

Ciências
ULisboa

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Principles of Economics and Management I

Session 1 · Economic Thinking and Scarcity

Introduction



About This Course

Principles of Economics and Management I

Master in Applied Mathematics for Economics and Management.

Course Instructor: Paulo Fagandini.

We are going to build economic **intuition** and **vocabulary**, useful for anyone heading into banking, insurance and investment. Also, we are going to present the core models of Economics.

This is a 6 ECTS course, with 168 total hours of work. We have 13 weeks (including the midterm), leading to 39 to 42 (if you count the final) hours in class room. This means you are expected to dedicate, along the semester, 126 hours of self study to this course.



Bibliography

Introductory, open access (CC BY):

1. OpenStax, [*Principles of Microeconomics*](#), 3rd ed. (Shapiro, MacDonald, Greenlaw).
2. OpenStax, [*Principles of Macroeconomics*](#), 3rd ed. (Greenlaw, Shapiro et al.).

Formal treatment, for going deeper:

3. Varian, *Intermediate Microeconomics with Calculus*, any edition.
4. Blanchard, Amighini and Giavazzi, *Macroeconomics: A European Perspective*, 3rd ed.

The syllabus maps **every session** to chapters in all four. Inside the decks, a 📖 note at the foot of a slide tells you exactly which section an example came from, and **links straight to it** in the free online book. 🚀



Assessment, Weights and Dates

Periodic assessment, two in-person written tests:

Test	Date	Content	Weight
Midterm	28/10/2026, 18:00, session 7	Block 1, Microeconomics	50%
Final	11/01/2027, 16:30	Block 2, Macroeconomics	50%

To pass: **at least 10** out of 20, the weighted average rounded to the nearest integer, so a 9.50 average already passes.

The **resit** is on **29/01/2027 at 13:00**, and it is open to everyone, including anyone who took the tests and did not pass. 



Rules in the Exam Room



Calculator: basic scientific only. Graphing calculators are not allowed.



Devices: earphones, a smartwatch, a smartphone or any electronic device during a test counts as **fraud**.

The full rules, the reading map and the calendar are (or will soon be) in the syllabus, on the course page. 



What the Course Covers

#	Block 1 · Microeconomics	#	Block 2 · Macroeconomics
1	Economic thinking and scarcity	8	GDP, measurement and growth
2	Consumer choice	9	Unemployment, inflation, labor
3	Demand and elasticity	10	Money, banking and inflation
4	Production, costs, market structures	11	Monetary policy
5	Market equilibrium and taxes	12	Fiscal policy
6	Uncertainty, risk and information	13	The open economy

Session **7 is the midterm**, so there is no session 7 deck. One theme per session, and every part of every session ends in exercises. 🧩



Today's Map

Scarcity forces choices. Everything today answers one of two questions about them.

Part 0 · What is economics? The subject, its two levels, and the difference between describing and prescribing.

Part 1 · How does one agent choose? Surplus, opportunity cost, sunk costs, and choosing at the margin.

Part 2 · How does a whole society choose? Specialization, the production possibilities frontier, and why its shape is the same opportunity cost, scaled up.

We follow a constructivist approach in each of the major modules. 🧱

Part 0 - What Is Economics?



Let Us Start With a Question

You only have **24 hours** in a day.

You want to study, sleep, work, see your friends, train.

Does it all fit?

No. You have to choose.

That feeling, of having to choose, is where economics starts. 



Scarcity

If you could have everything you wanted, there would be nothing to decide.

Scarcity: human wants for goods, services and resources exceed what is available.

Resources (labor, time, land, raw materials) exist in **limited** quantity. Wants, on the other hand, look **unlimited**.



The Scarcest Resource

Time is the purest example of scarcity.

Rich or poor, everyone has exactly **24 hours** a day.

Every hour spent studying is an hour not spent sleeping. Scarcity **forces a choice**, always.



The Definition

So we arrive at what economics really is:

Economics: the study of how people make decisions under scarcity.

Decisions by individuals, households, firms, society. It is about **choice**.



Two Levels of Analysis

Economics looks at the world at two scales:



Microeconomics: the decisions of individual agents. A household, a firm, a specific market.



Macroeconomics: the economy as a whole. Growth, unemployment, inflation, the aggregate.



Micro and Macro Side by Side

	Microeconomics	Macroeconomics
Looks at	Agents and markets	The whole economy
Examples	The price of bread, wages in a sector	GDP, inflation, unemployment
Typical question	How much does this firm produce?	Is the country growing this year?

