

International Economics

Week 1

The affordability puzzle, and the Ricardian answer

First, a guess

Write down two numbers.

- How many hours of work would an average Hungarian earner have needed, in 2007, to buy a new smartphone?
- And how many hours in 2026?

Student input · 5 minutes

The same car, measured two ways

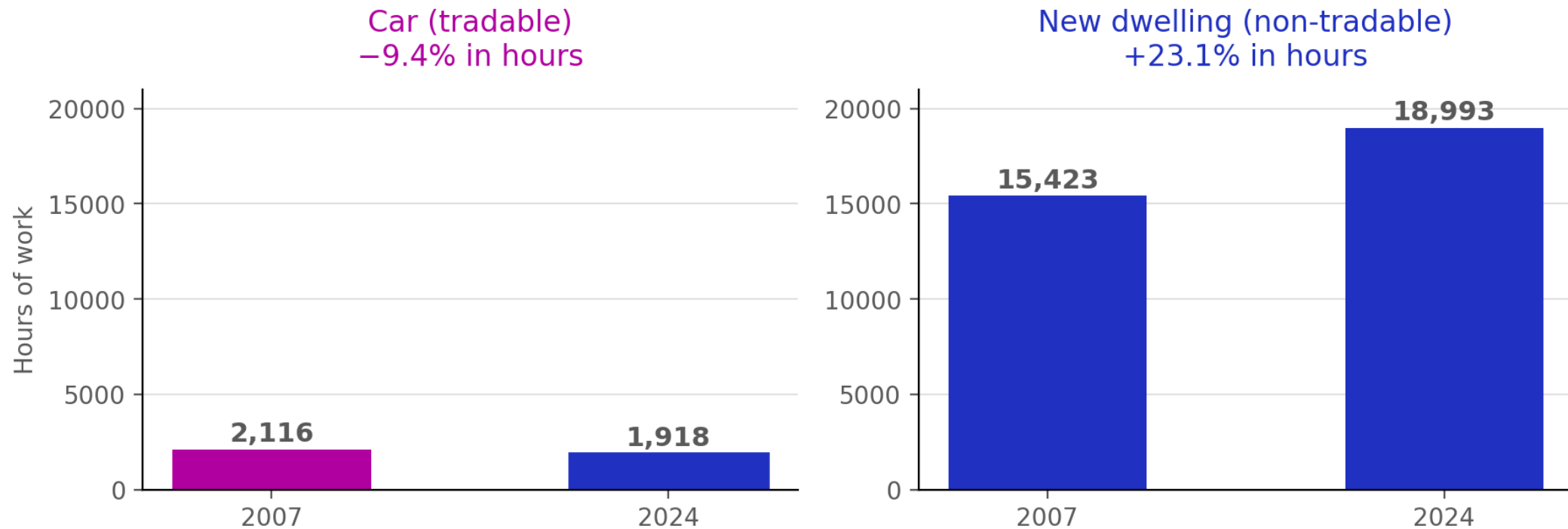
	2007	2024	Change
Car price, list (HUF)	2,250,000	7,130,000	×3.17
Gross monthly wage (HUF)	185,017	646,800	×3.50
Car in hours of work	2,116	1,918	-9.4%

The price in forints rose ×3.17. The wage rose faster, ×3.50. So the car became cheaper measured in working time.

Sources: KSH STADAT 2.1.1 (wages); Magyar Suzuki press release, 4 Feb 2005 via totalcar.hu (car).

Now a good that cannot be imported

Price measured in hours of work, 2007-2024



Both prices rose. In hours of work they moved in opposite directions.

Price in hours of work

The price of a good divided by the hourly wage — how much of a working life the good costs.

- Independent of currency and of inflation.
- Money price and wage can both rise — what matters is which rose faster.
- The measure we return to in Week 4 and again in Week 9.

Where does the gain come from?

1

Better technology

The good is produced with fewer inputs than before.

2

Division of labour

Production is reorganised; people and firms specialise.

3

Trade

The good, or its inputs, come from wherever they are cheapest to make.

This course is mostly about the third — but the first two return in Week 4.

● Theories based on labour requirements

Two countries · two goods · one factor

The unit labour requirement

a_L = the number of working hours needed to produce one unit of a good.

Assumptions of the model

- Two countries, two goods
- Labour is the only factor of production
- The two countries differ in the technology they use

Absolute advantage — a clean case

A country has an absolute advantage in a good if it produces one unit with fewer labour hours — a lower a_L .

	Wine	Oranges
Hungary	4	4
Ecuador	5	2

Hungary is better at wine.
Ecuador is better at oranges.

Each country has the absolute advantage in one good. Smith's rule gives a clean answer: Hungary specialises in wine, Ecuador in oranges, and both trade.

This is the textbook case — and it is not the case we actually have.

Switch the wine numbers

	Wine	Oranges
Hungary	5	4
Ecuador	4	2

Ecuador needs fewer hours for BOTH goods.

This is the real data. Ecuador now dominates both columns — Smith's rule gives no guidance, because it needs one country to be better at something.

So what decides who produces what?

C-1

Exercise C-1

Wine and oranges — the exact numbers on the last slide

Exercise sheet, Week 1 · parts (a) to (f)

Opportunity cost

How much of one good must be sacrificed to produce one more unit of the other.

A fact about PRODUCTION

What the economy physically gives up when it moves resources from one good to the other.

Written a_{LW}/a_{LO} — How many fewer oranges are produced if we make one extra wine

Relative price — a fact about EXCHANGE

The rate at which one good actually trades for another in a market. Week 2.

Written $(P_W/P_O)_d$ — the domestic relative price. It equals the opportunity cost exactly, because at home a good can only be obtained by producing it.

The two coincide only in a closed economy. Once trade opens they differ — and that gap is where the gains come from.

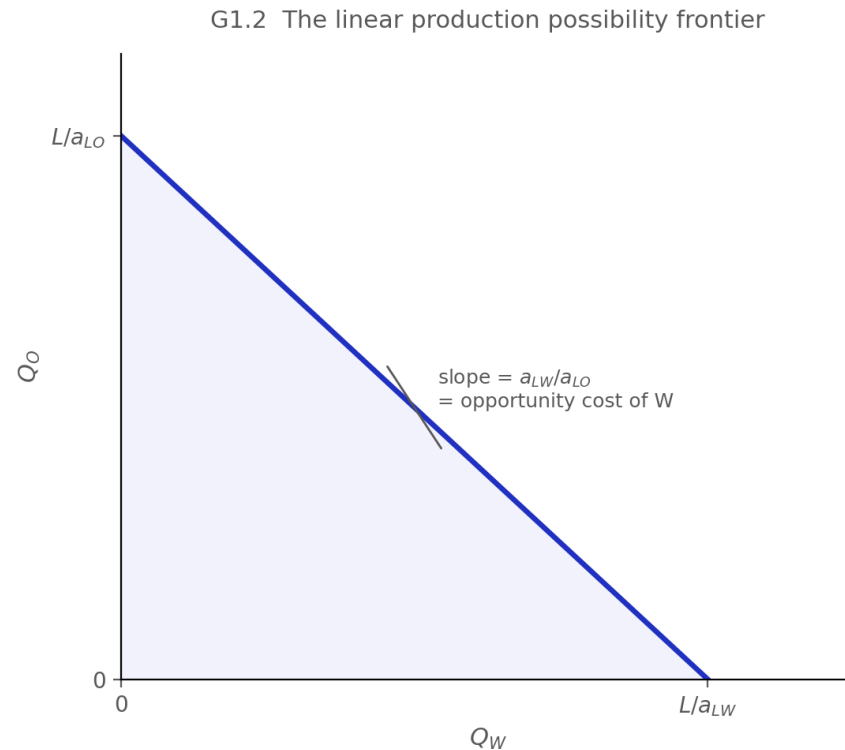
Comparative advantage

A country has a comparative advantage in a good if it produces that good at a lower opportunity cost than the other country — whether or not it also holds the absolute advantage.

Opportunity cost of...	Hungary	Ecuador
wine, in oranges	1.25	2.0
oranges, in wine	0.8	0.5

- Hungary — comparative advantage in wine
- Ecuador — comparative advantage in oranges
- Every country has one, and never in the same good (unless opportunity costs are identical)

The production possibility frontier



The combinations an economy can produce with all resources employed.

- Intercepts: total labour divided by the unit labour requirement
- Slope = the opportunity cost
- Straight line, because with one factor the opportunity cost never changes

The frontier is opportunity cost, drawn.

Does specialising actually raise output?

The rule says both countries gain. Here is the check — same total labour, before and after.

	Half-labour benchmark	Full specialisation	Change
World wine	400	400	0
World oranges	650	800	+150

Nothing was given up. The same labour now makes strictly more.

Wine happens to be unchanged here — a feature of these numbers, not a general law. Full working: exercise C-1(g).

Week 1 in five lines

- A good's price in hours of work can fall even while its money price rises.
- Three mechanisms could cause that: technology, division of labour, trade.
- Absolute advantage explains some trade — but not all of it.
- Comparative advantage explains all of it. Every country has one.
- Opportunity cost is about production; relative price is about exchange.

Everything above is in the explanation expansion, §1. Next week: how the gains are split.

International Economics

Week 2

Splitting the gains, and country size

Negotiate a price

In pairs: one of you is Hungary, one is Ecuador.

- Wine costs Hungary 1.25 oranges at home; it costs Ecuador 2.00 oranges at home.
- Agree on ONE price to trade wine for oranges — somewhere between those two numbers.
- Write down your price and one sentence on why you picked it.

No calculation needed yet — just negotiate. We will check what your price actually implies later in the class.

Student input · 5 minutes

Where could that price land?

G2.1 The mutually beneficial relative price range
(world price of wine, in oranges)



- Below 1.25: Hungary would rather make its own orange. No deal.
- Above 2.00: Ecuador would rather make its own wine. No deal.
- Anywhere in between: both countries prefer trading to autarky.

Two different relative prices

Domestic $(P_w/P_o)_d$

Equals the opportunity cost. Fixed by technology alone — Week 1.

International $(P_w/P_o)_i$

The terms of trade. Whatever price a country actually faces once trade opens.

The gap between the two, when it exists, is where the gains from trade live.

Production surplus

For a given world price, the extra quantity a country gets by trading instead of producing that good itself.

Hungary trades 1 wine (5 hours) for $(P_w/P_o)_i$ oranges.

Those same 5 hours, making oranges directly, yield $5/4 = 1.25$ oranges.

$$\text{Surplus per unit of wine} = (P_w/P_o)_i - 1.25$$

C-2

Exercise C-2

Splitting the surplus — who gets how much, at two different prices

Exercise sheet, Week 2 · parts (a) to (g)

What just happened at 1.8?

In C-2, Hungary's surplus: 75 $\rightarrow$ 165 oranges (price 1.5 $\rightarrow$ 1.8). Ecuador's, converted to the same good: 112.5 $\rightarrow$ 54 oranges

Short-term incentive

Push the price toward the partner's own cost. Capture more of the surplus, right now.

Long-term benefit

A partner left near-indifferent is a partner who may walk away next time.

At 1.8, Ecuador is left with almost nothing. Would you still call that a good deal for Hungary?

Terms of trade

The name for $(P_w/P_o)_i$ — the price a country actually faces trading with the world.

Terms of trade improving = $(P_w/P_o)_i$ moves in the country's favour = a larger share of the surplus.

This single idea threads through Week 4 (biased growth), Week 8 (tariff incidence), and Weeks 9–10 (trade as leverage).

Where does the world price actually settle?

Build the world relative supply of wine, step by step.

Below 1.25

Nobody makes wine — RS = 0

At 1.25

Hungary indifferent — RS runs 0 to 0.5

1.25 to 2.00

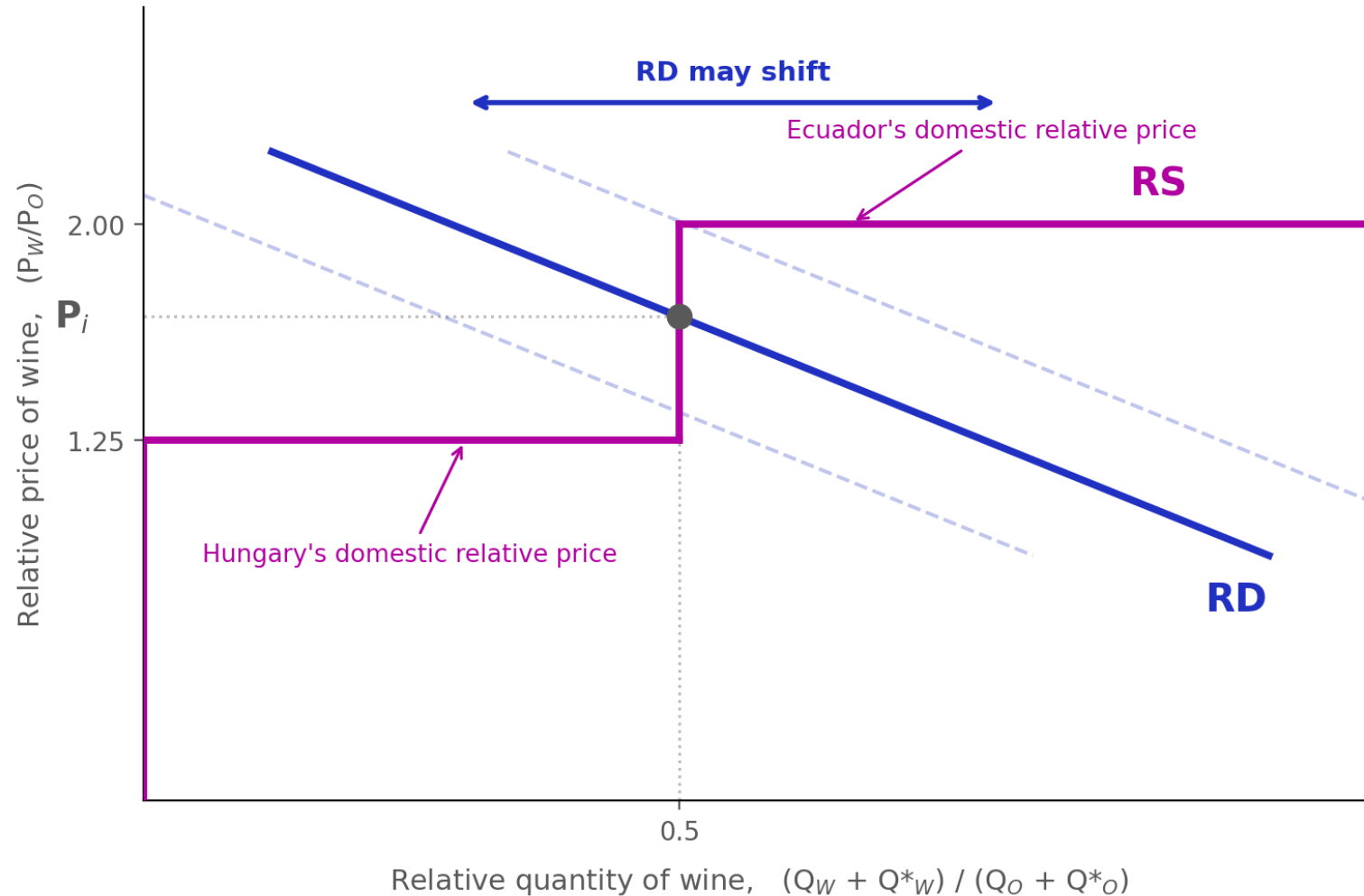
Both fully specialised — RS fixed at $400/800 = 0.5$

