$$\text{Debt value (before)} = 500\text{m} \times 10 = 5{,}000\text{m domestic-currency units.}$$

$$\text{Debt value (after)} = 500\text{m} \times 14 = 7{,}000\text{m domestic-currency units.}$$

The domestic-currency value of the debt **rises by 2,000m (40%)** purely because of the currency depreciation, with no change at all in the dollar amount owed — a major reason many developing economies with foreign-currency-denominated debt are especially vulnerable to depreciation, since it directly raises their real debt-servicing burden (measured in domestic resources that must be given up to service the same foreign debt).

Debt relief (partial or full cancellation of debt, often for the poorest, most heavily-indebted countries, sometimes conditional on the funds freed up being redirected to health/education spending) can free up substantial government resources for development, but critics note it can also create a **moral hazard** (Unit 2) — a government or its future lenders may anticipate that debt could be forgiven again, weakening the incentive for careful fiscal management or for lenders to assess risk carefully.

VN **GIẢI THÍCH TIẾNG VIỆT**

Nợ nước ngoài định giá bằng ngoại tệ có rủi ro lớn: nếu đồng nội tệ mất giá, gánh nặng trả nợ tính theo nội tệ sẽ **tăng lên** dù số nợ ngoại tệ không đổi. **Xoá/giãn nợ** (debt relief) giúp giải phóng ngân sách cho phát triển (y tế, giáo dục), nhưng có thể tạo ra **rủi ro đạo đức** (moral hazard) — kỳ vọng được xoá nợ trong tương lai có thể làm giảm kỷ luật tài khoá.

4.8.2 Migration and remittances

International labour migration is a direct expression of **interdependence** and factor mobility (Unit 1) operating across borders. **Remittances** — money migrant workers send back to family in their home country — are recorded as a secondary income (current transfer) credit on the home country's current account, and for many developing economies represent a larger and more stable source of foreign-currency inflow than either FDI or foreign aid.

Migration: benefits and costs

For the **home** (sending) country: remittances raise household incomes and can fund education/small-business investment (a development benefit), but persistent emigration of the most skilled workers — a **"brain drain"** — can deprive the home country of exactly the human capital it needs for its own long-run development. For the **host** (receiving) country: migrant labour can fill genuine skill/labour shortages and support growth, but can also create political and social tensions and pressure on public services if migration is large relative to existing infrastructure capacity.

VN **GIẢI THÍCH TIẾNG VIỆT**

Kiều hối (remittances — tiền người lao động di cư gửi về nước) được ghi nhận là khoản chuyển giao thu nhập trên tài khoản vãng lai, và với nhiều nước đang phát triển đây là nguồn ngoại tệ ổn định hơn cả FDI hay viện trợ. Di cư mang lại lợi ích (thu nhập hộ gia đình tăng, đầu tư giáo dục) nhưng cũng có chi phí: **chảy máu chất xám** (brain drain) — mất đi lao động có kỹ năng cao

cần thiết cho phát triển trong nước.

4.9 Purchasing power parity and comparing living standards

Comparing GDP/GNI per capita across countries using market exchange rates can be misleading, because exchange rates fluctuate with capital flows and speculation, and because the same amount of foreign currency buys very different quantities of local, non-traded goods and services (haircuts, housing, restaurant meals) in different countries.

Purchasing power parity (PPP) adjusts GNI/GDP comparisons using the actual relative cost of a representative basket of goods in each country, rather than the market exchange rate — a "PPP dollar" is meant to buy a comparable amount of goods and services wherever it is spent. Because price levels for many non-traded goods/services are typically *lower* in developing economies than in high-income economies, PPP-adjusted GNI per capita for developing economies is usually **higher** than the same figure converted at market exchange rates — a market-exchange-rate comparison tends to **understate** the real material living standards of lower-income countries.

Market exchange rate vs. PPP comparison

Country M has a GNI per capita of 800,000 units of its local currency. At the market exchange rate (12,000 local-currency units per USD), this converts to $800{,}000/12{,}000 \approx \$66.7$ market-exchange-rate GNI per capita. Using PPP conversion (which finds that a representative local basket costs the equivalent of only 5,500 local-currency units per "PPP dollar", reflecting much lower local prices for many goods/services), calculate PPP-adjusted GNI per capita and compare.

$$\text{PPP-adjusted GNI per capita} = \frac{800{,}000}{5{,}500} \approx \$145.5.$$

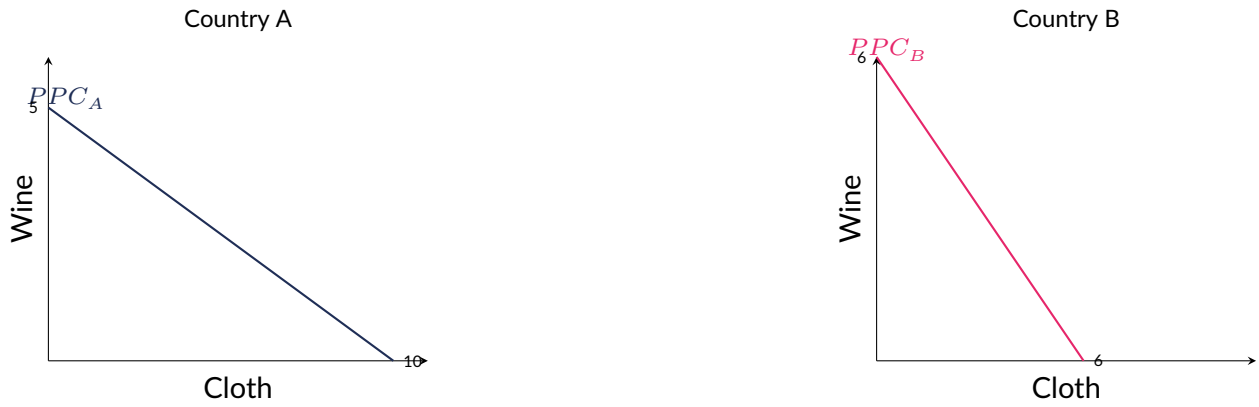
The PPP-adjusted figure ($145.5) is more than **double** the market-exchange-rate figure ($66.7) — the market exchange rate substantially understated Country M's real material living standard, because it does not account for the much lower cost of many locally-produced, non-traded goods and services in Country M. This is why cross-country development comparisons (e.g. World Bank, IMF statistics) typically report GNI/GDP per capita on *both* a market-exchange-rate basis and a PPP basis, and why relying on only the market-exchange-rate figure can distort international development comparisons.

VN **GIẢI THÍCH TIẾNG VIỆT**

So sánh GNI/GDP đầu người giữa các quốc gia bằng **tỷ giá thị trường** có thể gây hiểu lầm, vì tỷ giá biến động theo dòng vốn/đầu cơ và không phản ánh đúng sức mua thực tế đối với hàng hoá–dịch vụ **không thể xuất khẩu** (nhà ở, cắt tóc, ăn uống tại chỗ). **Ngang giá sức mua** (purchasing power parity — PPP) điều chỉnh theo chi phí thực tế của một giỏ hàng tiêu biểu ở mỗi nước. Vì mức giá nhiều hàng hoá–dịch vụ ở các nước thu nhập thấp thường **rẻ hơn**, GNI theo PPP của các nước đang phát triển thường **cao hơn đáng kể** so với khi quy đổi bằng tỷ giá thị trường thông thường.

4.10 Two-country comparative advantage: a combined PPC view

Sections 4.1's numeric comparative-advantage example can be visualised directly by comparing each country's PPC.



Straight-line PPCs for Country A (max 10 Cloth or 5 Wine — slope $= 0.5$ Wine/Cloth) and Country B (max 6 Cloth or 6 Wine — slope $= 1$ Wine/Cloth), matching Section 4.1's numeric example. A's flatter PPC (lower opportunity cost of Cloth) visually confirms its comparative advantage in Cloth; B's steeper-relative PPC confirms its comparative advantage in Wine.

Reading comparative advantage directly from PPC slopes

Using the two PPCs above, confirm each country's comparative advantage using only the *slope* of each PPC (without recomputing the opportunity-cost ratios from scratch).

The slope of a straight-line PPC (Wine on the vertical axis, Cloth on the horizontal axis) directly *is* the opportunity cost of Cloth in terms of Wine forgone. Country A's PPC has slope $5/10 = 0.5$; Country B's has slope $6/6 = 1$. Since $0.5 < 1$, **Country A's PPC is flatter**, confirming it has the **lower opportunity cost of Cloth** (comparative advantage in Cloth) — exactly matching the algebraic result from Section 4.1. This is a useful visual/exam shortcut: on any diagram-reading question, the country with the visually **flatter** PPC (with the traded good on the horizontal axis) has the comparative advantage in that good.

GIẢI THÍCH TIẾNG VIỆT

VN

Có thể đọc trực tiếp lợi thế so sánh từ **độ dốc** của PPC đường thẳng: độ dốc chính là chi phí cơ hội của hàng hoá trên trục hoành, tính theo hàng hoá trên trục tung. PPC càng **thoải** (độ dốc nhỏ hơn) đối với một hàng hoá thì quốc gia đó càng có lợi thế so sánh với hàng hoá đó — một mẹo đọc đồ thị nhanh khi làm bài thi có hình PPC của hai quốc gia.