In this course we start with **micro** (Block 1) and move up to **macro** (Block 2). 🧑🏫

📖 Source: OpenStax *Micro* 3e, §1.2 “Microeconomics and Macroeconomics”.



Positive or Normative?

Two ways of stating something in economics:



Positive: describes what **is**, and can be tested. “Raising VAT reduces sales.”



Normative: says what **ought** to be, and involves value judgments. “VAT should be cut.”

A good economist always keeps the two apart. Most of this course is positive.

Source: OpenStax *Micro* 3e, [§2.3](#) “Confronting Objections to the Economic Approach”, which sets positive against normative statements.



Two Questions Follow

Scarcity means every choice gives something up. So the subject reduces to two questions:

Who is choosing? One person, one firm, one investor, deciding one thing. That is **Part 1**, and it is micro.

And when it is everyone at once? A whole economy, allocating all its resources between competing uses. That is **Part 2**.

Part 2 is the same problem, with more people in it. 🙌

? Multiple Choice 1

Scarcity exists because:

- A. Governments manage resources badly.
- B. Wants exceed available resources.
- C. There is not enough money in the economy.
- D. There is too much specialization.

☒ **B.** Scarcity is wants exceeding resources. It would exist even in a society without money.

? Multiple Choice 2

Which of the following is a **positive** statement?

A. The government ought to subsidize public transport.

B. Inflation is too high.

C. Reducing unemployment matters more than reducing inflation.

D. A 10% rise in the price of tobacco reduces consumption by about 4%.

✓ **D.** Only D claims something about what **is**, and the claim can be checked against data. A and C carry an explicit “ought” and an explicit ranking. B looks factual but hides a value judgment in the word **too**: how high is too high is not something data can settle.

Discussion Question

A city council is deciding whether to close a downtown street to cars and make it a pedestrian zone.

- a)** Name the scarce resource at the heart of this decision.
- b)** Classify each statement as positive or normative: (i) “Pedestrianizing the street would cut retail deliveries by 12%”; (ii) “The council should put residents ahead of drivers”; (iii) “The scheme costs 4 million euros.”
- c)** Is this a micro or a macro question? One line of justification.



Solution

a) The **street itself**: a fixed quantity of space with competing uses (cars, pedestrians, deliveries, parking). Space is scarce in exactly the sense of this part, and no amount of money makes the street wider.

b) (i) **positive**, a testable claim about what would happen. (ii) **normative**: “should”, plus a ranking of whose interests count. (iii) **positive**, a number that can be checked against the accounts.

c) Micro. One agent, one decision, one small market for one piece of space. The macro version would ask about output or employment in the whole economy, not in one street.

Part 1 · How One Agent Chooses

How Much Would You Pay for a 10 Euro Note?

A **€10 note** is for sale. What is the most you would hand over for it? 🤔

€11? No. You would be down €1 the moment you paid. ❌

€9.99? Yes, and you would be **one cent** better off. ✅

Willingness to pay, or reservation price: the most you would pay, the point where buying and not buying feel the same. Here it is exactly **€10**.



Benefit, Cost and Surplus

Every choice has a **benefit** B , what it is worth to you, and a **cost** C , what you hand over.

$$S = B - C$$

Surplus: what the choice leaves you with once you have paid for it.

Buy the note at €9.99 and $S = 0.01$. Pay €11 and $S = -1$. Act only while $S > 0$.



Surplus Is the Measuring Rod

That exercise turned “is this worth doing?” into **a number**.

One option, one scalar. And two options can be compared, because scalars can.



Keep the object in mind. In **session 3** we compute this same number for every buyer in a market and add them up, and the sum becomes an **area** under the demand curve. Same quantity, aggregated. 



Now Two Options, and Only One Choice

Scarcity, again: taking one means giving up the other.

Option 1 leaves you $B_1 - C_1$. Option 2 leaves you $B_2 - C_2$.

Being **rational** means one thing here: take the option with the **larger surplus**.

So you take option 1 exactly when

$$B_1 - C_1 > B_2 - C_2$$

That Inequality Is the Opportunity Cost

Move C_1 across, and change nothing else:

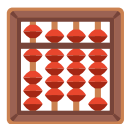
$$B_1 - C_1 > B_2 - C_2 \quad \Longleftrightarrow \quad B_1 > \underbrace{C_1 + (B_2 - C_2)}_{\text{opportunity cost of option 1}}$$

Read the right hand side. What option 1 truly costs is what you **pay** for it, **plus the surplus you gave up** by not taking the best alternative.