At 2.00

Ecuador indifferent — RS rises above 0.5

World relative supply meets world relative demand

G2.2 World relative supply and demand for wine
two countries, both large



What moves the step

The flat middle of RS sits at:

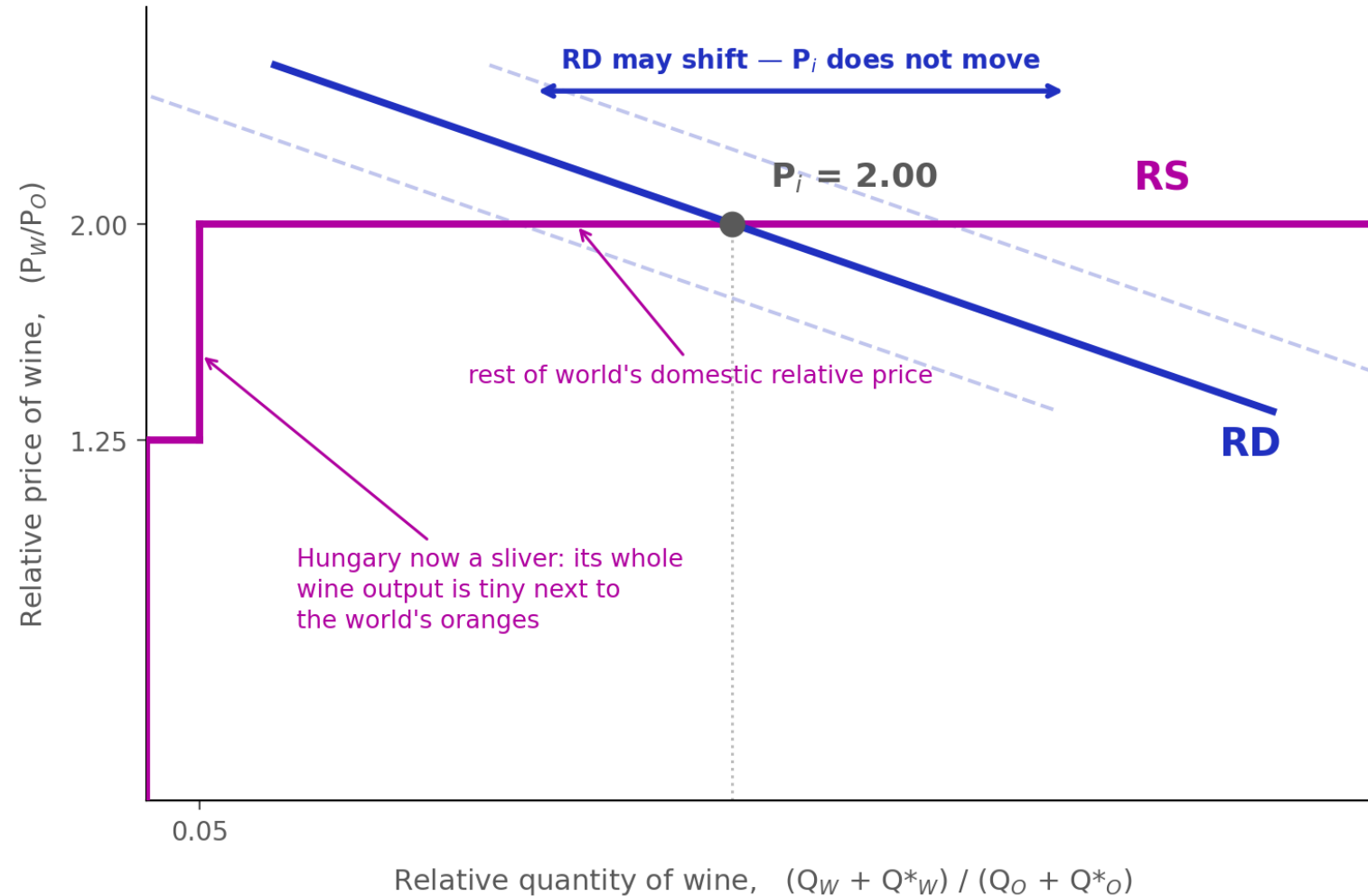
Hungary's max wine $\div$ partner's max oranges

Make the partner bigger, and the step slides toward the origin — without Hungary changing at all.

What happens to RD once the step is too small to reach?

Hungary trades with the world

G2.3 Hungary trades with the rest of the world
Hungary small, partner large



A horizontal arm is not empty space

It is the incomplete-specialisation case. The large side still makes both goods, is indifferent — and that is exactly why the price sits at ITS domestic price.

Hungary, small, sells wine at $(P_w/P_o)_i = 2.00$ rather than its own 1.25.

Almost the entire gain from trade goes to the small country.

Being large sets the price — it does not automatically mean gaining more. Weeks 8–10 make the opposite-sounding case: hold that thought.

Week 2 in five lines

- Both countries gain only where the price lies strictly between their two domestic prices.
- The gain at any such price is the production surplus — positive for both, zero at each boundary.
- Where the price actually settles decides the SPLIT — short-term extraction risks the relationship.
- That price is the terms of trade — distinct from the domestic relative price of Week 1.
- A large enough partner pushes the price to ITS own cost — and the small country keeps nearly the whole gain.

Everything above is in the explanation expansion, §2. Next week: the concave frontier.

International Economics

Week 3

The concave frontier, and choosing a point on it

Allocate before you're told the rule

In pairs. Four plots of land can each grow grapes or make cheese.

Plot	Grapes	Cheese
1	100	30
2	100	90
3	100	180
4	100	260

- The world will pay 1.5 units of cheese for 1 unit of grapes.
- Decide, plot by plot: grapes or cheese?
- Write your four decisions down — no formula yet, just judgement.

Student input • 5 minutes

Why the straight frontier was a special case

- Weeks 1–2: one factor, constant unit labour requirement. Every hour of labour was as good as every other hour.
- Real resources are not like that. A vineyard is good for wine, poor for oranges — or the reverse.
- The moment resources differ, one Week 1–2 prediction breaks: countries stop specialising completely.

Heterogeneous parcels — plots of land, teams of workers — each able to produce either good, but each with its own opportunity cost.

Four parcels, wine and oranges

Parcel	Wine	Oranges	Opp. cost of wine
A	100	50	0.5
B	100	100	1.0
C	100	200	2.0
D	100	300	3.0

Opportunity cost = oranges given up per unit of wine = oranges $\div$ wine.

A is the cheap source of wine. D is the expensive one.

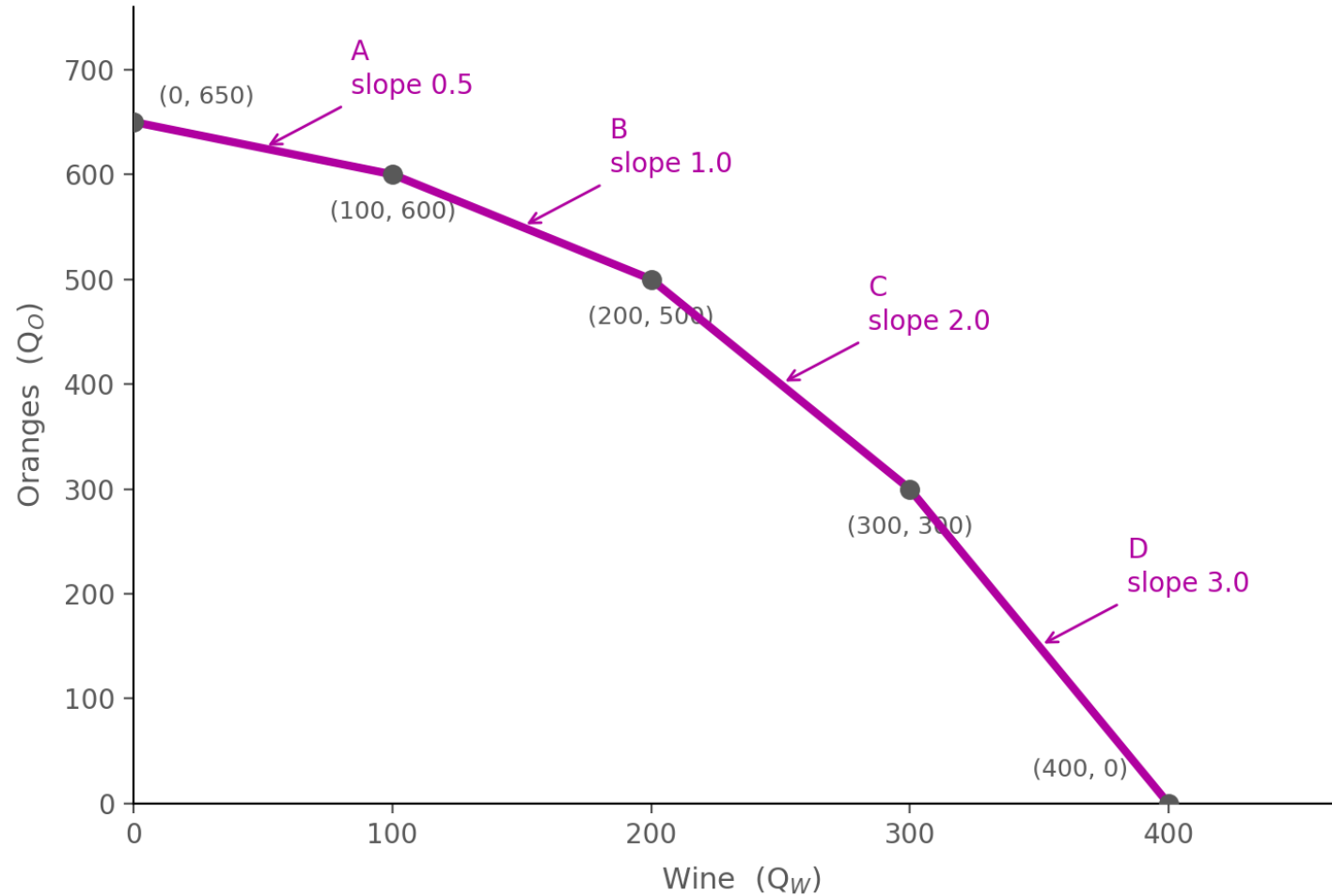
Switch the cheapest source first

Switch	Wine	Oranges	Slope
—	0	650	—
A	100	600	0.5
B	200	500	1.0
C	300	300	2.0
D	400	0	3.0

Any other order would give up more oranges for the same wine.

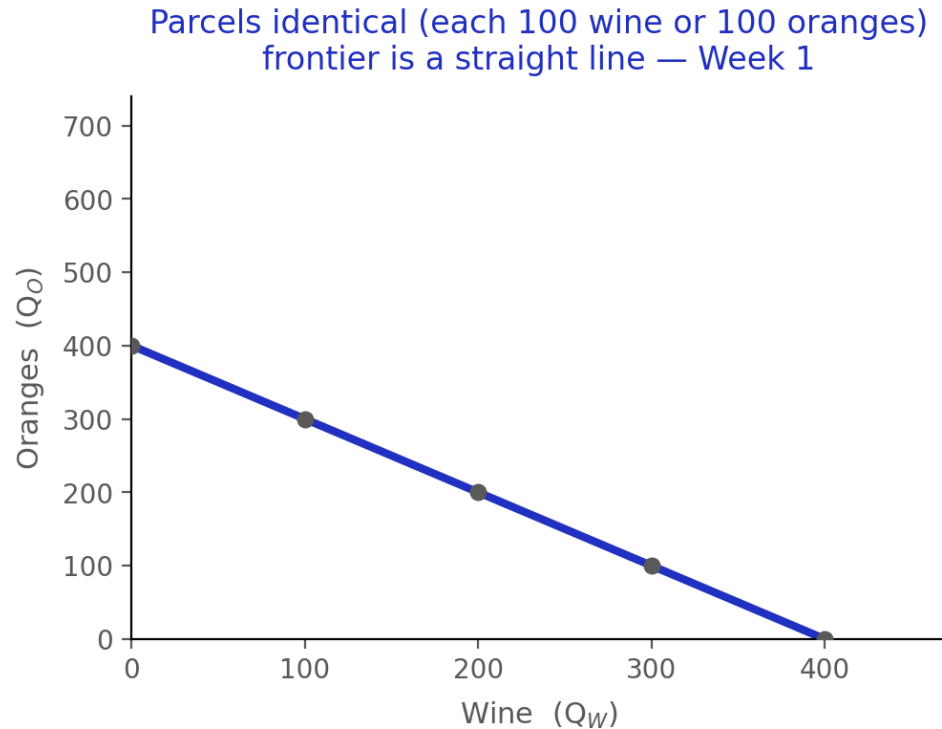
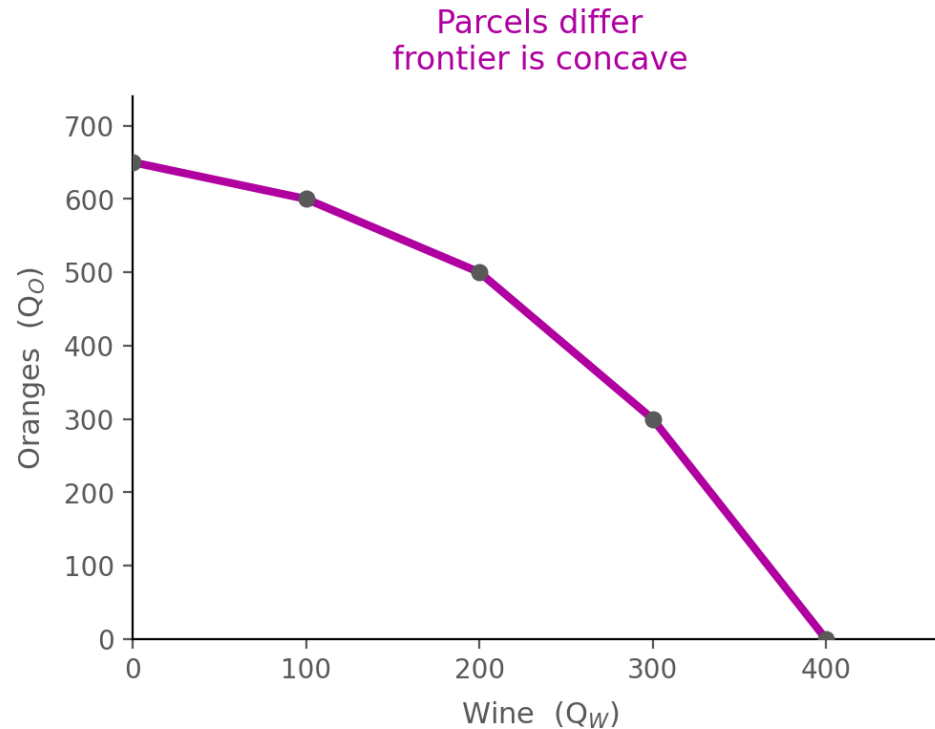
The frontier bends

G3.1 Four parcels, ordered by opportunity cost
The frontier bends because the parcels differ



The linear frontier, recovered

G3.2 The linear frontier is the special case



Not a different model — what this construction gives when the parcels happen to be identical.