Bài tập luyện tập

Country P's PPC (Rice vs. Fish) is a straight line with intercepts 40 Rice (0 Fish) or 20 Fish (0 Rice). Country Q's PPC has intercepts 15 Rice (0 Fish) or 15 Fish (0 Rice). Using PPC slopes, determine which country has comparative advantage in Rice.

(A) P (flatter slope for Rice)

(B) Q (flatter slope for Rice)

(C) Both have identical comparative advantage

(D) Cannot be determined from slopes alone

Lời giải chi tiết

With Fish on the vertical axis and Rice on the horizontal axis, slope (Fish per Rice) for P $= 20/40 = 0.5$; for Q $= 15/15 = 1$. P's PPC is flatter (lower opportunity cost of Rice in terms of Fish), so **P has comparative advantage in Rice. (A)**.

Bài tập luyện tập

Country R has GNI per capita of 2,400,000 units of local currency. The market exchange rate is 40,000 local-currency units per USD; the PPP conversion factor is 15,000 local-currency units per "PPP dollar". Calculate GNI per capita under both methods and explain the difference.

Lời giải chi tiết

Market exchange rate: $2{,}400{,}000/40{,}000 = \$60$ per capita. PPP-adjusted: $2{,}400{,}000/15{,}000 = \$160$ per capita. The PPP figure is nearly **2.7 times higher** than the market-exchange-rate figure, because the market exchange rate does not reflect the much lower cost of many non-traded goods and services within Country R — using only the market-exchange-rate figure would substantially **understate** Country R's real material living standard relative to countries where non-traded goods are relatively more expensive.

4.11 Informal PPP benchmarks and current account patterns

4.11.1 An informal PPP benchmark: the "Big Mac" approach

A well-known informal illustration of purchasing power parity compares the price of an identical, widely-available product (traditionally a Big Mac hamburger, since it is produced to a near-identical standard in many countries) converted into a common currency at the *market* exchange rate — a large gap from price equality suggests a currency may be significantly over- or under-valued relative to PPP.

An informal PPP under/over-valuation check

A Big Mac costs \$5.50 in the United States. In Country K, the identical product costs 33,000 units of local currency, and the market exchange rate is 7,500 local-currency units per USD. Estimate whether Country K's currency appears over- or under-valued relative to a simple PPP benchmark.

Converting Country K's Big Mac price to USD at the market exchange rate:

$$\frac{33{,}000}{7{,}500} = \$4.40.$$

Since \$4.40 $<$ \$5.50, the identical product is **cheaper** in Country K when converted at the market exchange rate — a simple PPP-style benchmark suggests Country K's currency is **under-valued** relative to the US dollar (by roughly $\frac{5.50-4.40}{5.50} \times 100\% \approx 20\%$). This kind of comparison is only a rough, informal indicator — it ignores differences in local input costs (rent, labour, taxes) that are not really about currency valuation at all — but it offers an intuitive, easily-communicated illustration of the PPP concept for a single, standardised product.

GIẢI THÍCH TIẾNG VIỆT VN

Một cách minh hoạ phi chính thức cho khái niệm PPP là so sánh giá của **cùng một sản phẩm tiêu chuẩn** (ví dụ bánh Big Mac) quy đổi sang một đồng tiền chung theo tỷ giá thị trường. Nếu sản phẩm đó **rẻ hơn đáng kể** ở một nước sau khi quy đổi, đồng tiền nước đó có thể đang bị **định giá thấp** so với PPP (và ngược lại). Đây chỉ là chỉ báo tham khảo đơn giản, không thay thế được phân tích PPP đầy đủ, nhưng giúp minh hoạ trực quan khái niệm ngang giá sức mua.

4.11.2 Additional terms-of-trade index calculations

Recall from the terms-of-trade (ToT) subsection earlier in this chapter that $ToT = \dfrac{\text{Index of average export prices}}{\text{Index of average import prices}} \times 100$, with $ToT > 100$ (relative to the base period) signalling an improvement and $ToT < 100$ signalling a worsening. The following example applies the same formula to a fresh set of index numbers.

A five-year terms-of-trade calculation

A country's export price index rises from 100 to 120 over five years, while its import price index rises from 100 to 110 over the same period. Calculate the terms of trade index in the final year and interpret the change.

$$ToT = \frac{120}{110} \times 100 \approx 109.09.$$

This is a rise from the base value of 100 to about 109.09 — a **favourable (improving)** movement in the terms of trade of approximately 9.1%: each unit of exports now buys, on average, about 9.1% more imports than in the base year.

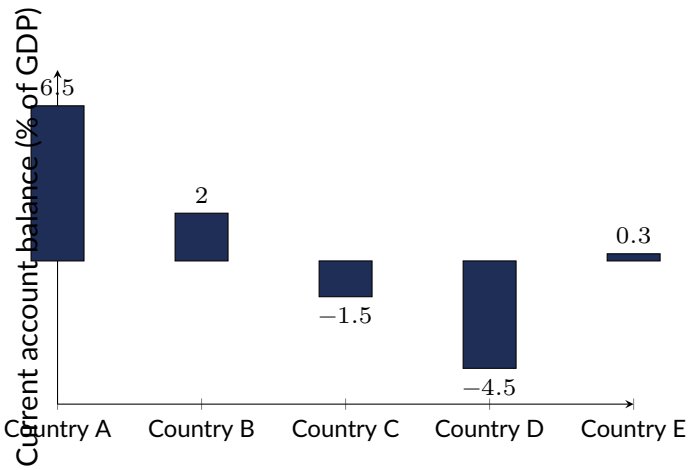
HL caveat: whether this terms-of-trade improvement actually raises total export *revenue* (in the country's own currency) depends on the **price elasticity of demand** for its exports. If foreign demand for its exports is relatively **elastic**, the higher relative export prices could reduce the volume of exports sold by enough that total export revenue actually falls, despite the "favourable" terms-of-trade movement — a reminder (as with the Marshall–Lerner condition earlier in this chapter) that a price ratio alone never tells the whole story; the quantity response to that price change matters just as much.

VN **GIẢI THÍCH TIẾNG VIỆT**

Nhắc lại công thức tỷ lệ thương mại (ToT) đã học ở phần trước: $ToT = \dfrac{\text{chỉ số giá xuất khẩu}}{\text{chỉ số giá nhập khẩu}} \times 100$. Ví dụ: chỉ số giá xuất khẩu tăng từ 100 lên 120, chỉ số giá nhập khẩu tăng từ 100 lên 110 $\Rightarrow ToT \approx 109.1$ — cải thiện khoảng 9.1%. Tuy nhiên (lưu ý HL), việc ToT cải thiện có thực sự làm tăng **doanh thu xuất khẩu** hay không còn phụ thuộc vào độ co giãn cầu theo giá của hàng xuất khẩu — nếu cầu nước ngoài co giãn nhiều, giá xuất khẩu tăng có thể làm giảm mạnh sản lượng bán ra, khiến tổng doanh thu xuất khẩu giảm dù ToT vẫn "cải thiện".

4.11.3 Comparing current account positions

Current account balances (as a % of GDP) vary widely and persistently across countries, reflecting deep structural differences in savings, investment, demographics, and export competitiveness.



Illustrative current account balances (% of GDP) across five economies: persistent surpluses (Countries A, B) typically reflect high national saving/strong export competitiveness; persistent deficits (Countries C, D) typically reflect high domestic consumption/investment relative to saving, often financed by capital inflows on the financial account.

Interpreting persistent current account positions

Country D has run a current account deficit averaging -4.5% of GDP for over a decade, consistently financed by foreign direct and portfolio investment inflows. Explain one risk this creates, and one reason it might *not* necessarily indicate a problem.

Risk: persistent reliance on foreign capital inflows to finance a current account deficit creates vulnerability to a sudden shift in global investor sentiment — if foreign investors become less willing to hold Country D's assets (e.g. due to rising global interest rates elsewhere, or concerns about Country D's economic outlook), the resulting slowdown or reversal of capital inflows could force a sharp currency depreciation and/or a disruptive contraction in domestic spending to close the external financing gap.
Why it might not be a problem: if the capital inflows are predominantly funding productive investment (e.g. FDI building new productive capacity, Section 4.7) rather than simply financing current consumption, the resulting future income/output growth could comfortably support continued debt service and gradually narrow the deficit over time — a deficit financed by productive investment is generally considered far more sustainable than one financed purely by borrowing to fund current consumption.