Opportunity cost: your own cost, plus the surplus of the best alternative you turned down.

So the whole rule is **benefit > opportunity cost**, and it holds for **exactly one** option: the best one.

 Source: OpenStax *Micro* 3e, §2.1, “The Concept of Opportunity Cost”. Mind the word: some texts keep it for the given-up surplus alone. Here it is the full **economic** cost, what you pay plus what you forgo.



Check It on Numbers

Your summer: a paid **internship**, or a **summer school** costing €1,200.

Option	Benefit	Cost	Surplus
Internship	2,000	0	2,000
Summer school	3,000	1,200	1,800

Internship: opportunity cost = $0 + 1800 = 1800$, and $2000 > 1800$. **Rational.** ✓

Summer school: opportunity cost = $1200 + 2000 = 3200$, and $3000 < 3200$. **Not rational.** ✗

Note the summer school has the **larger benefit** and still loses.

Everything Has an Opportunity Cost

There is no free lunch. 

An hour of studying is an hour you are neither working nor resting.

A thousand euros in a deposit account is a thousand euros not invested elsewhere. At 3% a year, keeping it there rather than in the alternative costs €30 a year, whether or not anyone sends you a bill. 

This is why **accounting** cost and **economic** cost differ. The accountant records what was paid; the economist adds what was forgone.

Beware of Sunk Costs

You have already spent €8 on a cinema ticket. Halfway through, you realize you hate the film.

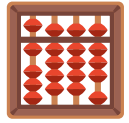
Stay or leave?

The €8 is **not coming back**, whatever you do.

Sunk cost: a cost already incurred and unrecoverable.

The rational decision: ignore the sunk cost, look only at the **future**. If you hate the film, leave. 

 Source: OpenStax *Micro* 3e, [§2.1](#), “Sunk Costs”. The book tells it as Selena, who pays 8 dollars for a film and knows after 30 minutes that it is terrible.



Sunk Costs, Formally

This is a property of the maximization.

At the interval the choice is over what happens **next**, and the €8 sits in every branch:

$$\max_{a \in \{\text{stay}, \text{leave}\}} [B(a) - C(a) - 8]$$

An additive constant does not move an argmax:

$$\arg \max_a [f(a) - k] = \arg \max_a f(a)$$

So the ticket price **cannot** change the decision. 

+ Marginal Thinking

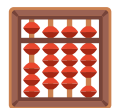
Big decisions are rarely “all or nothing”. They are “**a bit more or a bit less**”.

You do not decide “study or do not study”. You decide whether **one more hour** is worth it.

You compare the **marginal benefit** of that hour with its **marginal cost**.

The golden rule: keep doing something as long as the marginal benefit is **greater** than the marginal cost.

 Source: OpenStax *Micro* 3e, [§2.1](#), “Marginal Decision-Making and Diminishing Marginal Utility”, which is where the book explains why choices are made at the margin rather than all or nothing.



This Is a First Order Condition

Let $B(q)$ be the total benefit of doing q and $C(q)$ the total cost.
The problem is