C-3

Exercise C-3

Choosing a point on the frontier — parts (d) onward

Exercise sheet, Week 3 · parts (a) to (h)

The optimum rule

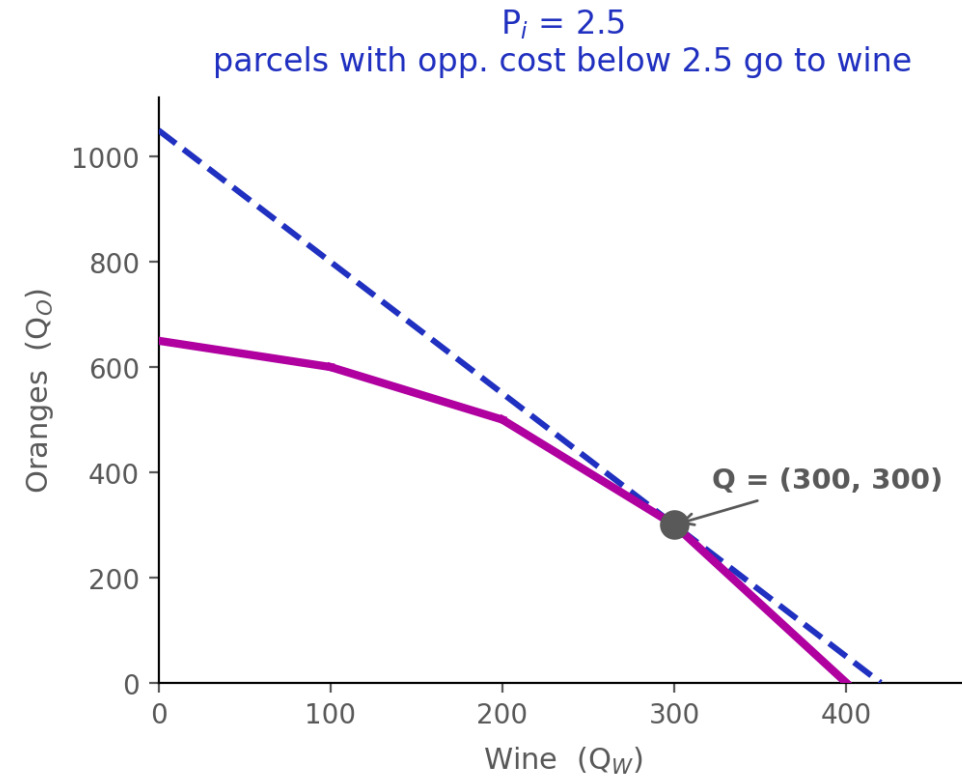
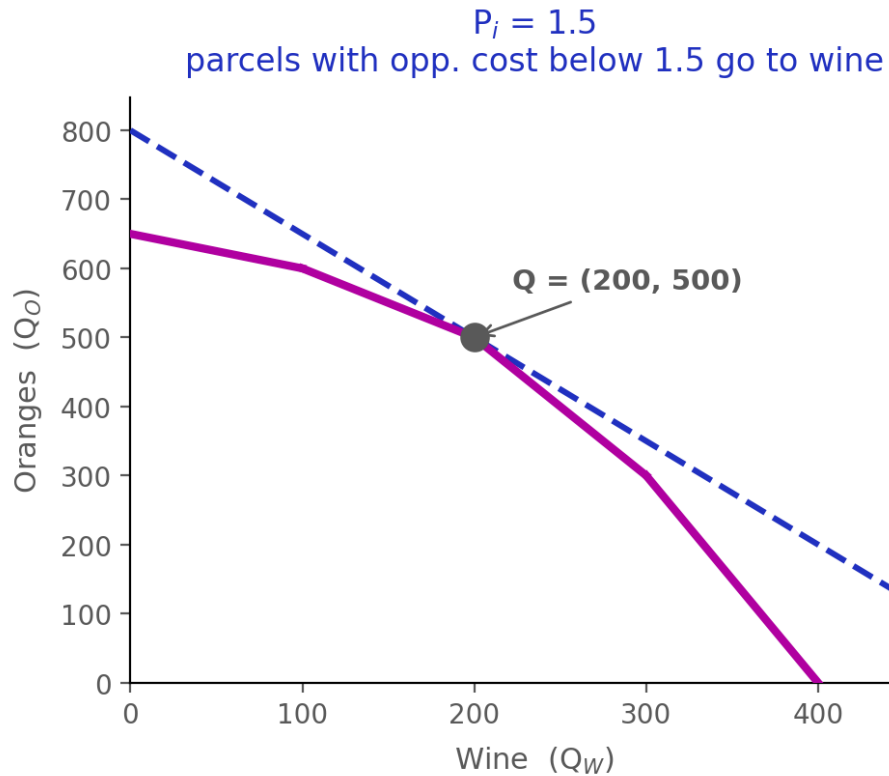
Switch a parcel into wine if its opportunity cost is below $(P_w/P_o)_i$.

No calculus. No tangency condition. Compare each parcel's number against one price and count.

This is exactly what you just did in C-3(d)–(e) — the rule has a name now, not new content.

The optimum sits at the kink

G3.3 The optimum sits at the kink where opportunity cost crosses the price



Where the price line comes from

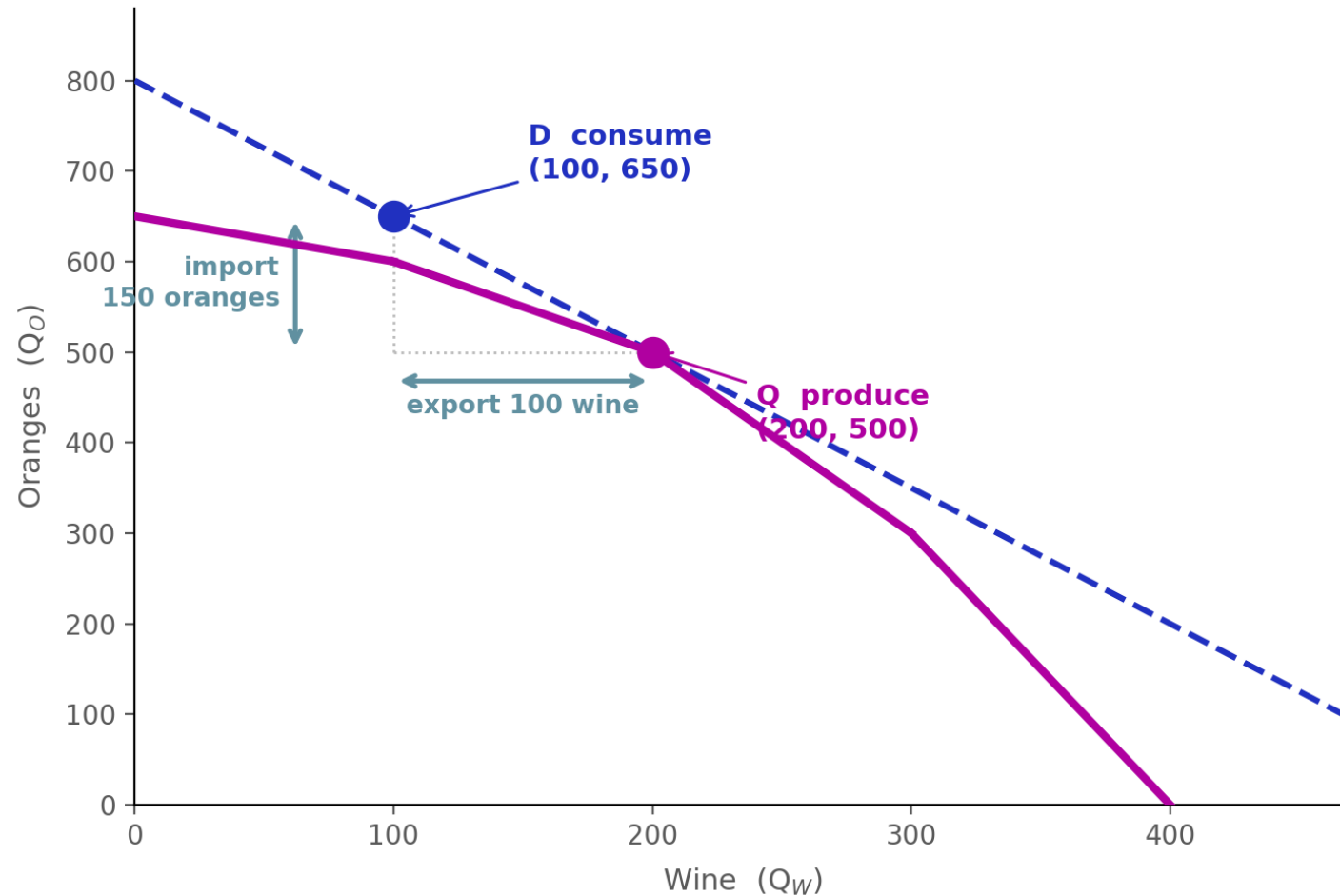
$$\text{GDP} = Q_W \times P_W + Q_O \times P_O$$

Divide by P_O : $\text{GDP} / P_O = Q_W \times (P_W / P_O)_i + Q_O$

Value measured in oranges — the same number the optimum rule already picked out. Change the price and a different point becomes the highest-value one.

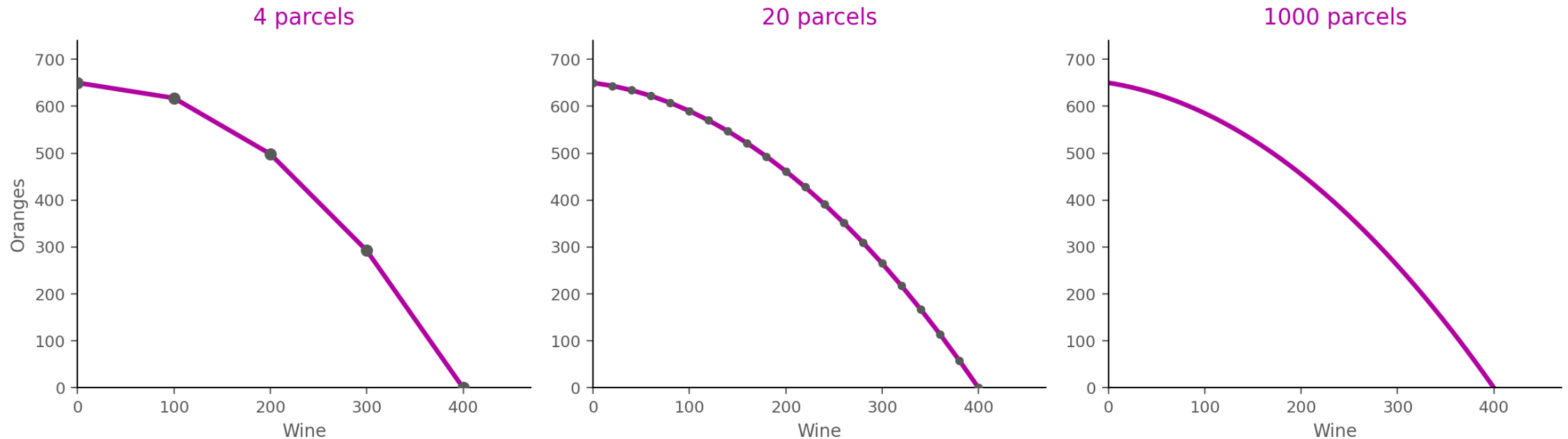
Production and consumption come apart

G3.5 At world prices, production and consumption come apart
no planner decides this — the price line does



What if there were a thousand parcels?

G3.4 As parcels multiply the kinks become too fine to see — and the list too long to scan



The rule has not changed. Opportunity cost is now the slope of a curve, not a table entry.

Week 3 in five lines

- Resources are not identical; represent them as parcels, each with its own opportunity cost.
- Order cheapest-first and the frontier bends — concave, with rising opportunity cost.
- Identical parcels give back the straight frontier of Weeks 1–2 — a special case.
- Switch a parcel into wine if its opportunity cost is below the terms of trade.
- Production and consumption separate along the iso-value line — the gap between them is trade.

Everything above is in the explanation expansion, §3. Next week: two ways of growing.

International Economics

Week 4

Two ways of growing, and when growth hurts

Vote before you see the numbers

A country exports wine. New technology lets it grow much more wine than before.

- It is a large country: its own extra wine on the market pushes the world price of wine down.
- Vote: after this growth, is the country better off, worse off, or could go either way?