VN **GIẢI THÍCH TIẾNG VIỆT**

Cán cân vãng lai (tính theo % GDP) khác nhau đáng kể và mang tính cấu trúc giữa các quốc gia — phản ánh khác biệt sâu về tiết kiệm, đầu tư, nhân khẩu học, và năng lực cạnh tranh xuất khẩu. Thâm hụt vãng lai kéo dài được tài trợ bởi dòng vốn nước ngoài có thể tạo rủi ro nếu tâm lý nhà đầu tư toàn cầu thay đổi đột ngột, nhưng **không nhất thiết là vấn đề** nếu dòng vốn đó tài trợ cho **đầu tư sản xuất** (thay vì chỉ tài trợ tiêu dùng hiện tại) — vì đầu tư sản xuất tạo ra tăng trưởng thu nhập tương lai có thể bù đắp cho khoản nợ tích luỹ.

Bài tập luyện tập

A Big Mac costs $5.50 in the US. In Country L, the same product costs 220 units of local currency, and the market exchange rate is 30 local-currency units per USD. Estimate whether Country L's currency appears over- or under-valued.

(A) Over-valued (Big Mac costs more in USD terms)
(B) Under-valued (Big Mac costs less in USD terms)
(C) Exactly at PPP
(D) Cannot be determined

Lời giải chi tiết

Converted price: $220/30 \approx \$7.33$. Since \$7.33 $>$ \$5.50, the product is *more* expensive in Country L at the market exchange rate — Country L's currency appears **over-valued** relative to this simple PPP benchmark. **(A)**.

Bài tập luyện tập

Explain why a current account deficit financed mainly by short-term portfolio investment (easily withdrawn) is generally considered riskier than one financed mainly by foreign direct investment (FDI). (Short response.)

Lời giải chi tiết

Portfolio investment (e.g. holdings of shares/bonds) can typically be sold and the proceeds withdrawn from the country very quickly if investor sentiment shifts, so a deficit financed this way is vulnerable to a sudden, destabilising reversal of capital flows ("sudden stop"), which can force a sharp currency depreciation or a disruptive contraction in domestic demand. **FDI** (e.g. ownership of factories, long-term productive assets) is inherently far less liquid and much slower to reverse — a foreign firm cannot quickly sell and repatriate a physical factory the way it can sell shares — so FDI-financed deficits are considered a more stable, lower-risk source of external financing, even though both appear identically as inflows on the financial account.

4.12 Foreign aid and its role in development

Foreign aid is a transfer of resources (money, goods, technical expertise) from one country or institution to another, typically on concessional (below-market, or fully grant) terms, intended to support development.

Bilateral aid flows directly from one government to another. **Multilateral aid** flows through international institutions (e.g. the World Bank, regional development banks, United Nations agencies) that pool contributions from many donor countries. **Tied aid** requires the recipient to spend the aid on goods/services from the donor country (raising donor-country exports, but often reducing the aid's real value to the recipient, since it cannot necessarily be spent on the lowest-cost supplier). **Humanitarian aid** responds to acute crises (natural disasters, conflict, famine) with immediate relief. **Development aid** instead funds longer-term structural goals (infrastructure, education, healthcare systems, institution-building).

Evaluating aid effectiveness

Arguments *for* aid: it can fund development directly where domestic saving and tax capacity are limited, respond rapidly to humanitarian emergencies, and (multilateral aid especially) can come with technical expertise and coordination that a recipient government may lack. Arguments *against* (or qualifying) aid effectiveness: aid can be misallocated or lost to corruption if recipient-country institutions are weak; **tied aid** can benefit the donor's own exporters more than the recipient; large, sustained aid inflows can appreciate the recipient's currency (under-

mining its own export competitiveness — sometimes called "Dutch disease" when applied to any large resource/aid inflow); and aid dependency can weaken the recipient government's own incentive to build a sustainable domestic tax base and stronger institutions over time.

Comparing aid types for a specific development goal

A country wants to fund immediate flood relief after a major natural disaster *and*, separately, build a long-term national vocational-training system. Identify the most appropriate type of aid for each goal, and justify briefly.

For the **immediate flood relief**, **humanitarian aid** — likely delivered rapidly and flexibly, often bilaterally or through international relief agencies, focused on speed and immediate needs (food, shelter, medical care) rather than long-run structural change.
For the **long-term vocational-training system**, **development aid** — ideally structured with sustained, predictable, multi-year funding (multilateral development-bank support is common here, since these institutions specialise in long-run capacity-building and can provide technical expertise alongside the funding) rather than a one-off emergency disbursement, since building durable institutions and training infrastructure requires years of consistent investment rather than a rapid, short-term response.

VN **GIẢI THÍCH TIẾNG VIỆT**

Viện trợ nước ngoài: **song phương** (bilateral — chính phủ với chính phủ) và **đa phương** (multilateral — qua các tổ chức quốc tế như World Bank, Liên Hợp Quốc). **Viện trợ ràng buộc** (tied aid) yêu cầu nước nhận chi tiêu khoản viện trợ cho hàng hoá/dịch vụ từ nước tài trợ — thường làm giảm giá trị thực của viện trợ. **Viện trợ nhân đạo** (humanitarian) ứng phó khủng hoảng cấp bách; **viện trợ phát triển** (development aid) tài trợ mục tiêu dài hạn. Rủi ro của viện trợ: có thể bị thất thoát do thể chế yếu, viện trợ ràng buộc có lợi cho nước tài trợ hơn nước nhận, dòng viện trợ lớn kéo dài có thể làm đồng nội tệ lên giá quá mức (ảnh hưởng xấu đến năng lực cạnh tranh xuất khẩu — tương tự "căn bệnh Hà Lan"), và phụ thuộc viện trợ có thể làm suy yếu động lực xây dựng nguồn thu thuế nội địa bền vững.

Bài tập luyện tập

Classify each as bilateral, multilateral, tied, humanitarian, or development aid (a scenario may fit more than one category): (a) the World Bank funds a national electricity-grid expansion; (b) Country X requires Country Y to purchase Country X's construction equipment using the aid Country X provides; (c) Country Z sends emergency medical teams after an earthquake in a neighbouring country.

Lời giải chi tiết

(a) **Multilateral** (via the World Bank) and **development** aid (long-term infrastructure). (b) **Tied aid** (Country Y must spend the funds on Country X's own equipment) — and likely also **bilateral** (government to government). (c) **Bilateral** (country to country directly) and **humanitarian** aid (emergency disaster response).

Bài tập luyện tập

Explain, using the concept of **sustainability**, why heavy long-term reliance on foreign aid might be considered a less durable development strategy than building a strong domestic tax base, even if both currently fund similar levels of government spending. (Short response.)

Lời giải chi tiết

Foreign aid flows are determined by donor-country decisions (their own budgets, political priorities, and economic conditions) largely outside the recipient country's control, and can be reduced or withdrawn with little warning — making aid-funded government spending inherently less **sustainable**/predictable over the long run. A strong domestic tax base, by contrast, is generated from the recipient country's own economic activity and is therefore more directly within the government's own control and tied to its own long-run economic growth — a government that funds itself primarily through sustainable domestic taxation is better insulated from external decisions it cannot influence, and building that tax base (alongside the institutions needed to collect it effectively) is itself a core, durable development achievement rather than a temporary financing solution.

4.13 Comparing exchange rate systems

Sections 4.4–4.5 introduced floating and fixed exchange rates individually; a direct comparison clarifies the trade-offs a country faces in choosing between them.

Criterion	Floating rate	Fixed rate
Automatic adjustment	Adjusts automatically to trade/capital flow shocks (helps correct BOP disequilibrium without policy action)	No automatic adjustment; disequilibrium must be corrected by reserves, or by changing the peg (devaluation/revaluation)
Policy independence	Central bank retains full independent control of domestic monetary policy	Monetary policy is largely tied to defending the peg, sacrificing independent control
Certainty for trade/investment	Exchange-rate uncertainty can discourage trade and FDI planning	Provides exchange-rate certainty, supporting trade and investment planning
Vulnerability	Vulnerable to speculative volatility and sharp swings	Vulnerable to speculative attacks and costly reserve depletion if the peg is not credible
Inflation discipline	Weaker automatic discipline against domestic inflation	Pegging to a low-inflation currency can import that currency's price stability

Choosing an exchange rate regime

A small economy trades overwhelmingly with one large neighbouring country and has historically struggled with high, volatile inflation and weak central bank credibility. Using the comparison table, explain why fixing its exchange rate to the neighbouring country's currency might be an attractive (if imperfect) policy choice.

Because the vast majority of this economy's trade is with a single partner, exchange-rate **certainty** against that partner's currency directly supports the bulk of its trade and investment planning — floating would introduce volatility against the currency that matters most for its economy, with comparatively little offsetting benefit (since it does not trade heavily with many other currencies). Given its history of weak monetary credibility, fixing to a more credible, historically low-inflation neighbouring currency can **import** that country's inflation discipline — effectively "borrowing" credibility the domestic central bank has struggled to establish on its own — at the real cost of surrendering independent domestic monetary policy (interest rates must instead track whatever is needed to defend the peg) and requiring sufficient foreign reserves to defend it against shocks.