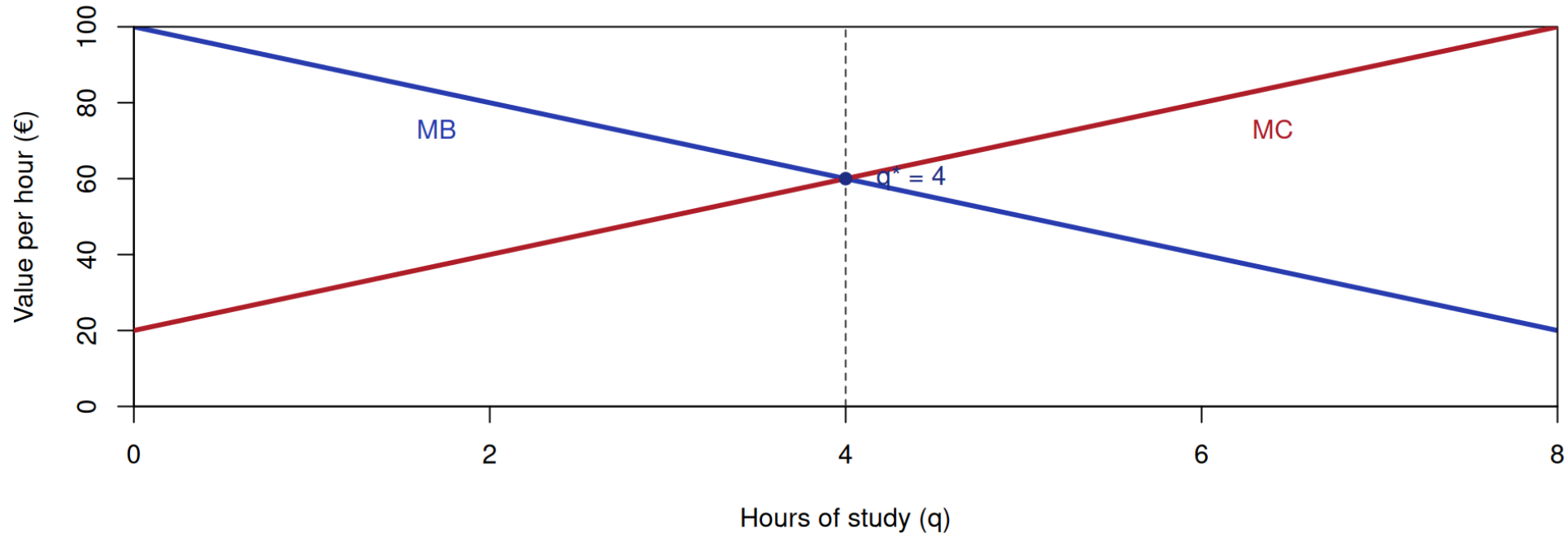
$$\max_q B(q) - C(q)$$

Differentiating and setting to zero: $B'(q) = C'(q)$.

That is, **MB = MC**. The “golden rule” of economics is the first order condition you already know.



The Optimum Is Where the Margins Cross



MB falls, MC rises, and they cross at $q^* = 4$ hours.

One Problem, Two Faces

Both halves of this part are the **same** problem, $\max_{x \in X} B(x) - C(x)$, read at two resolutions:

	Choice set X	Optimality condition
Which one?	$\{1, 2\}$, discrete	$B_1 - C_1 \geq B_2 - C_2$
How much?	an interval, continuous	$B'(q) = C'(q)$

The discrete condition compares **totals**, in euros. The continuous one compares **marginals**, in euros per hour. On an interval the rival to q is $q + \Delta q$: divide the surplus difference by Δq , then let $\Delta q \rightarrow 0$, and the comparison becomes $B'(q)$ against $C'(q)$.

Incentives Move the Margins

An **incentive** is anything that shifts MB or MC . Shift either curve and q^* moves, because q^* is defined by where they cross.

Fuel duty rises: the MC of driving shifts up, the crossing moves left. People drive less and buy more efficient cars. 🚗

A scholarship tied to grades raises the MB of study: the crossing moves right. 🎓

Predicting behavior is **comparative statics** on that crossing.

? Multiple Choice 3

You may take option 1 or option 2, never both, and option 1 is the rational choice. The **opportunity cost** of option 1 is:

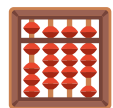
- A. The cost C_1 you actually pay for it.
 - B. The benefit B_2 of the option you turned down.
 - C. The surplus $B_2 - C_2$ you gave up.
 - D. $C_1 + (B_2 - C_2)$: what you pay, plus the surplus you gave up.
- ✓ **D.** Rationality is $B_1 - C_1 > B_2 - C_2$, which is $B_1 > C_1 + (B_2 - C_2)$. Option C is only the **implicit** half; the money you hand over is a cost too.

? Multiple Choice 4

The **sunk cost** of a decision:

- A. Should weigh heavily in the decision.
- B. Is irrelevant to the rational decision.
- C. Is the same thing as opportunity cost.
- D. Grows over time.

☒ **B.** It is no longer recoverable, so it enters every branch of the problem as the same constant, and constants do not move an argmax. Only benefits and costs still ahead of you count.



Numerical Question

Studying q hours brings a **total** benefit $B(q) = 90q - 7.5q^2$ and carries a **total** cost $C(q) = 30q + 7.5q^2$ (euros, q in hours).