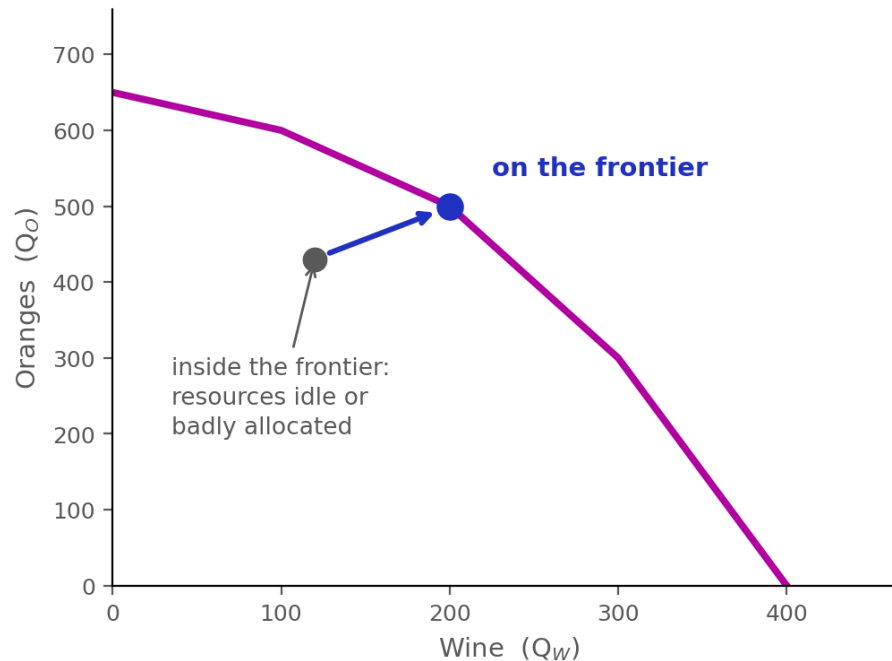
No arithmetic yet — just your instinct. We will check it properly in a few slides.

Student input · 3 minutes

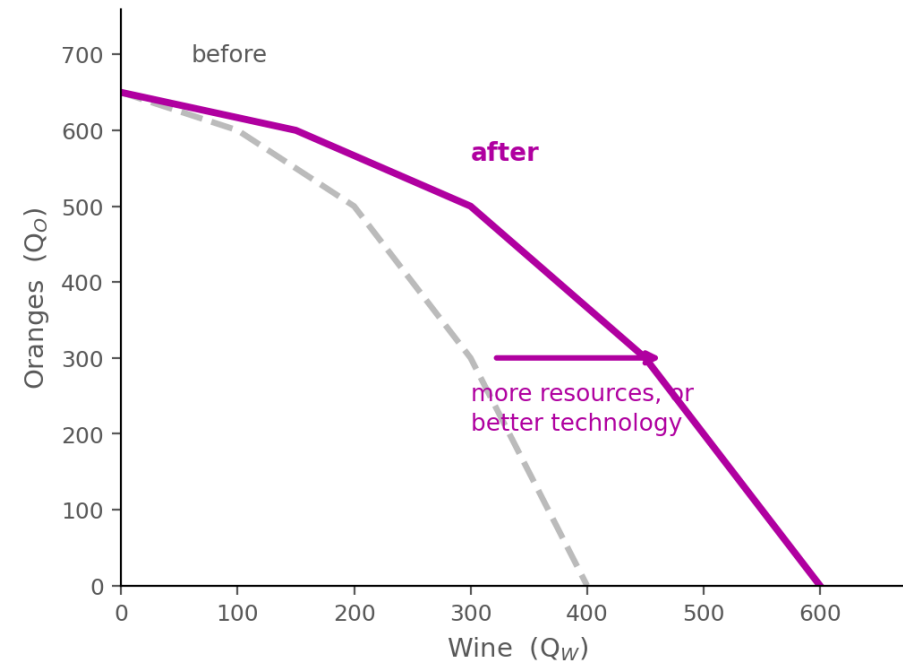
Two ways of growing

G4.1 Two ways of growing

1. Growing by using what you have better
the frontier does not move



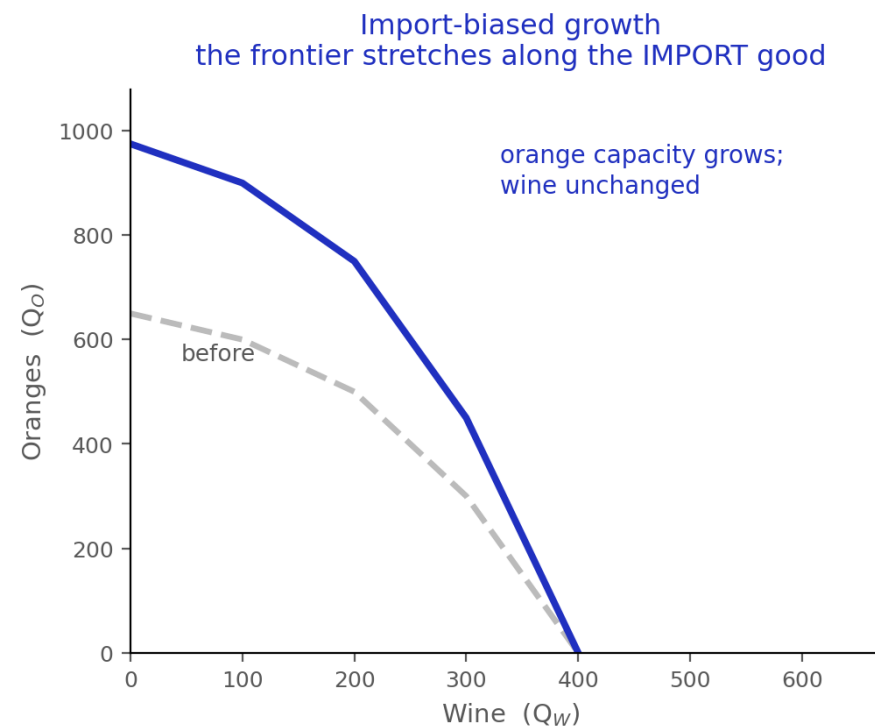
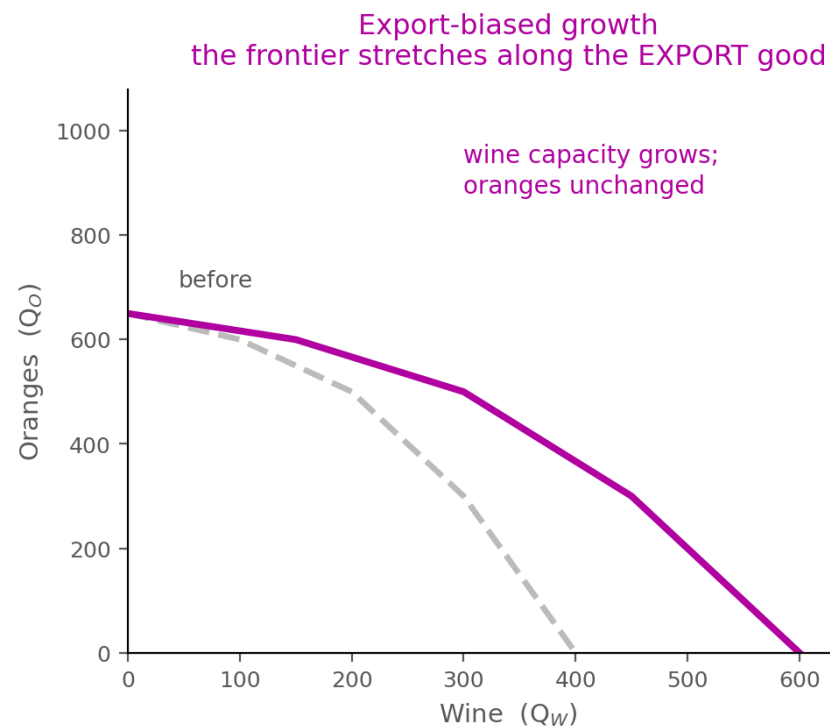
2. Growing by moving the frontier out
the frontier itself shifts



Trade is not a third way — it lets you consume outside the frontier, not grow it.

Growth is rarely even

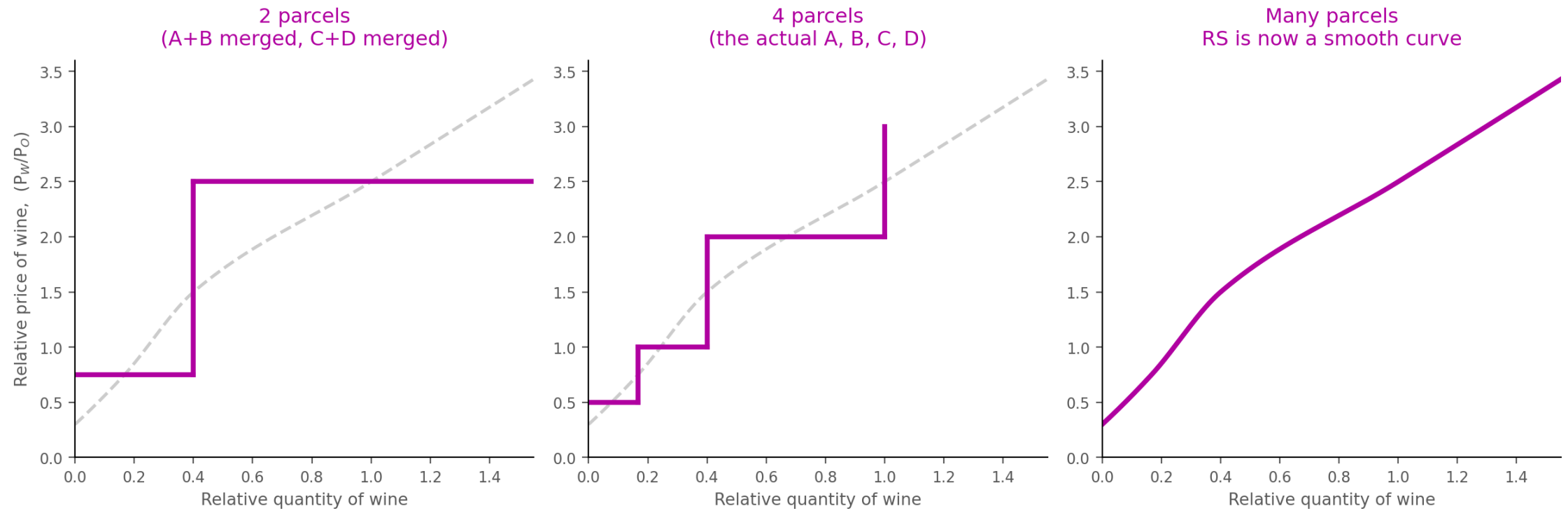
G4.2 Growth is rarely even — for a wine exporter



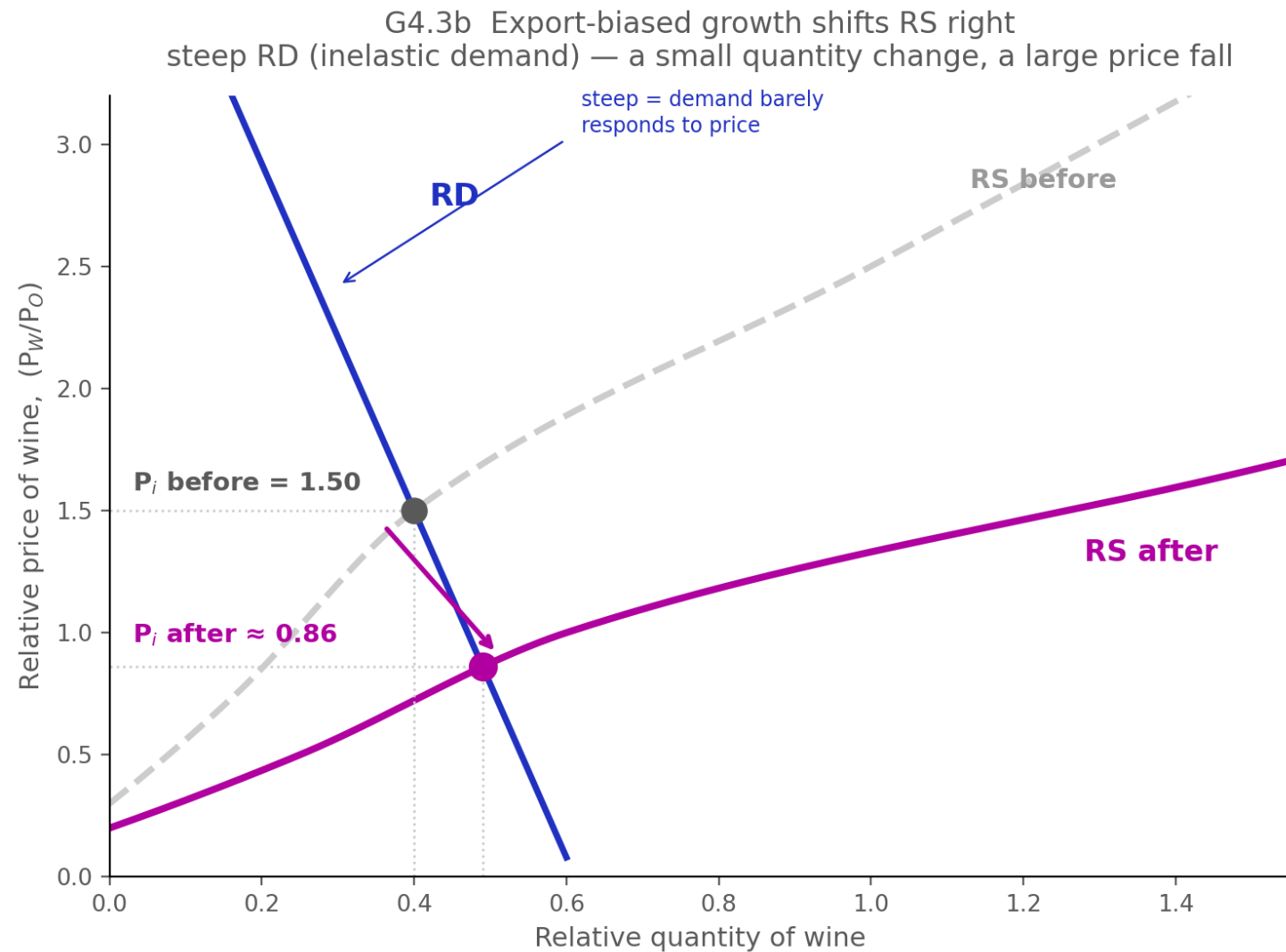
From here on: wine capacity per parcel rises from 100 to 150. Oranges unchanged. This is C-4.