VN **GIẢI THÍCH TIẾNG VIỆT**

So sánh hệ thống tỷ giá: **thả nổi** tự động điều chỉnh theo cú sốc thương mại/vốn và giữ được chính sách tiền tệ độc lập, nhưng biến động mạnh gây bất ổn cho thương mại/đầu tư. **Cố định** mang lại sự chắc chắn về tỷ giá (tốt cho thương mại với đối tác neo giữ) và có thể "nhập khẩu" kỷ luật lạm phát từ đồng tiền neo, nhưng đánh đổi bằng việc mất chính sách tiền tệ độc lập và rủi ro bị tấn công đầu cơ/cạn dự trữ ngoại hối nếu neo giữ thiếu tin cậy. Lựa chọn hệ thống phù hợp phụ thuộc cấu trúc thương mại và mức độ tín nhiệm của ngân hàng trung ương trong nước.

Bài tập luyện tập

State whether each statement describes an advantage of a *floating* or a *fixed* exchange rate: (a) automatically helps correct a current account deficit without requiring reserves; (b) provides certainty for firms planning long-term export contracts; (c) preserves full central bank independence over domestic interest rates.

Lời giải chi tiết

(a) **Floating** — depreciation happens automatically in response to a deficit, without the central bank needing to spend reserves. (b) **Fixed** — the guaranteed rate removes exchange-rate risk from long-term contract planning. (c) **Floating** — a fixed rate requires monetary policy to prioritise defending the peg, constraining independent interest-rate decisions.

4.14 Practice problems

Bài tập luyện tập

Country A can produce (per worker) 8 units of Textiles or 4 units of Electronics; Country B can produce 3 units of Textiles or 3 units of Electronics. Which statement is correct?

(A) A has comparative advantage in Electronics

(B) A has comparative advantage in Textiles; B has comparative advantage in Electronics

(C) Neither country should trade, since A has absolute advantage in both

(D) B has comparative advantage in both goods

Lời giải chi tiết

A's OC of 1 Textile $= 4/8 = 0.5$ Electronics; B's OC of 1 Textile $= 3/3 = 1$ Electronics. A has the lower opportunity cost of Textiles $\Rightarrow$ A has comparative advantage in **Textiles**. A's OC of 1 Electronics $= 8/4 = 2$ Textiles; B's OC of 1 Electronics $= 1$ Textile. B has the lower opportunity cost of Electronics $\Rightarrow$ B has comparative advantage in **Electronics**. Even though A has an *absolute* advantage in both goods, comparative advantage still makes trade mutually beneficial. **(B)**.

Bài tập luyện tập

A domestic market has $D: P = 30 - Q$, $S: P = 6 + Q$, and world price $P_w = \$10$. Find the free-trade quantities of domestic production, consumption, and imports.

Lời giải chi tiết

At $P_w = 10$: $Q_d = 30 - 10 = 20$; $Q_s = 10 - 6 = 4$. **Imports** $= Q_d - Q_s = 20 - 4 = 16$ units.

Bài tập luyện tập

Using the market in the previous question, a \$4/unit tariff is imposed. Find the new domestic price, production, consumption, imports, and government tariff revenue.

(A) P=14; production 8; consumption 16; imports 8; revenue \$32

(B) P=14; production 8; consumption 16; imports 8; revenue \$64

(C) P=10; no change; revenue \$0

(D) P=14; production 4; consumption 20; imports 16; revenue \$64

Lời giải chi tiết

New domestic price $= P_w +$ tariff $= 10 + 4 = 14$. $Q_s = 14 - 6 = 8$. $Q_d = 30 - 14 = 16$. Imports $= 16 - 8 = 8$. Tariff revenue $= 4 \times 8 = \$32$. **(A)**.

Bài tập luyện tập

Explain *one* argument for, and *one* argument against, using tariffs to protect a genuine infant industry in a developing economy. (Short response.)

Lời giải chi tiết

For: temporary protection can shield a young domestic industry from established, larger foreign competitors while it builds the scale, experience, and technology needed to become internationally competitive — potentially allowing the country to diversify away from reliance on a narrow range of commodity exports (supporting long-run **sustainability** of its export base). **Against:** protected firms often lack the competitive pressure to actually become efficient, so the "temporary" protection can become permanent, leaving domestic consumers paying persistently higher prices while the protected industry never truly matures — a common critique of the infant-industry argument in practice, especially where governments face political pressure not to withdraw protection once granted.

Bài tập luyện tập

An import quota restricts imports to the same quantity a tariff would have achieved. Compared with the equivalent tariff, the quota:

(A) Raises the same government revenue as the tariff automatically

(B) Generates no government revenue unless import licences are auctioned; domestic price and quantity effects are otherwise similar

(C) Always results in a lower domestic price than a tariff

(D) Has no effect on domestic producers

Lời giải chi tiết

Both a tariff and an equivalent quota raise the domestic price and domestic quantity supplied by a similar amount and reduce imports to the same level. The key difference: a tariff raises government revenue automatically, whereas the quota's equivalent gain (the gap between

world price and domestic price on each imported unit) accrues to whoever holds the import licence unless the government specifically sells/auctions those licences. **(B)**.

Bài tập luyện tập

GBP/USD falls from 1.40 to 1.19. Calculate the percentage change and classify it, then state one likely effect on the UK's exports.

Lời giải chi tiết

$$\%\Delta e = \frac{1.19 - 1.40}{1.40} \times 100\% = -15\%.$$

This is a **depreciation** of 15% (a floating-rate fall). UK exports become roughly 15% cheaper in foreign-currency terms (all else equal), which — assuming the Marshall–Lerner condition holds (combined export/import demand elasticities exceed 1) — should raise the volume of exports sold and, over time, improve the UK's trade balance.

Bài tập luyện tập

A central bank must buy \$450m of its own currency each month (using foreign reserves) to defend a fixed exchange rate. It holds \$5.4bn in reserves. For how many months can this intervention continue, and what must eventually happen if underlying pressure does not change?

Lời giải chi tiết

$$\frac{5{,}400}{450} = 12 \text{ months}.$$

After roughly 12 months of reserves are exhausted, and — unless the underlying depreciation pressure eases on its own, or the central bank raises interest rates enough to attract offsetting capital inflows — the central bank will be forced to **devalue** the currency (officially lower the fixed rate) rather than continue defending an unsustainable peg.

Bài tập luyện tập

[HL ONLY] A country's exports to a trading partner have $PED = 0.3$; its imports from that partner have $PED = 0.5$. If the country's currency depreciates by 10%, predict the short-run effect on the trade balance and name the relevant condition.

(A) Improves, by the Marshall–Lerner condition

(B) Worsens initially (J-curve), by the Marshall–Lerner condition

(C) No effect, since PED values are below 1 individually

(D) Improves permanently with no initial dip

Lời giải chi tiết

$|PED_x| + |PED_m| = 0.3 + 0.5 = 0.8 < 1$ — the Marshall–Lerner condition is **not** satisfied, so a depreciation is predicted to worsen (not durably improve) the trade balance; any short-run pattern is likely to resemble the initial dip of a J-curve without the later recovery the condition would otherwise predict. **(B)**.

Bài tập luyện tập

[HL ONLY] A country's export price index rises from 100 to 118, while its import price index rises from 100 to 130. Calculate the terms of trade and interpret the result for this country's real purchasing power from trade.

Lời giải chi tiết

$$ToT = \frac{118}{130} \times 100 \approx 90.8.$$

Terms of trade have **worsened** (falling from 100 to about 90.8): even though the country's export prices rose in absolute terms, they rose *less* than import prices, so the same volume of exports now buys roughly 9% *fewer* imports than before — the country's real purchasing power from a given quantity of trade has fallen.

Bài tập luyện tập

Given Current account $= -\$40$bn and Financial/Capital account $= +\$36$bn, find the errors-and-omissions term needed for the BOP to balance.

(A) $+\$4$bn
(B) $-\$4$bn
(C) $+\$76$bn
(D) 0

Lời giải chi tiết

$-40 + 36 + x = 0 \implies x = \$4$bn. **(A)**.

Bài tập luyện tập

Explain, using the concepts of **efficiency** and **interdependence**, the difference between trade creation and trade diversion when a country joins a customs union. (Short response.)

Lời giải chi tiết

Trade creation occurs when membership shifts a country's imports from a less efficient domestic producer to a more efficient union partner — global resources are used more efficiently, raising **efficiency**, and it reflects genuine gains from deeper **interdependence** within the bloc. **Trade diversion** occurs when membership shifts imports from the world's genuinely most efficient (lowest-cost) producer to a *less* efficient union partner, purely because of the preferential tariff structure — this can still lower domestic prices relative to a purely national tariff regime, but it *reduces* global efficiency, since real resources are diverted to a higher-cost producer purely because of the artificial tariff advantage rather than genuine comparative advantage — a reminder that deeper interdependence *within* a bloc does not automatically raise *global* efficiency if it comes at the expense of trade with more efficient non-members.

Bài tập luyện tập

Match each stage of economic integration to its correct defining feature: (a) Customs union; (b) Common market; (c) Monetary union; (d) Free trade area. Features: (i) shared single currency; (ii) zero tariffs between members only, each keeps own external tariffs; (iii) common external tariff added to a free trade area; (iv) free movement of factors of production added to a customs union.