- a) Derive the marginal benefit and the marginal cost.
- b) Find the optimal number of hours q^* .
- c) What net benefit does the student get at q^* ?



Solution

a) Differentiate the totals:

$$MB(q) = B'(q) = 90 - 15q, \quad MC(q) = C'(q) = 30 + 15q$$

b) Set $MB = MC$: $90 - 15q = 30 + 15q \Rightarrow 60 = 30q \Rightarrow q^* = 2$ hours, where $MB = MC = 60$ euros per hour.

c) $B(2) - C(2) = (180 - 30) - (60 + 30) = 150 - 90 = 60$ euros. It really is a maximum:
 $B'' - C'' = -15 - 15 < 0$. 

Part 2 · How a Society Chooses

Nobody Produces What They Consume

Part 1 gave one agent a rule. Now put many of them in the same economy.

Imagine having to grow your own wheat, build your own house and repair your own phone. Impossible.

Nobody lives like that. Why not? **Adam Smith's** answer (1776): the **division of labor**. 



The Pin Factory

Smith observed a pin factory. Making a pin involves about **18 distinct tasks**.

One worker alone: maybe **20 pins** a day.

Ten workers, each specialized in one task: **48,000 pins** a day. 🤖

That is **4,800** per worker, against 20. How?

📖 Source: OpenStax *Micro* 3e, [§1.1](#), “The Division of and Specialization of Labor”. Smith’s own account is in *The Wealth of Nations* (1776), Book I, ch. 1.



Why Specialization Produces More

Smith gave three reasons:

1.  **Advantage:** each person focuses on what they do best.
2.  **Practice:** repeating a task makes it faster and better.
3.  **Economies of scale:** producing at scale lowers the average cost of each unit.

 Source: OpenStax *Micro* 3e, [§1.1](#), “Why the Division of Labor Increases Production”, where the three reasons are set out one by one.



Specialization Requires Exchange

If I specialize in just one thing, how do I get everything else?

I trade. I use what I earn from my work to buy what others have produced.

Specialization and the **market** always come together. You cannot build a phone, but you can buy one. 📱

Smith's own limit: **the division of labor is limited by the extent of the market.** A specialist needs enough buyers to be worth being a specialist. 📏

📖 Source: OpenStax *Micro* 3e, [§1.1](#), "Trade and Markets". The limit itself is Smith's own, and it is the title of *The Wealth of Nations* (1776), Book I, ch. 3.

But Who Specializes in What?

Smith says specialization raises output. He does not say **who should do which job**.

Suppose two people can each do both jobs. How do we assign them?

The answer is Part 1, applied to production. Putting someone on a job costs the output they would have produced elsewhere: an **opportunity cost**.

So the rule is: give a job to whoever gives up **least** to do it. 

Two Producers, Two Opportunity Costs

Ana and Bruno each work a full day, on **bread** 🍞 or **software** 💻:

Worker	Bread only	Software only	Opportunity cost of 1 software
Ana	12	6	2 bread
Bruno	6	4	1.5 bread

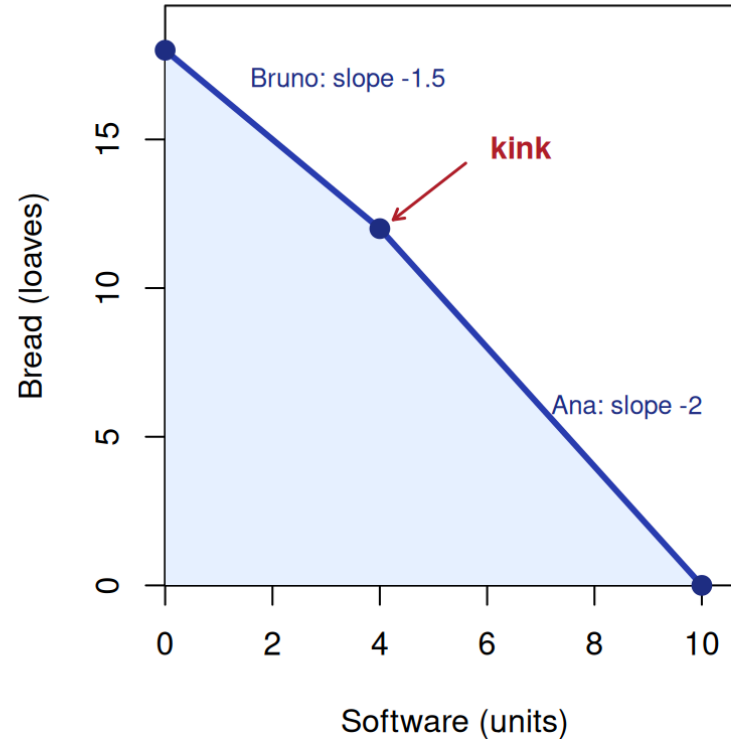
Ana is better at **both** jobs: 12 against 6, and 6 against 4. She has the **absolute advantage** everywhere.