The same rule, at higher resolution

G4.3a Same economy, three resolutions — RS is always the same rule



Export-biased growth shifts RS right



C-4

Exercise C-4

Does growth help? — small country vs large country

Exercise sheet, Week 4 · parts (a) to (i)

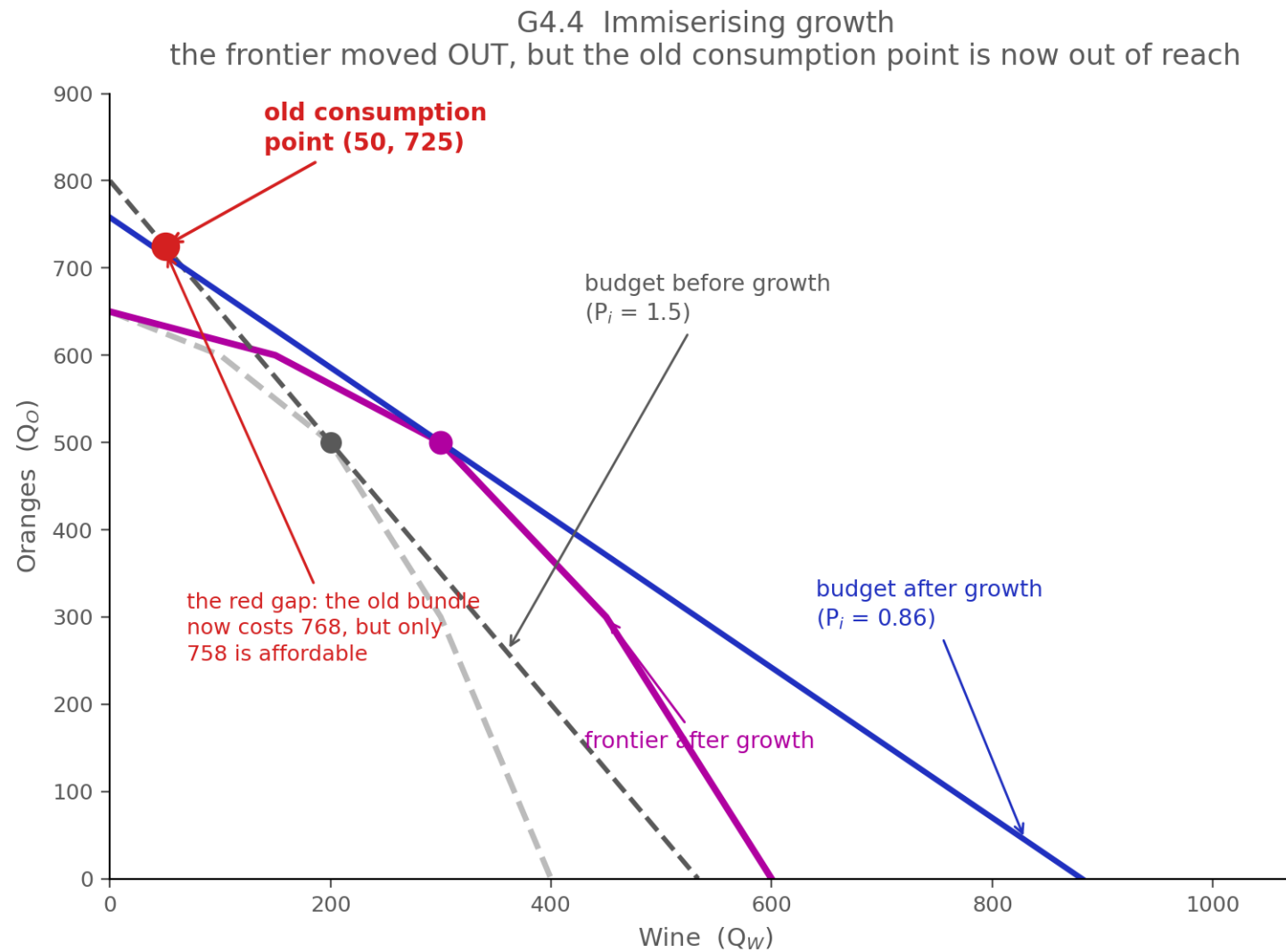
What you just found has a name

Immiserising growth — growth that leaves a country worse off, because the terms-of-trade loss outweighs the gain in output.

First identified by Jagdish Bhagwati, 1958.

Can the country still afford the bundle it used to consume? If not, it is unambiguously worse off — assuming set preferences, e.g., wine and oranges in a 1:6.5 ratio.

More capacity, less welfare



When does this actually happen?

Immiserising growth is not the normal case. All four must hold at once:

1

Large country

own growth must be big enough to move the world price

2

Export-biased

growth must concentrate in the good that is sold abroad

3

Inelastic world demand

so extra supply mostly cuts the price, not the quantity sold

4

Trade-dependent

the country must sell most of what it grows

Growth abroad

Partner grows in OUR export good

More competition in what we sell. World supply of our export rises, its price falls. Our terms of trade WORSEN.

Partner grows in OUR import good

More of what we buy becomes available. Its price falls. Our terms of trade IMPROVE.

Same mechanism as our own growth — just read from the other side of the market.

Week 4 in five lines

- Two ways of growing: using existing resources better, and shifting the frontier out.
- Growth is rarely even — export-biased growth stretches the frontier along the export good.
- A large country's export-biased growth drives its own terms of trade down.
- If that loss outweighs the output gain, the country is worse off — immiserising growth (Bhagwati, 1958).
- The test needs no preferences: can the country still afford what it used to consume?

Everything above is in the explanation expansion, §4. Next week: factor proportions and the HO model.

International Economics

Week 5

Factor endowments: Heckscher-Ohlin and Stolper-Samuelson

Guess before the theorem

In pairs. Two countries, two factors.

Country	Land	Labour
Hungary	600	1,200
Italy	4,000	2,000

- Wine needs a lot of land, little labour. Cloth needs a lot of labour, little land.
- Vote: which country exports wine? Which exports cloth?

Italy has MORE of both land and labour than Hungary. Does that change your answer?

Student input · 4 minutes

A second factor

- Weeks 1–4: one factor (labour), technology differs by country. That was Ricardo.
- From here: technology is IDENTICAL everywhere. Countries differ in ENDOWMENTS — how much land and labour they hold.
- Same 2×2 structure, same perfect competition, same within-country factor mobility — only the source of comparative advantage changes.

Heckscher–Ohlin (1919, 1933): the same trade logic as Ricardo, run on a different engine.

Two ratios, not one

Good	Land/unit	Labour/unit	Land per labour
Wine	3	1	3
Cloth	1	3	0.33

Country	Land	Labour	Land per worker
Hungary	600	1,200	0.5
Italy	4,000	2,000	2.0

Factor intensity — a property of a GOOD (a ratio).

Factor abundance — a property of a COUNTRY (a ratio).

Italy has more of BOTH factors — yet Hungary is labour-abundant. Ratios, not totals.

Who produces what

	Wine	Cloth
Hungary (labour-abundant)	75	375
Italy (land-abundant)	1,250	250

Heckscher–Ohlin theorem: a country produces relatively more of the good that uses its abundant factor intensively.

Solve: $3QW + QC = \text{land}$, $QW + 3QC = \text{labour}$, two equations per country.

C-5

Exercise C-5

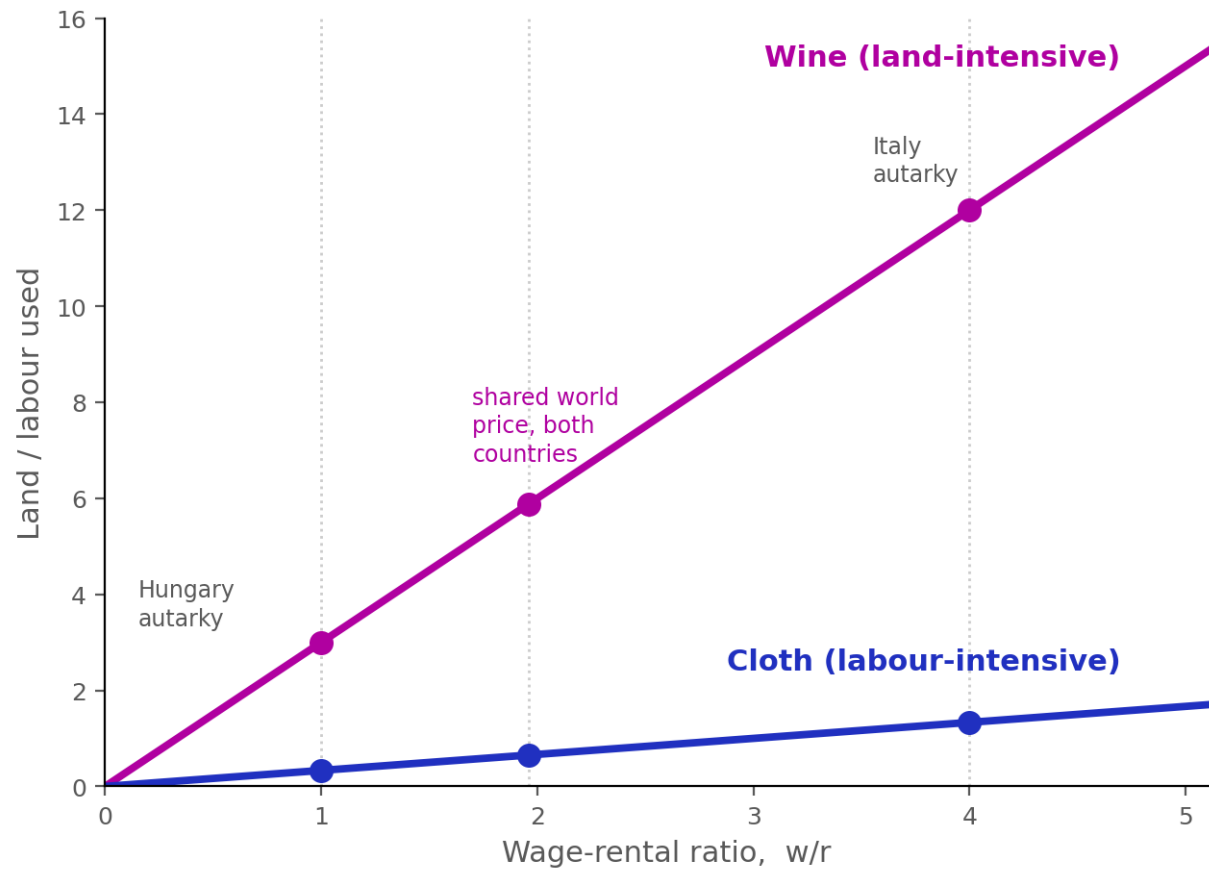
Wine and cloth — Hungary and Italy

Exercise sheet, Week 5 · parts (a) to (i)

The table was a snapshot

Firms choose the cheapest input mix. The 3:1 / 1:3 table holds at ONE wage-rental ratio.

G5.1 Factor intensity: each good's chosen input ratio
wine always more land-intensive than cloth, at every w/r



From w/r to relative price — and back

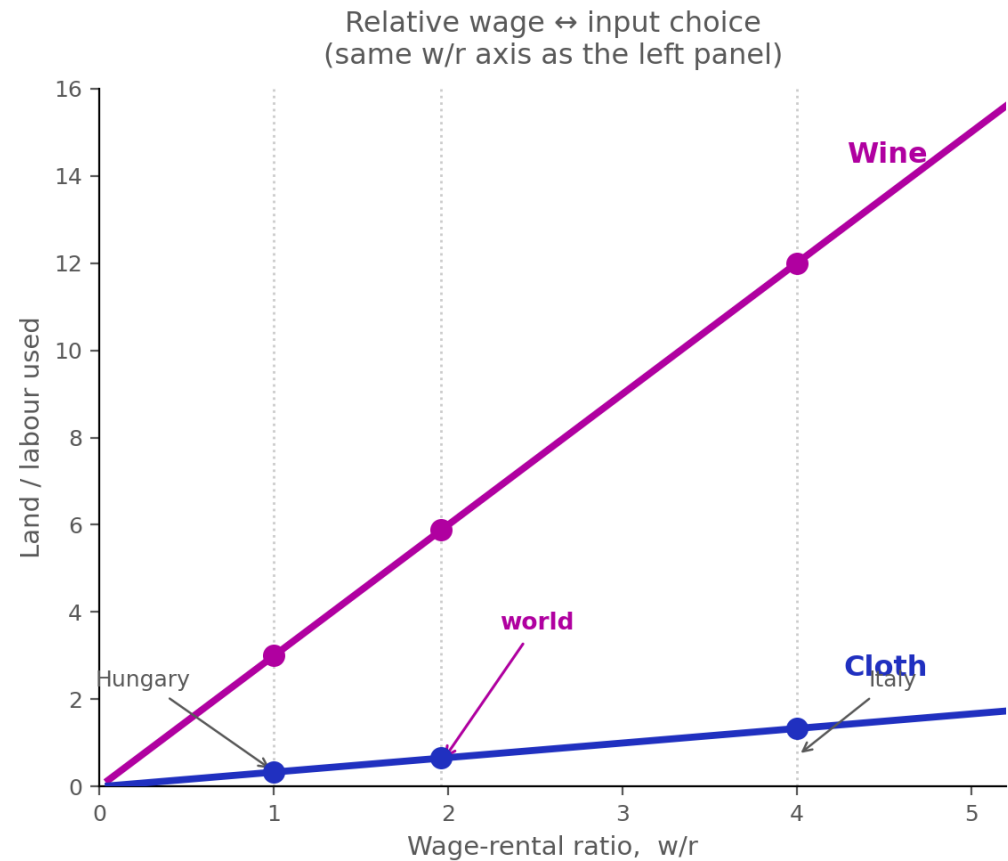
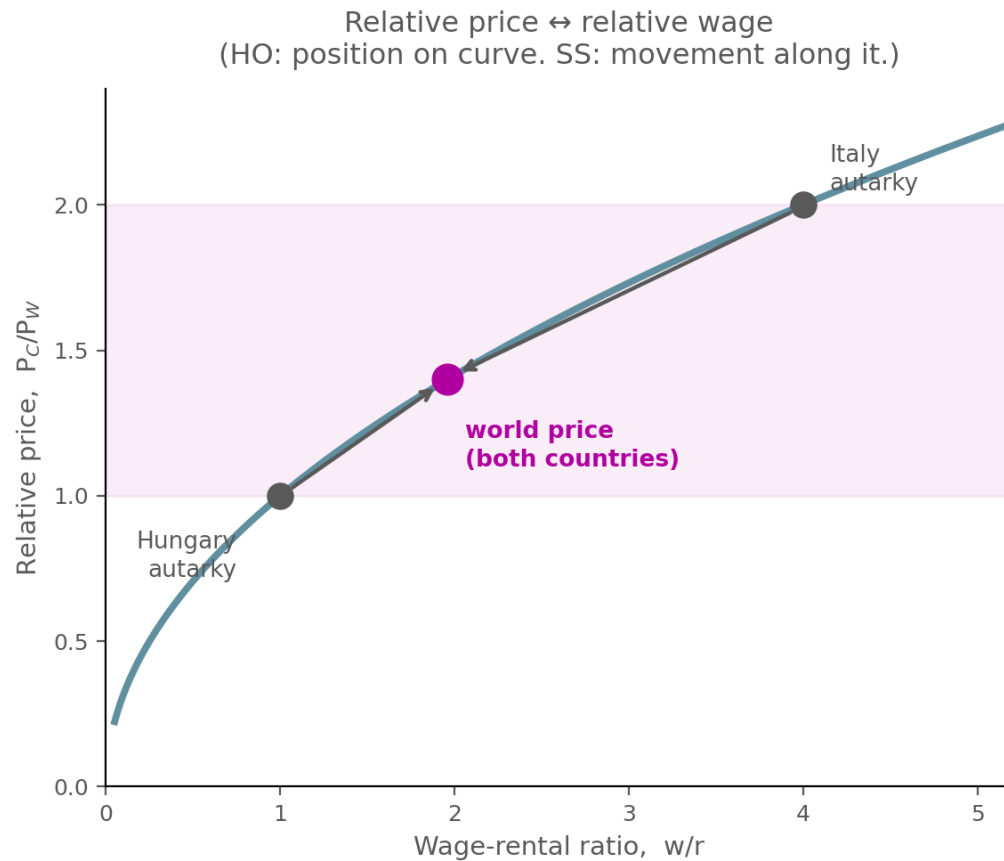
$$(P_c/P_w) = v(w/r)$$

One relationship for this technology. Higher w/r (dear labour) $\rightarrow$ higher relative price of the labour-intensive good.