Lời giải chi tiết

(a) Customs union → (iii). (b) Common market → (iv). (c) Monetary union → (i). (d) Free trade area → (ii).

Bài tập luyện tập

Diagram-drawing prompt. Draw and fully label a domestic demand-and-supply diagram for an importable good, showing: the free-trade world price, free-trade domestic production and consumption, the volume of imports, and then the effect of a specific tariff (new domestic price, new production, new consumption, new (smaller) import volume, and the tariff-revenue rectangle).

Lời giải chi tiết

A correct diagram has quantity on the horizontal axis and price on the vertical axis, with an upward-sloping domestic S and downward-sloping domestic D, a horizontal world-price line P_w below the (unshown) autarky equilibrium (confirming the country is an importer), with Q_s (at P_w) marked where S meets P_w, and Q_d (at P_w) marked where D meets P_w — the gap between them is free-trade imports. A second, higher horizontal line at $P_w +$ tariff should show a new (smaller) domestic-supply quantity (further right on S), a new (smaller) domestic-demand quantity (further left on D), a narrower import gap between them, and a shaded rectangle between the two supply-side quantities, bounded vertically between P_w and $P_w +$ tariff, representing tariff revenue (tariff per unit $\times$ post-tariff import volume).

Bài tập luyện tập

Explain why ”GDP growth” and ”genuine economic development” can diverge, giving one specific real-world-style example. (Short response.)

Lời giải chi tiết

GDP growth measures only the *quantity* of output produced, while development is a broader concept encompassing **economic well-being**: health, education, environmental quality, and equity. For example, a country could see rapid GDP growth driven by expanding an extractive mining sector, while wages in that sector are captured mostly by a small group of owners/-foreign investors, local environmental damage harms public health, and government revenue from the sector is not reinvested in public education or healthcare — GDP rises sharply, yet HDI, income equality, and long-run **sustainability** may stagnate or even worsen, illustrating growth without meaningful development.

Bài tập luyện tập

A country relies on a single agricultural commodity for 70% of its export revenue. Using the concept of **interdependence**, explain one specific risk this creates, and one policy that could reduce it.

Lời giải chi tiết

Because the country’s export revenue and terms of trade are so heavily tied to a single commodity’s world price, a global price slump for that commodity (entirely outside the country’s control — a direct illustration of **interdependence** with world markets) would sharply reduce

national export earnings, worsen the terms of trade, and could trigger a current account crisis or a sharp currency depreciation. A policy to reduce this risk is **export diversification** — using targeted industrial policy, infrastructure investment, or FDI incentives to build up new export sectors (manufacturing, services, processed/value-added versions of the commodity itself) so that no single global price movement can dominate the country's export revenue and terms of trade.

Bài tập luyện tập

Two economies pursue different development strategies: Economy P liberalises trade and privatises state industries; Economy Q invests heavily in state-led infrastructure and public education while keeping some import protection. Using at least two named central concepts, evaluate the trade-offs each strategy involves. (Short response.)

Lời giải chi tiết

Economy P's market-based approach can raise **efficiency** by exposing firms to competitive pressure and attracting foreign investment/technology, but risks worsening **equity** in the short run if privatisation/liberalisation displaces workers faster than new opportunities emerge, and increases exposure to global market volatility (**interdependence**). Economy Q's interventionist approach directly builds human capital and infrastructure — a foundation for long-run **economic well-being** — and import protection may support strategic infant industries, but risks **efficiency** losses if protected firms remain uncompetitive, and requires sustained government spending capacity (an **opportunity cost** against other priorities). Neither strategy is unambiguously superior — the appropriate mix, and its pace, is ultimately a **normative** choice depending on a country's specific institutional strength, resource base, and social priorities.

Bài tập luyện tập

Paper 1-style extended response. "A small developing economy is deciding whether to join a proposed regional customs union with several larger, more industrialised neighbours." Using at least three named central concepts, evaluate this decision.

Lời giải chi tiết

A strong answer should address: (1) **Interdependence** — joining deepens economic ties with neighbours, offering access to larger markets and potential trade creation, but also greater exposure to economic shocks originating in partner economies; (2) **Efficiency** — the small economy could benefit from trade creation (importing more cheaply from efficient union partners) but risks trade diversion (and losing tariff revenue) if its previous cheapest trading partners are outside the bloc, and risks its infant industries being unable to compete directly with larger, more industrialised neighbours once internal tariffs disappear; (3) **Equity/economic well-being** — cheaper imports from the union could raise real incomes for consumers, but if domestic industries struggle to compete, job losses in those sectors could worsen inequality in the short-to-medium run, requiring a domestic response (e.g. retraining programmes) to manage the transition; (4) **Sustainability/change** — a full answer weighs whether the long-run structural transformation (specialising further according to comparative advantage within the bloc) leaves the economy more resilient and diversified, or more narrowly dependent on a few sectors; (5) a complete evaluation reaches a **normative conclusion** — e.g. recommending phased entry, transitional protections for key infant industries, or negotiated exceptions — rather than a simple "yes/no" without qualification.

Bài tập luyện tập

A domestic market has $D: P = 25 - Q$, $S: P = 3 + Q$, world price $P_w = \$9$. A quota of 6 units is imposed (fewer than the free-trade import level). Find the new equilibrium price and quantity, and identify who receives the resulting quota rent if licences are not auctioned.

Lời giải chi tiết

Free-trade check (at $P_w = 9$): $Q_d = 25 - 9 = 16$; $Q_s = 9 - 3 = 6$; imports $= 16 - 6 = 10$. Since the quota (6) is smaller than the free-trade import level (10), it is indeed **binding**.
With the quota, total quantity available at price P is domestic supply plus the fixed quota: $Q = (P - 3) + 6$. Setting this equal to demand $Q = 25 - P$:

$$25 - P = (P - 3) + 6 \implies 25 - P = P + 3 \implies 22 = 2P \implies P = \$11.$$

Total quantity $Q = 25 - 11 = 14$. Domestic production $= P - 3 = 11 - 3 = 8$. Imports = quota $= 6$ (check: $8 + 6 = 14$ ✓).
Quota rent $= (\text{new domestic price} - P_w) \times \text{quota} = (11 - 9) \times 6 = \$12$. Since licences are not auctioned, this \$12 accrues to whoever holds the import licences — *not* to the domestic government (which would instead have collected it as tariff revenue under an equivalent \$2/unit tariff).

Bài tập luyện tập

A multinational firm's FDI project generates \$80m/year in profit, of which 60% is repatriated abroad. Calculate the annual repatriated-profit outflow, and state which BOP account records it.

(A) \$48m; current account (primary income)
(B) \$32m; current account (primary income)
(C) \$48m; financial account
(D) \$80m; financial account

Lời giải chi tiết

Repatriated profit $= 0.60 \times \$80\text{m} = \$48\text{m}$/year. This is recorded as a **primary income outflow** on the **current account** (the initial investment itself was a financial-account inflow, but ongoing profit repatriation is a current-account income flow). **(A)**.

Bài tập luyện tập

A country's foreign-currency-denominated debt is \$2bn. Its exchange rate moves from 8 to 11 units of domestic currency per USD. Calculate the change in the domestic-currency value of the debt, in both absolute and percentage terms.

Lời giải chi tiết

Before: $2{,}000\text{m} \times 8 = 16{,}000\text{m}$ domestic-currency units. After: $2{,}000\text{m} \times 11 = 22{,}000\text{m}$ domestic-currency units.

$$\text{Change} = 22{,}000 - 16{,}000 = 6{,}000\text{m}, \qquad \%\Delta = \frac{6{,}000}{16{,}000} \times 100\% = 37.5\%.$$

The domestic-currency debt burden rises by 6,000m (37.5%) purely from the depreciation, with the dollar-denominated debt itself unchanged — illustrating why currency depreciation is especially costly for countries with large foreign-currency debt.

Bài tập luyện tập

Explain *one* potential benefit and *one* potential cost of debt relief for a heavily-indebted developing country, using the concept of **moral hazard** in your answer about the cost. (Short response.)

Lời giải chi tiết

Benefit: cancelling or reducing debt frees up government revenue previously devoted to debt-servicing, which can be redirected toward health, education, or infrastructure spending — directly supporting **economic well-being** and long-run development capacity. **Cost (moral hazard):** if a government (or future lenders assessing that government's creditworthiness) comes to expect that debt might be forgiven again in the future, this can weaken the incentive for careful fiscal management on the borrower's side, and weaken the incentive for careful risk assessment on the lender's side — potentially encouraging another cycle of excessive borrowing that eventually requires further relief.

Bài tập luyện tập

A developing country experiences significant emigration of its university-trained doctors and engineers to higher-income countries. State the technical term for this phenomenon, and explain *one* way it could offset the development benefits of the remittances these emigrants send home.