And yet **Bruno** should write the software, because he gives up only 1.5 loaves for each unit while Ana gives up 2. Lower opportunity cost, so he goes first.

Comparative advantage: producing something at a lower opportunity cost than someone else.



Pool Them: the Frontier Bends



Both on bread: **18** loaves. Both on software: **10** units. In between, Bruno switches first.



Reading the Kink

Efficiency has an **order**: put the cheapest producer on the job first.

Up to **4** units of software, Bruno does it, and each costs **1.5** loaves. That is the flat stretch.

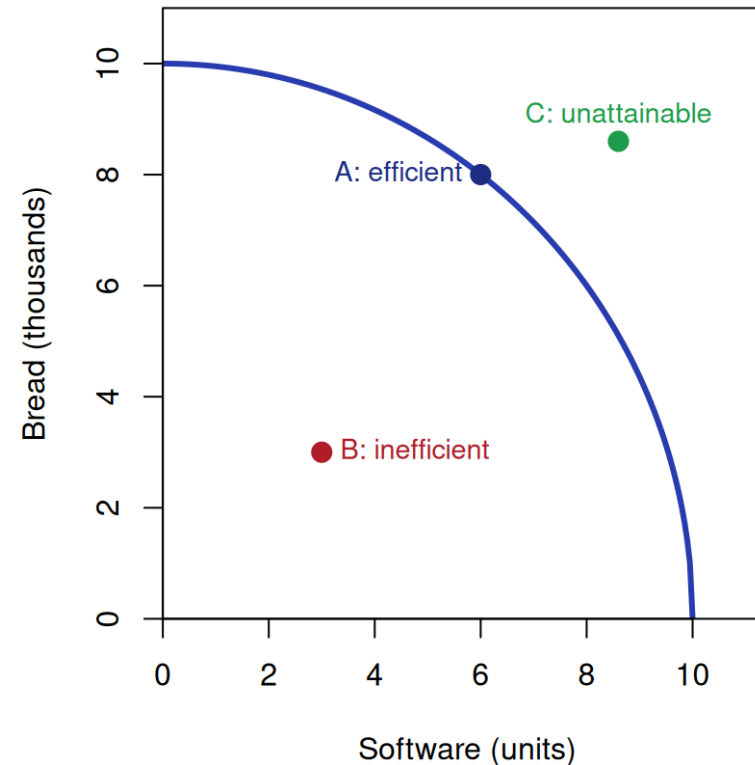
Past 4, Bruno is fully occupied and only Ana is left. Each further unit now costs **2** loaves. The line gets steeper.

So the frontier bends **because the cheap capacity runs out first.** 



Many Producers: a Smooth Frontier

Two producers gave one kink. A hundred give ninety-nine, and the corners vanish.





Reading the Frontier

Production possibilities frontier (PPF): what an economy can produce with all its resources fully and efficiently used.

- **On the curve (A):** all resources are used. This is **efficient**.
- **Inside the curve (B):** waste, idle resources. This is **inefficient**.
- **Outside the curve (C):** desirable, but **unattainable** with today's resources and technology.

Keep the two words apart: inside is a **waste**, outside is a **limit**.

 Source: OpenStax *Micro* 3e, [§2.2](#) "The Production Possibilities Frontier and Social Choices", which draws the same frontier for a society choosing between healthcare and education.



The Slope Has a Name

Write the frontier as $y = f(x)$, with x units of software and y of bread. Its slope is the economy's exchange rate between the two:

$$MRT(x) = - \frac{dy}{dx}$$

Marginal rate of transformation: how much y the economy must give up to get one more unit of x .

Which is to say: the **opportunity cost** of software, measured in bread, for a whole economy. On the kinked frontier the MRT was 1.5, then 2.