You do not derive this — use it, the way you used the frontier formulas in Week 3.

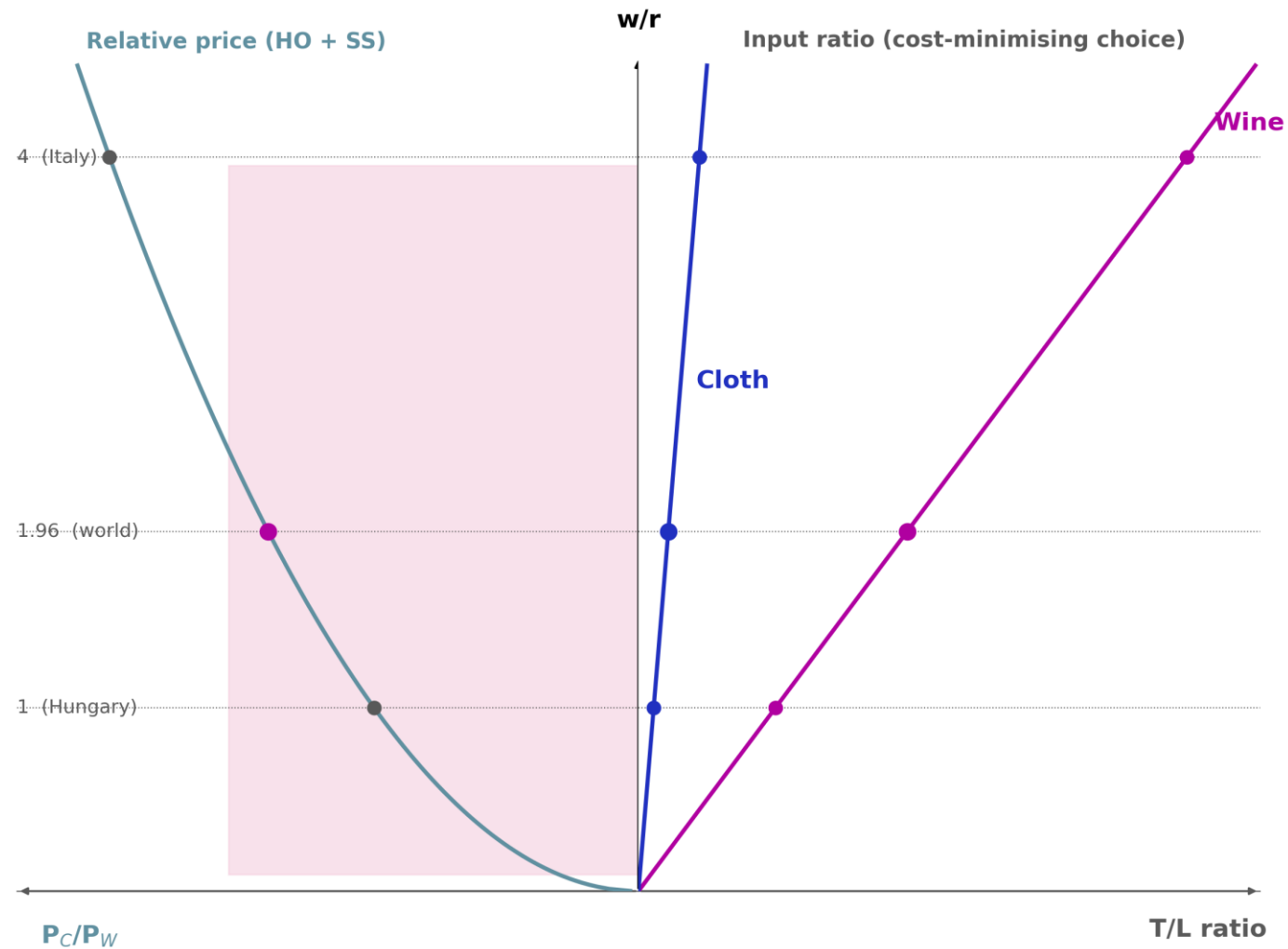
Hungary and Italy, one shared curve

G5.2 From factor abundance to who gains — Hungary and Italy on one shared diagram



One axis, two stories

G5.2b One axis, two stories
factor abundance sets w/r ; w/r sets both comparative advantage and who gains



The magnification effect

	Before	After	Change
Rent (r)	25	21.13	-15.5%
Wine price	100	100	0%
Cloth price	100	140	+40%
Wage (w)	25	41.41	+65.6%

Both factor prices move MORE than either goods price. Hungary's workers gain, its landowners lose — Stolper–Samuelson.

Two corollaries

Rybczynski

Prices FIXED, more of a factor → more of the good using it intensively, LESS of the other.

Fixed prices = the small-country case of Week 2, §2.5. Same condition, new question.

Factor price equalisation

Free trade + identical technology → wage and rent equalise ACROSS countries. No factor ever crosses a border.

A strong prediction — tested next.

The Leontief paradox

1953: Wassily Leontief tested Heckscher–Ohlin on US trade data.

The most capital-abundant country in the world exported the LESS capital-intensive goods.

The exact opposite of the HO prediction.

The logic still holds given its assumptions. The paradox points at which assumption is weakest — identical technology across countries.

Week 5 in five lines

- A second factor, land, alongside labour — technology now identical; endowments differ.
- Factor intensity is a property of a good; factor abundance a property of a country — both ratios.
- Heckscher–Ohlin: a country exports the good using its abundant factor intensively.
- Stolper–Samuelson: owners of the abundant factor win from trade; owners of the scarce factor lose.
- Factor price equalisation is the model's boldest claim — Leontief shows it does not hold as stated.

Everything above is in the explanation expansion, §5. Next week: increasing returns and intra-industry trade.

International Economics

Week 6

Increasing returns and intra-industry trade

A puzzle

Germany sells cars to France. France sells cars to Germany.

- Both countries have similar technology (Week 1–4) and similar factor endowments (Week 5).
- Vote: can Ricardo explain this trade? Can Heckscher–Ohlin?
- Do you have any other explanation?

Student input · 3 minutes

Economies of scale

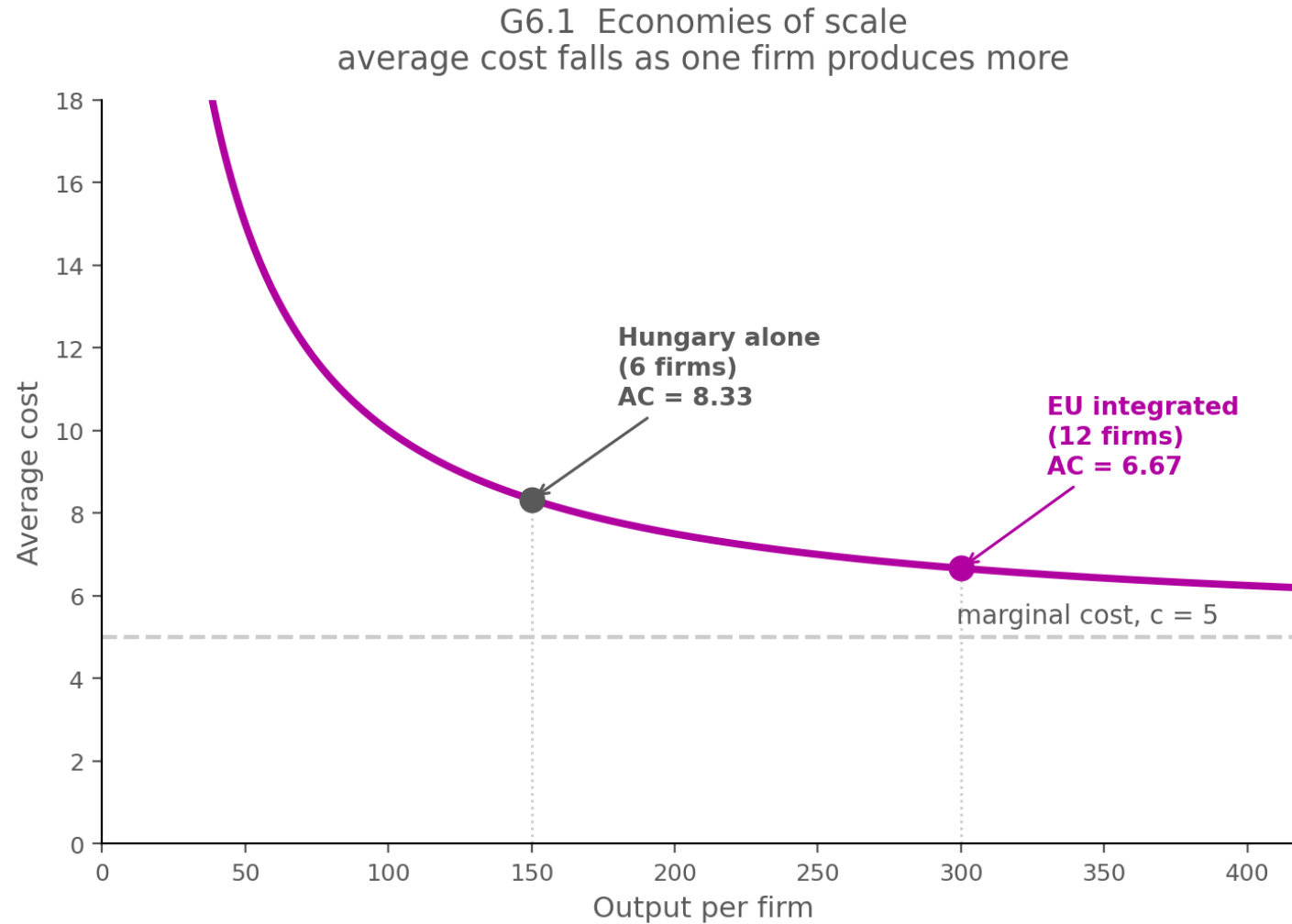
The missing candidate from Week 1: division of labour.

$AC = F/Q + c$ — fixed cost spread over more units, plus marginal cost.

Bigger output → lower average cost. This breaks perfect competition: a bigger firm always beats a smaller one.

External economies of scale (whole industries, not one firm) exist too — a different course's material.

Cost falls with scale



Two curves, stated not derived

CC: $AC = nF/S + c$ (cost rises with more firms sharing a market)

PP: $P = c + 1/(bn)$ (price falls as firms compete harder)

Same status as Week 5's $(PC/PW) = v(w/r)$ — a tool to use, not to build from scratch.

Equilibrium: entry stops paying when CC meets PP.