Lời giải chi tiết

This is **"brain drain"**. Even though remittances raise the income of the emigrants' families and provide valuable foreign-currency inflows for the country as a whole, the loss of highly-trained doctors and engineers directly reduces the **domestic stock of human capital** needed to provide healthcare, build infrastructure, and support other sectors of the home economy — the country may find itself short of exactly the skilled workers most needed for its own long-run development, even while benefiting financially from those same individuals' earnings abroad.

Bài tập luyện tập

A country's remittance inflows are \$3.2bn/year, compared to FDI inflows of \$1.1bn/year and foreign aid of \$0.6bn/year. Using this data, explain why remittances are often described as a particularly important and stable source of development finance for some countries. (Short response.)

Lời giải chi tiết

In this example, remittances (\$3.2bn) substantially exceed *both* FDI (\$1.1bn) and foreign aid (\$0.6bn) combined (\$1.7bn) — showing remittances can be the single largest source of foreign-currency inflow for some developing economies. Remittances also tend to be more **stable** than FDI or aid: FDI can be highly sensitive to global investor sentiment and can be withdrawn relatively quickly in a downturn, and aid budgets can be cut by donor-country political decisions largely outside the recipient country's control, whereas remittances are sent by millions of individual migrant workers supporting their own families — a much more diversified and behaviourally "sticky" (persistent even in hard times) source of foreign-currency income.

Bài tập luyện tập

Diagram-drawing prompt. Sketch a simple timeline diagram (horizontal time axis) showing an FDI project's net effect on a host country's balance of payments: a large one-off positive financial-account inflow at $t = 0$, followed by a smaller, recurring negative current-account flow (profit repatriation) in each subsequent year. Label both flows and their respective BOP accounts.

Lời giải chi tiết

A correct sketch has a horizontal time axis (years 0, 1, 2, 3, ...) with a single, large upward bar or arrow at $t = 0$ labelled "FDI inflow — financial account (+)", followed by a series of smaller, repeating downward bars or arrows at each subsequent year labelled "profit repatriation — current account, primary income ($-$)". The diagram should make clear that the financial-account benefit is a **one-off** event while the current-account cost **recurs every year** the investment remains profitable — reinforcing why a full assessment of FDI's balance-of-payments impact requires looking well beyond the initial year.

Bài tập luyện tập

Paper 1-style extended response. "A developing country is deciding whether to actively court more foreign direct investment in its mining sector, versus relying more heavily on foreign aid and debt-financed public investment." Using at least three named central concepts, evaluate this choice.

Lời giải chi tiết

A strong answer should address: (1) **Interdependence** — FDI ties the country's mining sector more closely to global commodity markets and multinational investment decisions, while aid/debt-financed investment ties the country's fiscal position to donor priorities or lender terms — both routes create a different kind of external dependence rather than eliminating it; (2) **Sustainability** — FDI in mining raises immediate questions about the sustainable extraction rate of a non-renewable resource (Unit 1) and about how much of the resulting profit is repatriated abroad versus reinvested domestically, while debt-financed public investment raises questions about the country's ability to service that debt over time, especially if its currency depreciates (Section 4.6); (4) **Efficiency/economic well-being** — FDI typically brings technology/management transfer and direct job creation with less immediate government financial risk, while debt-financed public investment gives the government more direct control over how funds are used (e.g. prioritising education/health infrastructure) but concentrates financial risk on the government's own balance sheet; (5) a complete evaluation reaches a **normative conclusion**, e.g. recommending a diversified strategy (welcoming FDI under stronger domestic content/reinvestment requirements, while using debt cautiously and only for high-return public investment) rather than relying exclusively on either source.

Bài tập luyện tập

A domestic market has $D: P = 32 - Q$, $S: P = 4 + Q$, world price $P_w = \$12$. Find free-trade domestic production, consumption, and imports; then find the effect of a \$3/unit tariff.

Lời giải chi tiết

Free trade (at $P_w = 12$): $Q_d = 32 - 12 = 20$; $Q_s = 12 - 4 = 8$. Imports $= 20 - 8 = 12$.
With \$3 tariff (domestic price $= 15$): $Q_d = 32 - 15 = 17$; $Q_s = 15 - 4 = 11$. Imports $= 17 - 11 = 6$. Tariff revenue $= 3 \times 6 = \$18$.

Bài tập luyện tập

Explain why a country running a persistent trade surplus is not automatically "winning" at trade, using the concept of **economic well-being**. (Short response.)

Lời giải chi tiết

A persistent trade (and current account) surplus means the country is exporting more than it imports — effectively consuming *less* of its own output domestically than it produces, with the difference lent out to (or invested in) the rest of the world. While this can reflect strong export competitiveness, it can also reflect suppressed domestic consumption (e.g. very high household saving rates, sometimes linked to weak social safety nets encouraging precautionary saving, or wage growth lagging productivity growth) — meaning residents may not be enjoying the full benefit of their own economy's output today. A large, persistent surplus is therefore not automatically a sign of superior **economic well-being**; it must be assessed alongside domestic living standards, not treated as a self-evidently "winning" outcome in trade.

Bài tập luyện tập

Diagram-drawing prompt. Draw a foreign exchange market diagram for the Japanese yen (JPY) against the US dollar, showing an initial equilibrium e_0. Show the effect of a rise in Japanese interest rates relative to US rates, clearly labelling the curve that shifts, the direction of the shift, and the new equilibrium e_1.

Lời giải chi tiết

A correct diagram has quantity of JPY on the horizontal axis and the price of JPY (in USD) on the vertical axis, with an upward-sloping S_{JPY} and initially downward-sloping D_0 intersecting at e_0. A rise in Japanese interest rates (relative to US rates) makes JPY-denominated assets more attractive to international investors, raising demand for JPY: the diagram should show D_0 shifting **right** to a new curve D_1, with a new equilibrium at a **higher** price of JPY, $e_1 > e_0$ — an **appreciation** of the yen, clearly labelled.

Bài tập luyện tập

[HL ONLY] Over one year, a country's nominal exchange rate against its trading partners is unchanged. Domestic inflation is 8%, while average trading-partner inflation is 20%. Calculate the change in the country's real exchange rate and state whether its price competitiveness improves or worsens.

Lời giải chi tiết

$$\frac{1.08}{1.20} = 0.90.$$

Domestic prices have risen by only 90% as much as foreign prices — domestic goods have become roughly **10% cheaper relative to foreign goods**. This is a **real depreciation** of about

10%, even though the nominal exchange rate never moved: the country's international price **competitiveness improves**.

Bài tập luyện tập

[HL ONLY] Over one year, a country's nominal exchange rate against its trading partners is unchanged. Domestic inflation is 25%, while average trading-partner inflation is 10%. Calculate the change in the country's real exchange rate and state whether its price competitiveness improves or worsens.

Lời giải chi tiết

$$\frac{1.25}{1.10} \approx 1.136.$$

Domestic prices have risen by about 13.6% more than foreign prices — this is a **real appreciation** of approximately 13.6%, even though the nominal exchange rate never moved: domestic goods have become more expensive relative to foreign goods, so the country's international price **competitiveness worsens**.

Bài tập luyện tập

[HL ONLY] Over one year, a country's nominal exchange rate is unchanged. Domestic inflation is 4%, and average trading-partner inflation is also 4%. What happens to the country's real exchange rate and competitiveness?

(A) Real appreciation; competitiveness worsens

(B) Real depreciation; competitiveness improves

(C) No change in the real exchange rate; competitiveness is unaffected

(D) Cannot be determined without knowing the nominal exchange rate's history

Lời giải chi tiết

$$\frac{1.04}{1.04} = 1.00.$$

Because domestic and foreign inflation are **identical**, there is no change in relative prices and therefore no change in the real exchange rate, despite both countries experiencing positive inflation. What matters for competitiveness is the *inflation differential* between countries, not the absolute inflation rate in either one alone. **(C)**.

Bài tập luyện tập

[HL ONLY] A country's export price index rises from 100 to 108, while its import price index falls from 100 to 96. Calculate the terms of trade index and interpret the change.

Lời giải chi tiết

$$ToT = \frac{108}{96} \times 100 = 112.5.$$

The terms of trade have **improved** from 100 to 112.5 — an improvement of about 12.5%: the same volume of exports now buys roughly 12.5% more imports than in the base year, since export prices rose while import prices actually fell.

Bài tập luyện tập

[HL ONLY] A country's export price index falls from 100 to 90, while its import price index rises from 100 to 108. What is the resulting terms of trade index?

(A) ≈ 83.3
(C) ≈ 108.0
(B) ≈ 90.0
(D) ≈ 120.0

Lời giải chi tiết

$$ToT = \frac{90}{108} \times 100 \approx 83.3.$$

The terms of trade have **worsened** substantially, from 100 to about 83.3 — export prices fell while import prices rose, so the country must now export significantly more just to afford the same quantity of imports. **(A)**.

Bài tập luyện tập

[HL ONLY] A country's export price index rises from 100 to 115, while its import price index is unchanged at 100. Calculate the terms of trade index and its percentage change. Then explain, using the concept of price elasticity of demand, why this terms-of-trade improvement will not necessarily raise the country's total export revenue.