Concavity Is Increasing Opportunity Cost

On the kinked frontier the MRT jumped once. On a smooth one it rises continuously, and that is exactly what concavity means:

$$\frac{d MRT}{dx} > 0 \quad \Longleftrightarrow \quad \frac{d^2 y}{dx^2} < 0 \quad \Longleftrightarrow \quad f \text{ concave}$$

The economics is the kink argument with more producers: resources are not equally suited to the two uses, and the best suited are moved first. Each further unit costs more than the last.

A **straight** frontier would say every resource is equally good at both jobs, so the order of switching would not matter.

 Source: OpenStax *Micro* 3e, §2.2, where the curvature is tied to the law of diminishing returns.



Growth Means Pushing the Frontier Out

How do we get to point C, unattainable today?

With **more resources** (more workers, more machines) or **better technology**.

Economic growth **shifts the frontier outward**. That is the subject of Block 2. 🌱



Countries Are Producers Too

Ana and Bruno were two workers. Replace them with two **countries** and not one step of the argument changes.

The country with the lower opportunity cost in a good has the **comparative advantage** in it, and should produce it. Ana was better at everything in absolute terms, and Bruno still wrote the software. 🌐

That is the basis of international trade. And what a country gains by doing it can be read straight off the frontier we just drew. 👉

scarcity → **opportunity cost** → **comparative advantage** → **specialization** → **exchange**.





A Second Way Past the Frontier

Growth moved the frontier itself, and it needed new machines or new technology.

The harder question: with **today's** resources and **today's** technology, can a country consume a bundle its own frontier puts out of reach?

Yes, if it can **trade**. 🤝

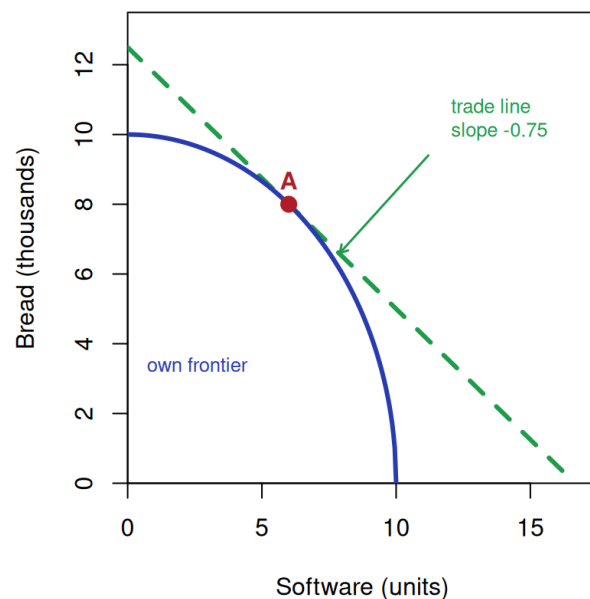
The frontier limits what a country can **produce**. What it **consumes** is a separate question the moment there is somebody on the other side of a trade.

 Source: OpenStax *Micro* 3e, §19.2, “Production Possibilities and Comparative Advantage”, which draws this line for US and Mexican shoes and refrigerators.



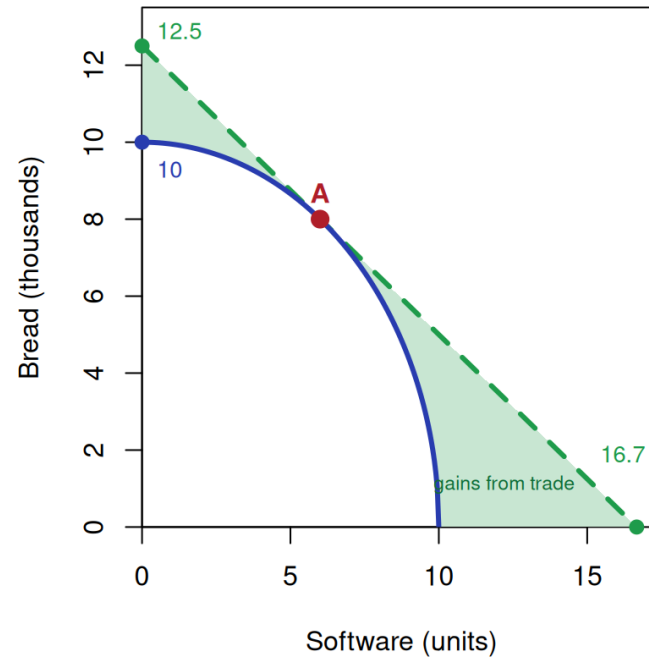
Trade Along the Price Line

Back to point A: the economy makes **6** units of software and **8** thousand loaves. Suppose the world market swaps **3 thousand loaves for every 4 units of software**, a price this small economy takes as given.