Hungary alone vs the EU market

	Hungary alone	EU integrated	Change
Market size, S	900	3,600	$\times 4$
Number of firms, n	6	12	$\times 2$
Price	8.33	6.67	-20%
Output per firm	150	300	$\times 2$

C-6

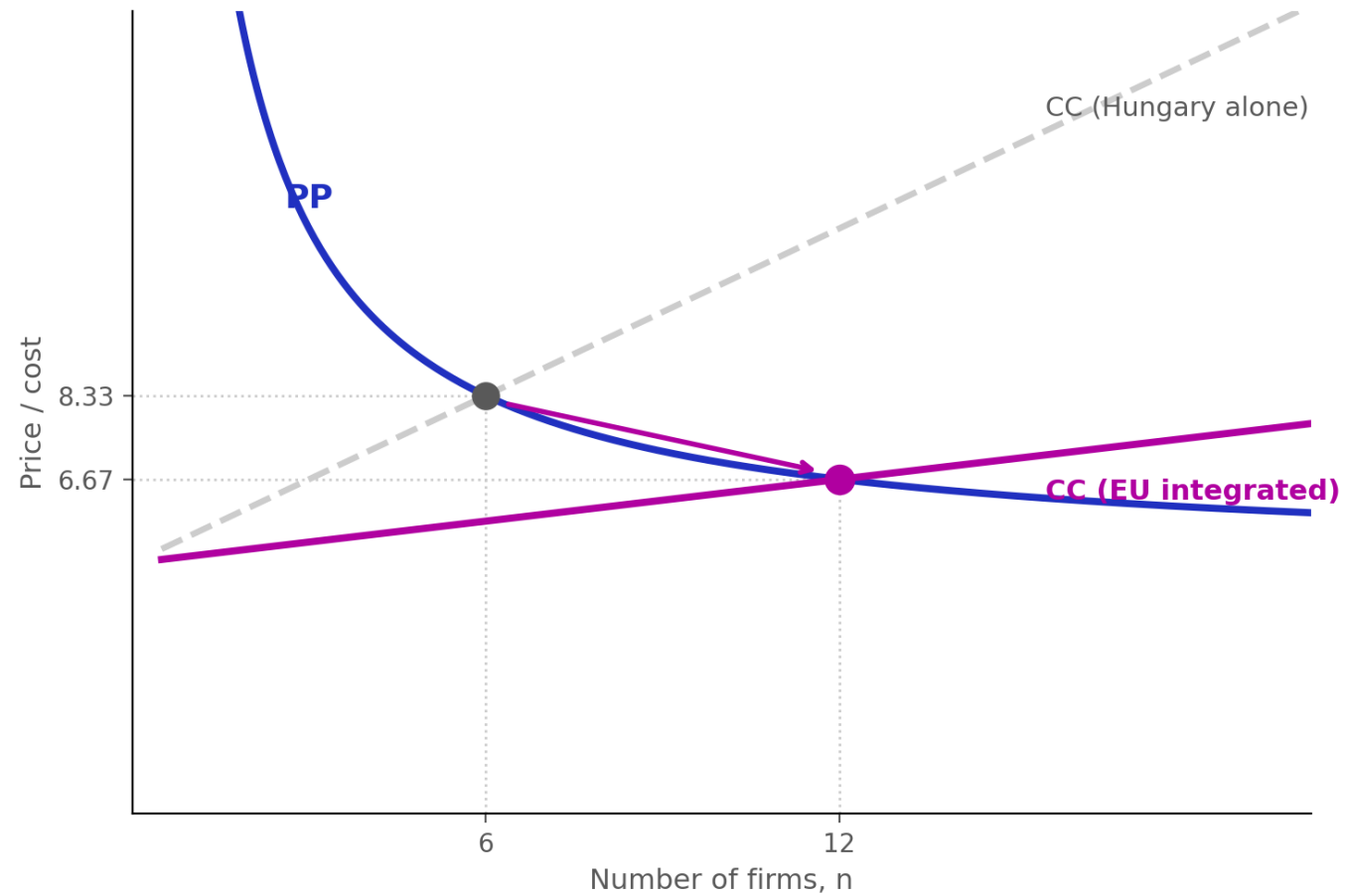
Exercise C-6

Cars — Hungary and the EU market

Exercise sheet, Week 6 · parts (a) to (h)

Market integration

G6.2 Market integration: more firms, lower price
CC rotates down as the market grows — PP does not move



Gains with no comparative advantage

- 1 More varieties — 6 firms' models become 12
- 2 A lower price for every variety — 8.33 to 6.67
- 3 Larger, more efficient firms — 150 to 300 units each

None of this needs Hungary and its partners to differ in technology or endowments.

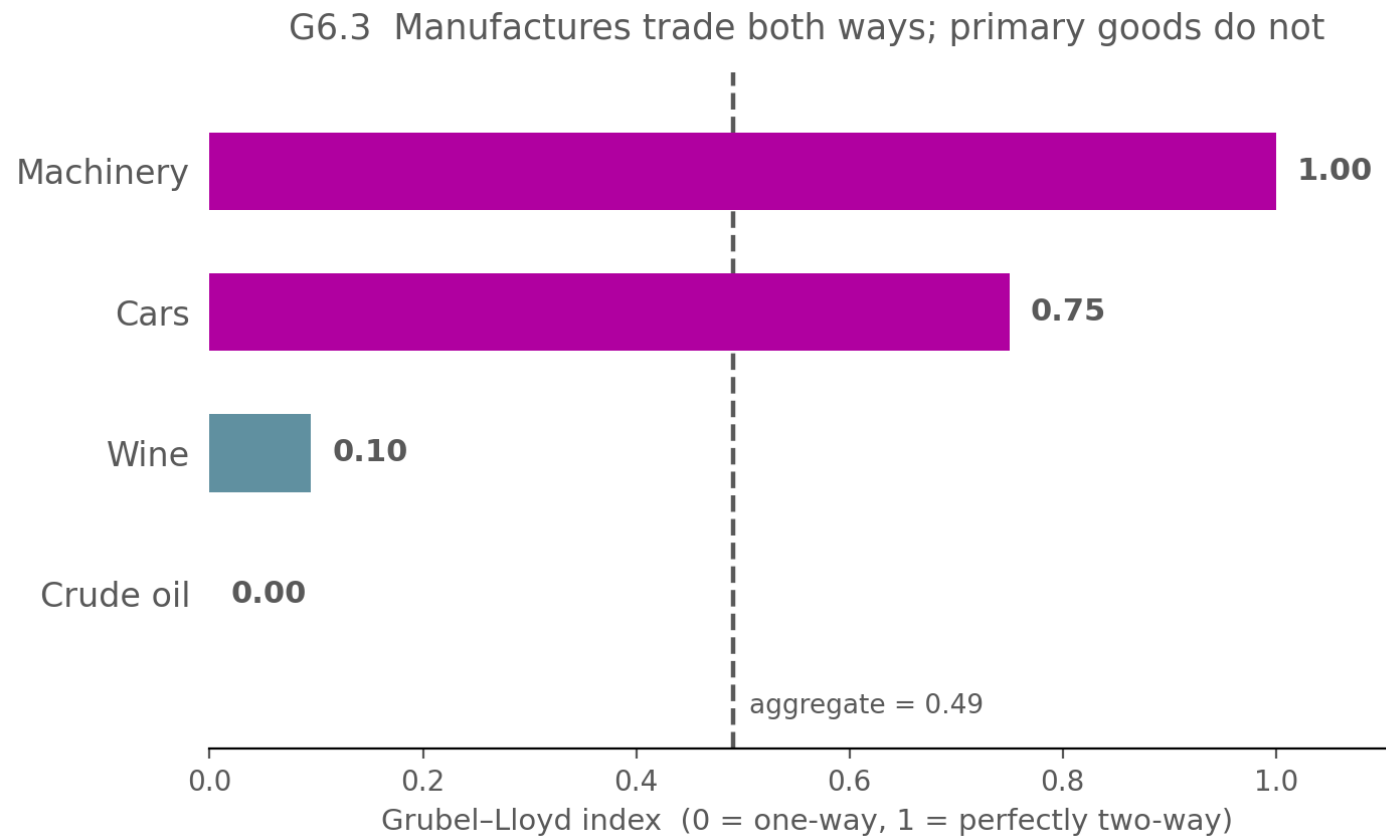
Measuring two-way trade

$$GL = 1 - |X - M| / (X + M)$$

GL = 0 — entirely one-way (Ricardo/HO case)

GL = 1 — exports and imports exactly equal (pure intra-industry trade)

Which industries trade both ways?



Intra-firm trade

A large share of trade takes place between affiliated entities — it moves between units of the same multinational firm.

Transfer price — the internal price a firm sets for a shipment between its own units. Set by the firm, not a market.

Can be chosen for tax reasons, not just cost — which makes some trade statistics harder to interpret than they look (Week 11).

Week 6 in five lines

- Similar countries trading similar goods — a pattern neither Ricardo nor HO predicts.
- Economies of scale break perfect competition, push toward a few large firms.
- A bigger market: more firms AND lower prices AND larger firms — no comparative advantage needed.
- Grubel–Lloyd measures two-way trade — high for manufactures, near zero for primary goods.
- This model sits ALONGSIDE Ricardo and HO — different industries, different chapters.

MIDTERM 1 — covers Weeks 1–6

International Economics

Week 7

Trade policy instruments

A quick vote

A government wants to limit imports of a good. It can either:

- A)** impose a tariff, or
- B)** ask foreign producers to 'voluntarily' limit how much they export.

If you were the FOREIGN EXPORTER, which would you prefer?

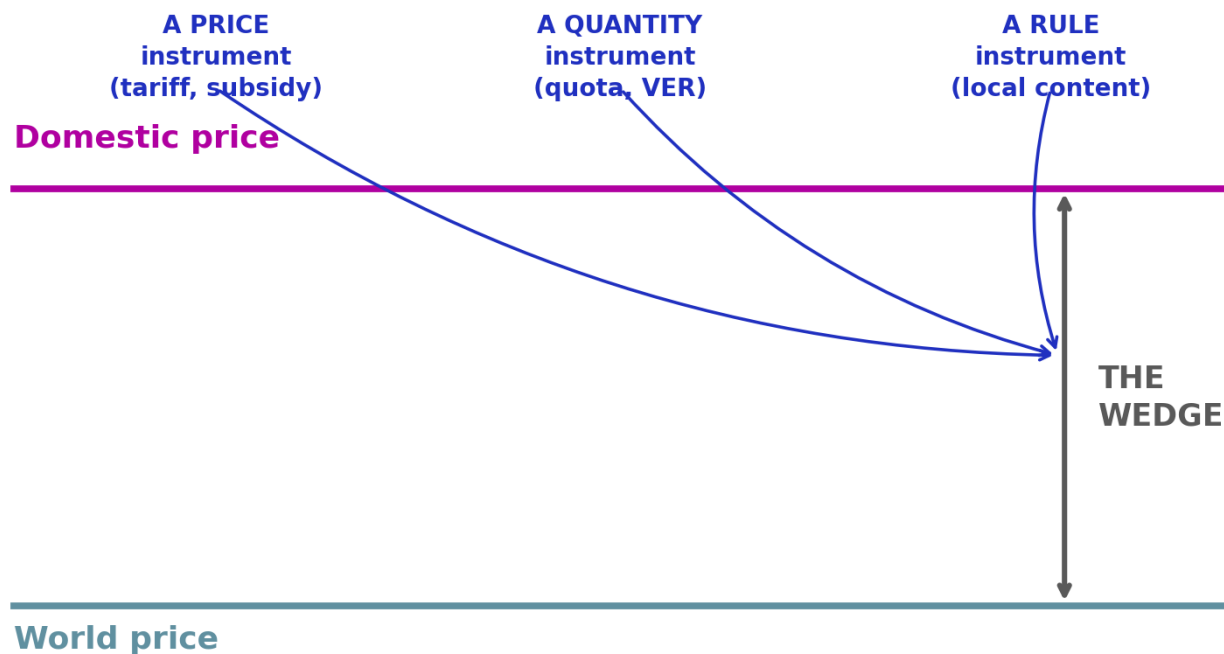
- A) The tariff B) The voluntary limit C) Makes no difference**

Scan the QR code · vote now

One idea, three mechanisms

Every instrument this week makes foreign output different from domestic output.

G7.1 Trade policy makes foreign output different from domestic
three ways to create the same wedge



A little history

1860

Cobden–Chevalier Treaty

Britain & France cut tariffs sharply; MFN clause spread the deal across Europe

1930

Smoot–Hawley Tariff Act

US tariffs rose ~60%; retaliation deepened the Great Depression

1947

GATT

23 countries set rules for tariff reduction and non-discrimination

1995

WTO

Absorbed GATT; still administers the rules-based trading system

Price instruments

Tariff — ad valorem (% of value) or specific (fixed amount per unit).

Export subsidy — costs the government money, rather than raising it.

A live case

Since October 2024 the EU has applied anti-subsidy duties on Chinese-made EVs: the standard 10% tariff plus 17–35.3% more, depending on the manufacturer — up to 45–48% total. Still in force.

The tariff is Week 8's subject — here it is the reference case everything else gets compared against.

Quantity instruments

Quota — a physical limit on imports. Once filled, no more may enter, at any price.

EU steel safeguard: a tariff-rate quota since 2018, tightened 1 July 2026 — 18.3 million tonnes duty-free, 50% tariff beyond. One of the highest rates this week.

VER → illegal since 1995

1981 US-Japan car VER: capped at 1.68m/year, cost the US ~\$8bn (1981-84). The WTO's 1995 Safeguards Agreement banned new VERs outright. Its legal descendant: the price undertaking (Feb 2026, EU lets VW's Cupra swap its EV tariff for a minimum price + quota).

Rule instruments

Local content requirement — a good must contain a minimum share of domestic inputs to qualify for a subsidy, tax break, or public contract.