Lời giải chi tiết

$$ToT = \frac{115}{100} \times 100 = 115,$$

a rise of 15% from the base value of 100 — a favourable terms-of-trade movement. However, total export revenue depends on price *and* quantity together. If foreign demand for this country's exports is relatively **elastic** ($PED > 1$), the 15% rise in export prices could cause the *volume* of exports sold to fall by proportionally more than 15%, so that price $\times$ quantity (total export revenue, in the country's own currency) actually **falls** despite the "favourable" terms-of-trade movement. Only if foreign demand is relatively **inelastic** would the price rise be expected to raise total export revenue alongside the improving terms of trade — a reminder that a terms-of-trade index is a price ratio only, and never automatically tells us what happens to the *value* of trade.

Bài tập luyện tập

Explain, using the concept of income elasticity of demand (YED), why the Prebisch–Singer hypothesis predicts that commodity-exporting countries may experience a long-run deterioration in their terms of trade relative to exporters of manufactured goods. (Short response.)

Lời giải chi tiết

Many primary commodities (basic foodstuffs, raw materials) have a relatively **low income elasticity of demand (YED)**: as world incomes rise, demand for these goods grows only slowly (consumers do not proportionally increase their consumption of, say, raw cotton or unprocessed grain as they get richer). Manufactured goods, by contrast, often have **higher YED** — demand grows more strongly as incomes rise. If global demand for commodities persistently grows more slowly than global demand (and hence prices) for manufactured goods, then — accord-

ing to the Prebisch–Singer hypothesis — the relative price of commodities may drift downward over time relative to manufactures, causing a long-run **deterioration** in the terms of trade of commodity-dependent exporters. This is presented as a hypothesis to be evaluated against the evidence for particular commodities and time periods, not as a universal law.

Bài tập luyện tập

Country V exports 95% unprocessed raw cotton; Country W imports that cotton and exports finished textiles and garments. According to the Prebisch–Singer hypothesis, which policy would most directly help Country V avoid a long-run terms-of-trade disadvantage?

(A) Increasing the volume of raw cotton exported each year

(B) Developing domestic textile and garment manufacturing capacity to export processed goods instead of raw cotton

(C) Fixing its nominal exchange rate to Country W's currency

(D) Reducing tariffs on imported manufactured goods

Lời giải chi tiết

The Prebisch–Singer hypothesis points to weak long-run relative price growth for raw, unprocessed commodities compared with manufactured/processed goods — and to the limited pricing power of many small commodity producers in competitive world markets. Simply exporting more raw cotton (A) leaves Country V exposed to exactly the same structural disadvantage, and may even worsen prices further if world commodity supply rises faster than demand. The policy implication most consistent with the hypothesis is **diversification up the value chain** — developing domestic processing/manufacturing capacity so Country V exports higher-value textiles and garments rather than only raw cotton. **(B)**.

Bài tập luyện tập

Country X can produce, per hour of labour, *either* 6 units of Corn *or* 3 units of Steel. Country Y can produce, per hour of labour, *either* 4 units of Corn *or* 8 units of Steel. Which country has comparative advantage in which good?

(A) X in Corn; Y in Steel

(B) X in Steel; Y in Corn

(C) X in both goods

(D) Y in both goods

Lời giải chi tiết

$$\text{X's OC of 1 Corn} = \tfrac{3}{6} = 0.5 \text{ Steel}, \qquad \text{Y's OC of 1 Corn} = \tfrac{8}{4} = 2 \text{ Steel}.$$
$$\text{X's OC of 1 Steel} = \tfrac{6}{3} = 2 \text{ Corn}, \qquad \text{Y's OC of 1 Steel} = \tfrac{4}{8} = 0.5 \text{ Corn}.$$

X has the lower opportunity cost of Corn ($0.5 < 2$) $\Rightarrow$ X has comparative advantage in **Corn**. Y has the lower opportunity cost of Steel ($0.5 < 2$) $\Rightarrow$ Y has comparative advantage in **Steel**. **(A)**.

Bài tập luyện tập

Using Country X (6 Corn or 3 Steel per hour) and Country Y (4 Corn or 8 Steel per hour) from the previous question, suppose each country has 8 labour-hours, initially split evenly (4/4) between the two goods. Calculate combined world output of Corn and Steel before trade,

and after each country fully specialises according to its comparative advantage.

Lời giải chi tiết

Pre-trade: X produces $4 \times 6 = 24$ Corn and $4 \times 3 = 12$ Steel; Y produces $4 \times 4 = 16$ Corn and $4 \times 8 = 32$ Steel. Combined world pre-trade output: Corn $= 24 + 16 = 40$; Steel $= 12 + 32 = 44$.
After full specialisation: X (comparative advantage in Corn) uses all 8 hours on Corn $= 8 \times 6 = 48$ Corn, 0 Steel. Y (comparative advantage in Steel) uses all 8 hours on Steel $= 8 \times 8 = 64$ Steel, 0 Corn. Combined world output after specialisation: Corn $= 48$; Steel $= 64$.
Gain from specialisation: Corn $48 - 40 = +8$; Steel $64 - 44 = +20$ — both goods' combined world output rises purely from specialising according to comparative advantage, before any trade even takes place.

Bài tập luyện tập

Using Country X and Country Y from the two previous questions, state the range of mutually beneficial terms of trade (Corn for Steel), and determine whether a proposed rate of 1 Corn $= 2.5$ Steel would be acceptable to both countries. Explain why or why not.

Lời giải chi tiết

Mutually beneficial rates lie strictly between the two countries' domestic opportunity costs of Corn: X's OC of Corn is 0.5 Steel; Y's OC of Corn is 2 Steel — so any rate strictly between 0.5 **and** 2 **units of Steel per unit of Corn** benefits both. A proposed rate of 1 Corn $= 2.5$ Steel lies **outside** this range (above the upper bound of 2): at this rate, Country Y would have to give up 2.5 units of Steel to obtain 1 unit of Corn through trade, when it could instead produce that same unit of Corn domestically by sacrificing only 2 units of Steel (its own opportunity cost). Country Y would therefore be **better off producing Corn itself** than trading at this rate, so Y would refuse the deal — this rate is **not** mutually beneficial, even though Country X would gladly accept it.

Bài tập luyện tập

The Australian dollar (AUD) appreciates from 0.65 USD to 0.72 USD. Calculate the percentage change, and state the likely effect on Australian export volumes, assuming the Marshall–Lerner condition holds.

Lời giải chi tiết

$$\%\Delta e = \frac{0.72 - 0.65}{0.65} \times 100\% \approx 10.8\%$$ appreciation of AUD.

Australian exports become roughly 10.8% more expensive in foreign-currency terms. Assuming the Marshall–Lerner condition holds (the combined price elasticities of demand for exports and imports exceed 1, so trade volumes respond meaningfully to the price change), the higher foreign-currency price of Australian exports is predicted to **reduce** the volume of exports sold, and — by the same logic as a depreciation improving the trade balance — an **appreciation** under these conditions is predicted to **worsen** Australia's trade balance.

Bài tập luyện tập

[HL ONLY] A currency depreciates by 12%. In the very short run (before quantities adjust), the combined price elasticities of demand for its exports and imports sum to just 0.6. Which best describes the likely short-run effect on the trade balance?

(A) Improves immediately, since any depreciation helps the trade balance

(B) Worsens initially, consistent with the first stage of a J-curve, since the Marshall–Lerner condition (elasticities summing to less than 1) is not satisfied

(C) Has no effect, since exchange-rate changes never affect the trade balance in the short run

(D) Improves permanently with no initial adjustment lag

Lời giải chi tiết

$|PED_x| + |PED_m| = 0.6 < 1$: the Marshall–Lerner condition is **not** satisfied. In the short run, contracts and buying habits are slow to adjust, so trade *volumes* barely respond to the price change while the *value* of imports (now costing more in domestic-currency terms) rises immediately — the trade balance is predicted to **worsen initially**, the classic first stage of a J-curve, with no guarantee of the later recovery a durable improvement would require unless elasticities rise substantially as more time passes. **(B)**.

Bài tập luyện tập

A multinational's FDI project generates \$120m/year in profit, of which 55% is repatriated abroad and the rest reinvested locally. Calculate the annual repatriated-profit outflow, state which BOP account/sub-account records it, and explain why the reinvested portion does *not* appear as a current account outflow.

Lời giải chi tiết

$$\text{Repatriated profit} = 0.55 \times \$120\text{m} = \$66\text{m/year}.$$

This \$66m/year is recorded as a **primary income outflow** on the host country's **current account**. The remaining $\$120\text{m} - \$66\text{m} = \$54\text{m/year}$ is **reinvested locally** — it stays within the host economy (e.g. funding further local capital spending by the firm) rather than being transferred abroad, so it generates *no* corresponding current-account outflow that year, even though it is still technically part of the profit the FDI project earned.

Bài tập luyện tập

A country receives remittance inflows of \$4.5bn/year, FDI inflows of \$2.0bn/year, and foreign aid of \$0.9bn/year. Calculate remittances as a percentage of the combined total of all three flows, and explain one reason remittances might be considered more stable than the other two.