Each unit sold brings 0.75 back, the first and the last alike, so the bundles A opens up lie on a **straight** line through it.

▲ The Consumption Set



Sell all 6 units of software and you hold **12.5** thousand loaves, where producing bread yourself stops at 10. The other corner: 16.7 units of software against 10.

Production never left the frontier. It is **consumption** that moved out to the line, and the shaded region between the two is the **gains from trade**.



Why a Country Cannot Lose

No country is forced to trade at the price it faces.

Point A sits **on** the line, at zero trade (**autarky**). Whatever the price, the bundle the economy produced is still available to it. ✓

And the frontier is **concave**, so the tangent line lies weakly above it everywhere: no bundle that was attainable before the price existed becomes unattainable now.

Why produce at A? Where the frontier is flatter than the price line, a unit of software costs the economy less bread than the market pays for it, so it should make more. That stops exactly where MRT equals the price ratio, which is where the line is tangent. 🎯

Producing at A while consuming elsewhere on the line is **specialization and exchange**, drawn. Where the price comes from, and how two countries split these gains, is **session 13**.



? Multiple Choice 5

A point **inside** the Production Possibilities Frontier represents:

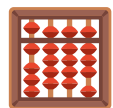
- A. An efficient combination.
 - B. An unattainable combination.
 - C. A combination with wasted resources.
 - D. Economic growth.
- ☒ **C.** Inside the frontier there are idle resources: inefficient production.

? Multiple Choice 6

Ana produces more of **both** goods per day than Bruno. It follows that:

- A. Ana should produce both goods, and Bruno neither.
- B. There is nothing to gain from letting Bruno produce anything.
- C. Ana has the comparative advantage in both goods.
- D. Who produces what still depends on the opportunity costs, which these figures alone do not give.

✓ **D.** Absolute advantage compares **output levels**; comparative advantage compares **what each gives up**. Ana was better at both and still handed the software to Bruno, because he sacrificed less bread for it. C is impossible: the two opportunity costs are reciprocals, so nobody can be lower in both.



Numerical Question

An economy's frontier is

$$y = 100 - \frac{1}{4}x^2, \quad 0 \leq x \leq 20$$

with x units of software and y tonnes of bread.

- a) How much bread at $x = 0$? And at $x = 8$?
- b) Obtain the marginal rate of transformation $MRT(x)$.
- c) Roughly what does the 8th unit of software cost? And the 16th?
- d) Is the frontier concave? Say what that means in economic terms.



Solution

a) $y(0) = 100$ tonnes. $y(8) = 100 - 64/4 = 84$ tonnes.

b) $MRT(x) = -dy/dx = x/2$.

c) $MRT(8) = 4$ tonnes, $MRT(16) = 8$ tonnes. The 16th unit costs **twice** as much bread as the 8th. 

d) $y'' = -1/2 < 0$, so yes, and equivalently $MRT' = 1/2 > 0$. Economically: resources are not equally suited to both uses, so the ones moved into software first are those least productive in bread, and every further unit costs more than the last. 

Wrap-Up

What to Take From This Session

 **Scarcity** means resources are limited and wants are not, so every choice gives something up.

 **Surplus** $B - C$ turns “is this worth doing?” into one number, and that is what makes options comparable.

 **Opportunity cost** is what you pay plus the surplus you forgo, so the rule is benefit above opportunity cost.

✚ Choices are **marginal**: $MB = MC$ is the first order condition of $\max B(q) - C(q)$, and sunk costs drop out because constants do not move an argmax.

 The **PPF** is that logic for a whole economy. Its slope is the **MRT**, and it is concave because the best suited resources are used first.

 Differences in opportunity cost are **comparative advantage**, which is why we specialize and exchange. Session 13 turns it into trade.

Next Session

Consumer Choice.

Today we compared surplus across a handful of options. Next we do it properly:

1. 😊 **Preferences:** how we describe what you like.
2. 💶 **The budget constraint:** what you can afford, and a slope that is again an opportunity cost.
3. 🎯 **Constrained maximization:** the best affordable bundle, and the **demand** it produces.

See you next week. 🙌