Lời giải chi tiết

Combined total $= 4.5 + 2.0 + 0.9 = \$7.4$bn.

$$\text{Remittances share} = \frac{4.5}{7.4} \times 100\% \approx 60.8\%.$$

Remittances make up over 60% of these three combined inflows in this example. Remittances

tend to be more **stable** because they are sent by a large, diversified number of individual migrant workers supporting their own families — a decision driven mainly by personal/household ties rather than by shifting investor sentiment (which can cause FDI to slow sharply in a downturn) or by donor-country political/budget decisions (which can cause foreign aid to be cut with little warning).

Bài tập luyện tập

A country loses 15% of its university-educated workforce to emigration each decade, but its economy also receives substantial remittances from these emigrants in return. Using the concept of human capital, evaluate whether this pattern is likely to be a net benefit or a net cost for the home country's long-run development. (Extended response.)

Lời giải chi tiết

On one hand, remittances from these emigrants raise household incomes directly and can fund education, healthcare, or small-business investment for the families who remain — a genuine development benefit, and often a more stable source of foreign-currency income than FDI or aid. On the other hand, losing 15% of the university-educated workforce each decade is a direct and sustained loss of **human capital** — precisely the doctors, engineers, teachers, and other skilled professionals a country needs to build its own healthcare system, infrastructure, and educational institutions. If the skills lost are in sectors with severe domestic shortages (e.g. healthcare), the loss of service capacity and knock-on effects on public health and productivity could outweigh the financial benefit of remittances, even though the country's balance of payments looks stronger in the short run. A balanced evaluation would weigh the *scale* and *sector* of the skills lost against the *size and use* of the remittances received (e.g. whether remittances fund productive investment or only current consumption), and would also consider whether the country could adopt policies (e.g. incentives for skilled emigrants to return, or expanding domestic training capacity to more than replace those who leave) to capture more of the benefit while reducing the human-capital cost.

Bài tập luyện tập

Domestic inflation is 8% over a year, while trading-partner (foreign) inflation is 3%, with the nominal exchange rate unchanged. Approximate the % real appreciation/depreciation and state the effect on competitiveness.

Lời giải chi tiết

Relative price ratio $= \dfrac{1.08}{1.03} \approx 1.0485$ — a real appreciation of approximately **4.85%**. Domestic goods have become relatively more expensive than foreign goods even though the nominal exchange rate did not move, so international price **competitiveness worsens**.

Bài tập luyện tập

A country's export price index rises from 100 to 108, while its import price index *falls* from 100 to 95. Calculate the terms of trade index and classify the change.

Lời giải chi tiết

$ToT = \frac{108}{95} \times 100 \approx 113.68$ — an **improvement (favourable movement)** of about 13.7%: each unit of exports now buys, on average, roughly 13.7% more imports than in the base year.

Bài tập luyện tập

Country R can produce, per labour-hour, either 5 units of Textiles or 10 units of Machinery. Country S can produce, per labour-hour, either 8 units of Textiles or 8 units of Machinery. Determine which country has comparative advantage in which good.

Lời giải chi tiết

Country R's opportunity cost of 1 Textile $= 10/5 = 2$ Machinery; of 1 Machinery $= 5/10 = 0.5$ Textile. Country S's opportunity cost of 1 Textile $= 8/8 = 1$ Machinery; of 1 Machinery $= 8/8 = 1$ Textile. Comparing Textiles: R's cost (2 Machinery) $>$ S's cost (1 Machinery), so **S has comparative advantage in Textiles**. Comparing Machinery: R's cost (0.5 Textile) $<$ S's cost (1 Textile), so **R has comparative advantage in Machinery** — even though Country S has the *absolute* advantage in Textiles (8>5), comparative advantage depends only on the opportunity-cost comparison.

Bài tập luyện tập

Which of the following is the strongest argument for a developing country actively courting inward FDI in manufacturing?

(A) FDI guarantees equal income distribution

(B) FDI can bring capital, technology, and management expertise that raise domestic productivity and create jobs

(C) FDI eliminates the need for any domestic saving

(D) FDI always improves the current account balance

Lời giải chi tiết

FDI's core development benefit is transferring capital, technology, and managerial know-how while creating employment — it does not guarantee equal distribution, does not eliminate the value of domestic saving, and does not automatically improve the current account (profit repatriation by foreign investors is itself a debit item). **(B)**.

Bài tập luyện tập

A country's diaspora sends home remittances equal to 6% of GDP annually, exceeding both FDI inflows (3% of GDP) and foreign aid receipts (1% of GDP). Explain one reason remittances are often considered a more stable source of development finance than FDI. (Short response.)

Lời giải chi tiết

Remittances are driven by family/personal ties and tend to be sent fairly consistently — sometimes even **rising** during hard times at home to support struggling relatives (countercyclical) — whereas FDI is driven by profit expectations and investor sentiment, and can be withdrawn or reduced sharply during global downturns or if the investment climate deteriorates. This makes remittances a comparatively steadier source of foreign-currency inflow.

Bài tập luyện tập

A currency appreciates. Holding all else constant, this is most likely to:

(A) Make exports cheaper abroad and imports more expensive at home

(B) Make exports more expensive abroad and imports cheaper at home

(C) Have no effect on trade volumes

(D) Automatically improve the current account balance

Lời giải chi tiết

An appreciation raises the foreign-currency price of exports (making them less competitive abroad) and lowers the domestic-currency price of imports (making them cheaper at home). **(B)**.

Bài tập luyện tập

A government wants to guarantee that imports of a good never exceed a specific physical quantity, regardless of how much world prices might fall. Explain why a quota achieves this guarantee more reliably than an equivalent tariff. (Short response.)

Lời giải chi tiết

A tariff only raises the price of imports by a fixed amount; if world prices fall enough, imports could still rise well beyond the level the tariff was originally designed to limit, since a tariff does not cap quantity directly. A **quota** places a direct legal limit on the physical quantity of imports allowed, guaranteeing that import volume cannot exceed that quantity no matter how world prices move — though quotas do not automatically generate government revenue the way tariffs do, unless import licences are auctioned.

Bài tập luyện tập

Country Y's nominal GDP per capita is \$8,000, but its price level is only 60% of Country Z's (whose nominal GDP per capita is \$10,000, used as the reference). Using a simple PPP adjustment (dividing by the relative price level), estimate Country Y's PPP-adjusted GDP per capita, and compare it to Country Z's.

Lời giải chi tiết

PPP-adjusted GDP per capita of Y $= \dfrac{8{,}000}{0.6} \approx \$13{,}333$ — **higher** than Country Z's \$10,000 nominal figure. Because a dollar goes much further in Country Y's lower-price economy, real living standards (in PPP terms) may actually exceed what the raw nominal comparison suggests.

Bài tập luyện tập

Distinguish between a free trade area and a customs union, using one concrete difference in policy toward non-member countries. (Short response.)

Lời giải chi tiết

In a **free trade area**, members remove trade barriers between themselves but each member remains free to set its *own*, potentially different tariffs on imports from non-member countries. In a **customs union**, members additionally adopt a *common external tariff* applied uniformly to imports from all non-member countries — a deeper degree of integration than a free trade area.

Bài tập luyện tập

A small economy discovers a large offshore natural gas field, causing a surge in export revenue and a sharp appreciation of its currency. Explain one way this could harm its non-resource manufacturing and agricultural export sectors (a pattern sometimes called "Dutch disease"). (Short response.)

Lời giải chi tiết

The currency appreciation driven by the resource export boom makes the country's other exports (manufactured goods, agricultural produce) relatively more expensive in foreign markets and less price-competitive internationally, while making imports cheaper for domestic buyers to choose instead of domestically-made goods — manufacturing and agriculture can shrink even as overall, resource-driven GDP rises, a pattern commonly referred to as **"Dutch disease"**.

Ôn tập nhanh — Unit 4: (1) lợi thế so sánh (chi phí cơ hội thấp hơn), không phải lợi thế tuyệt đối, mới quyết định lợi ích thương mại; (2) thuế quan/hạn ngạch đều làm tăng giá nội địa, tăng sản xuất nội địa, giảm tiêu dùng, giảm nhập khẩu — khác nhau ở việc *ai* nhận phần chênh lệch giá (chính phủ vs người giữ giấy phép); (3) tỷ giá thả nổi do cung–cầu; tỷ giá cố định cần dự trữ ngoại hối để bảo vệ; (4) điều kiện Marshall–Lerner: $|PED_x| + |PED_m| > 1$ thì phá giá mới cải thiện cán cân thương mại (đường cong chữ J trong ngắn hạn); (5) $ToT = \dfrac{\text{giá xuất khẩu}}{\text{giá nhập khẩu}} \times 100$; (6) luôn phân biệt **tăng trưởng** (GDP) và **phát triển** (HDI, phúc lợi rộng hơn); (7) hội nhập kinh tế có 5 cấp độ tăng dần từ PTA đến liên minh tiền tệ.

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