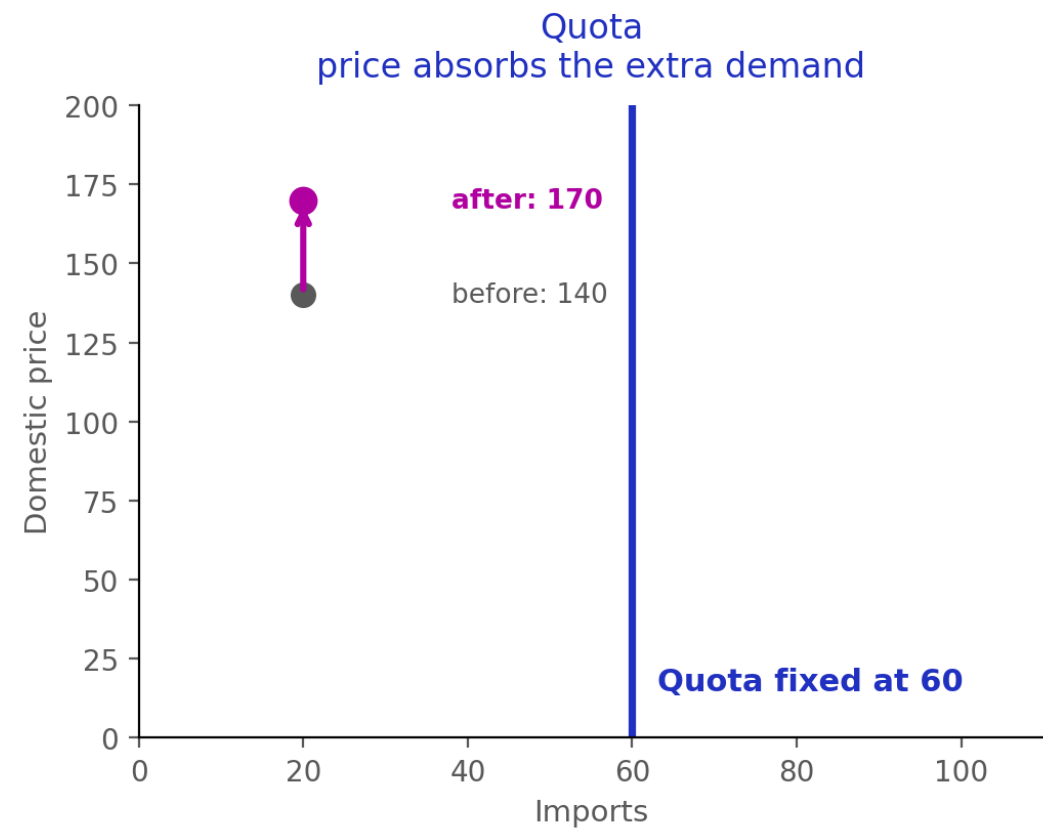
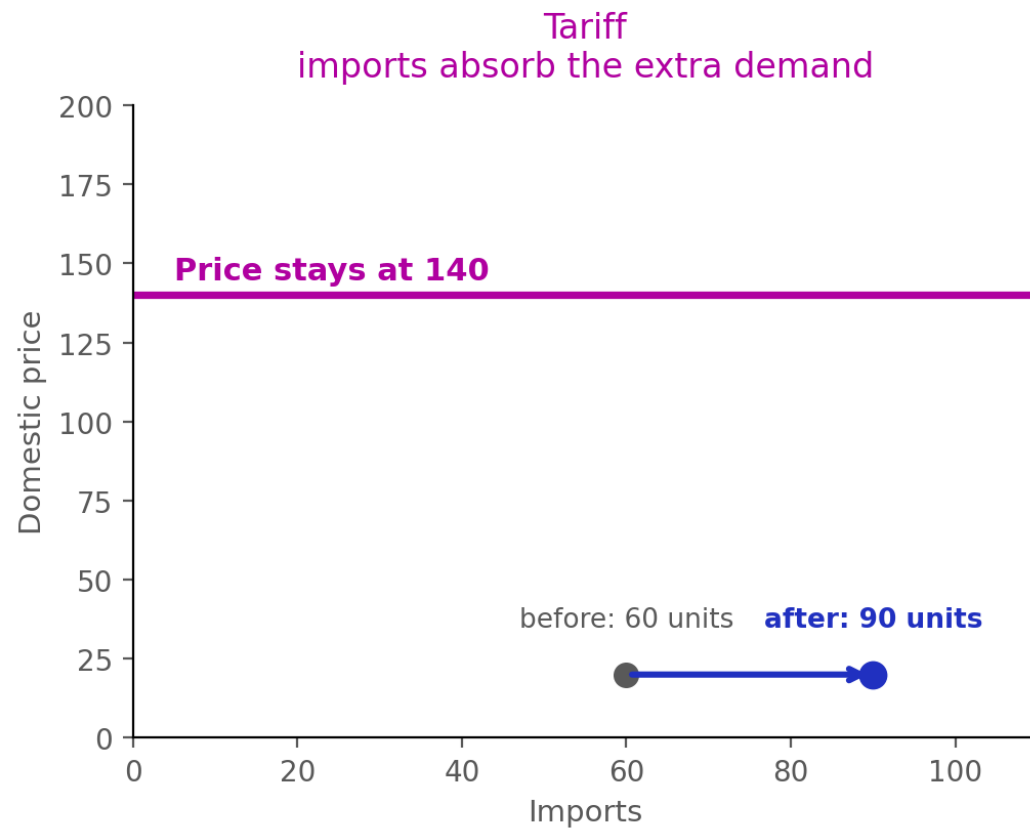
US Buy American Act (1933, still active): federal purchases over \$10,000 must be ~66% US-made.

EU Industrial Accelerator Act (proposed, March 2026): would require EVs to source 70% of components from the EU to get state support — not yet law.

One of the most actively used tools in current policy — kept brief here, but do not underestimate it.

Equivalent today, not tomorrow

G7.2 A tariff and a quota can start equivalent — demand growth breaks the equivalence





Exercise C-7

Tariff vs quota under demand growth

Exercise sheet, Week 7 · parts (a) to (g)

Who gets the money?

Instrument	Who captures the wedge
Tariff	Home government
Quota (auctioned)	Home government
Quota (given away)	Whoever holds the licence
VER / price undertaking	The FOREIGN exporter
Export subsidy	Costs the government money

Week 7 in five lines

- Every instrument makes foreign output different from domestic — a wedge between world and domestic price.
- Price instruments (tariffs, subsidies) fix the wedge directly.
- Quantity instruments (quotas, VERs) fix the quantity, letting price move.
- A quota can match a tariff today, but not once demand grows — quantity can adjust for a tariff, not for a quota.
- Who captures the wedge differs sharply by instrument — and a VER hands it to the foreign exporter.

Everything above is in the explanation expansion, §7. Next week: the tariff, modelled properly with MD/XS.

International Economics

Week 8

Modelling the tariff

A quick vote

A government imposes a tariff on an imported good. Two possible countries:

- A)** A small country — too small to affect the world price.
- B)** A large country — big enough that its own demand moves the world price.

Can EITHER of these countries end up BETTER OFF after imposing the tariff?

- A) Only the small country B) Only the large country C) Both D) Neither**

[Scan the QR code · vote now](#)

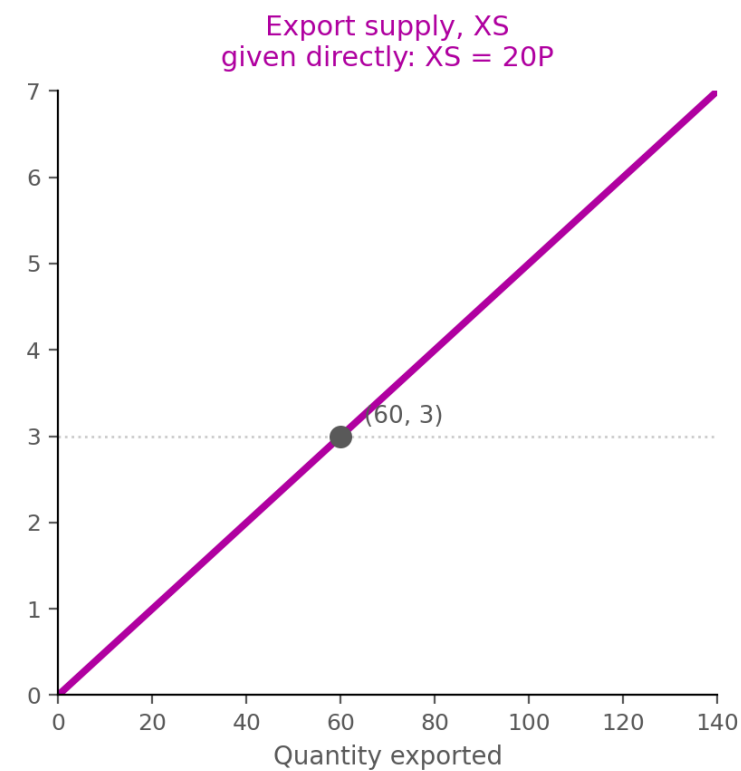
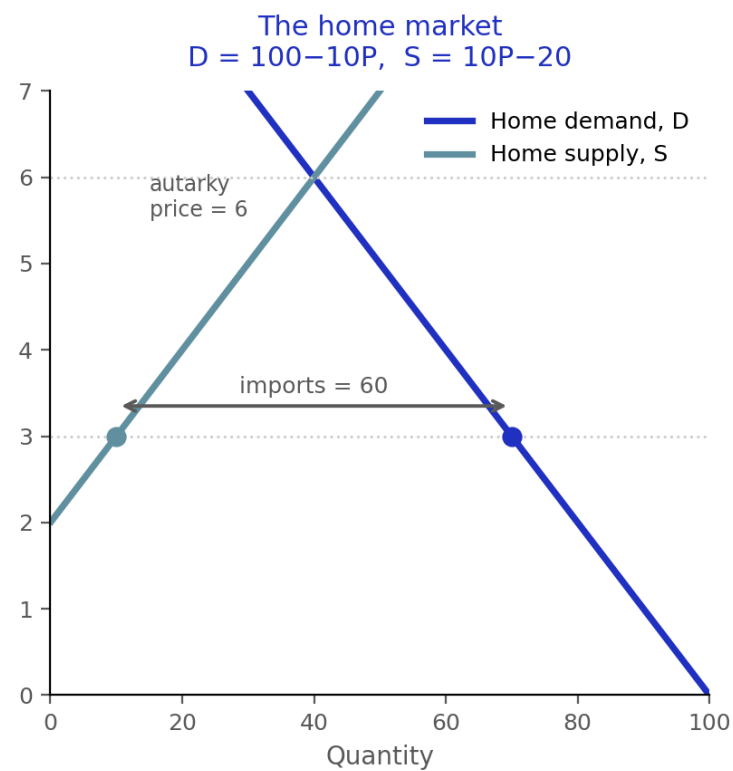
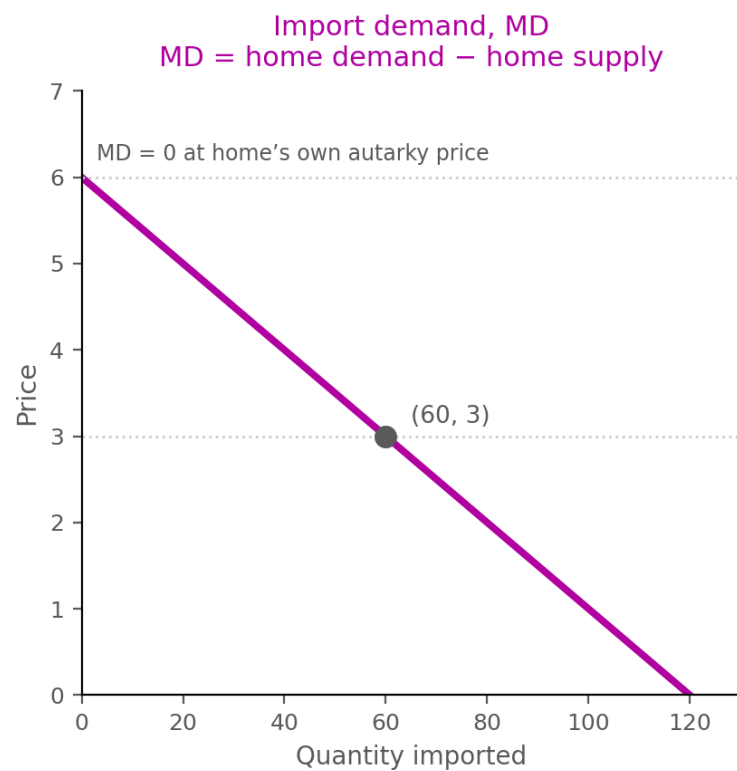
A different question needs a different diagram

	RS / RD (Weeks 1-5)	MD / XS (this week)
Price	Relative price of two goods	Money price of one good (same currency)
Goods	Two, traded against each other	One, traded for money
Scope	General equilibrium	Partial equilibrium
Answers	Who trades what, and why	What a policy does to a market

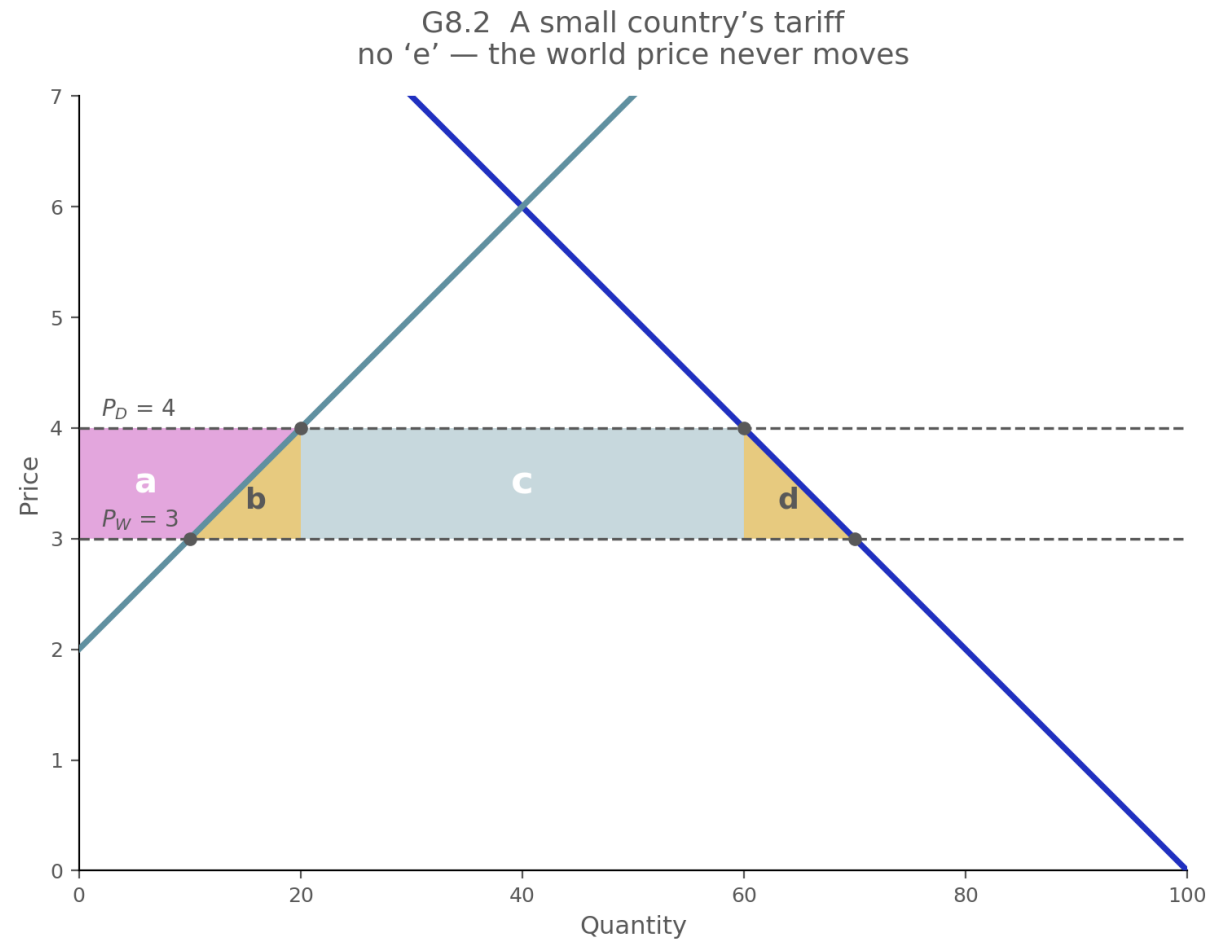
Same country, same trade — just a different question asked of it.

Building MD and XS

G8.1 Building the import-market diagram from the home market



A small country's tariff



Where the value goes

Area	What it is	Value	Who gets it
a	Producer surplus gain	15	Home producers
b	Production distortion	5	Lost — nobody
c	Tariff revenue	40	Home government
d	Consumption distortion	5	Lost — nobody

b + d = deadweight loss. Net welfare = $-(b+d) = -10$. No area e — see the next diagram for a counterexample.

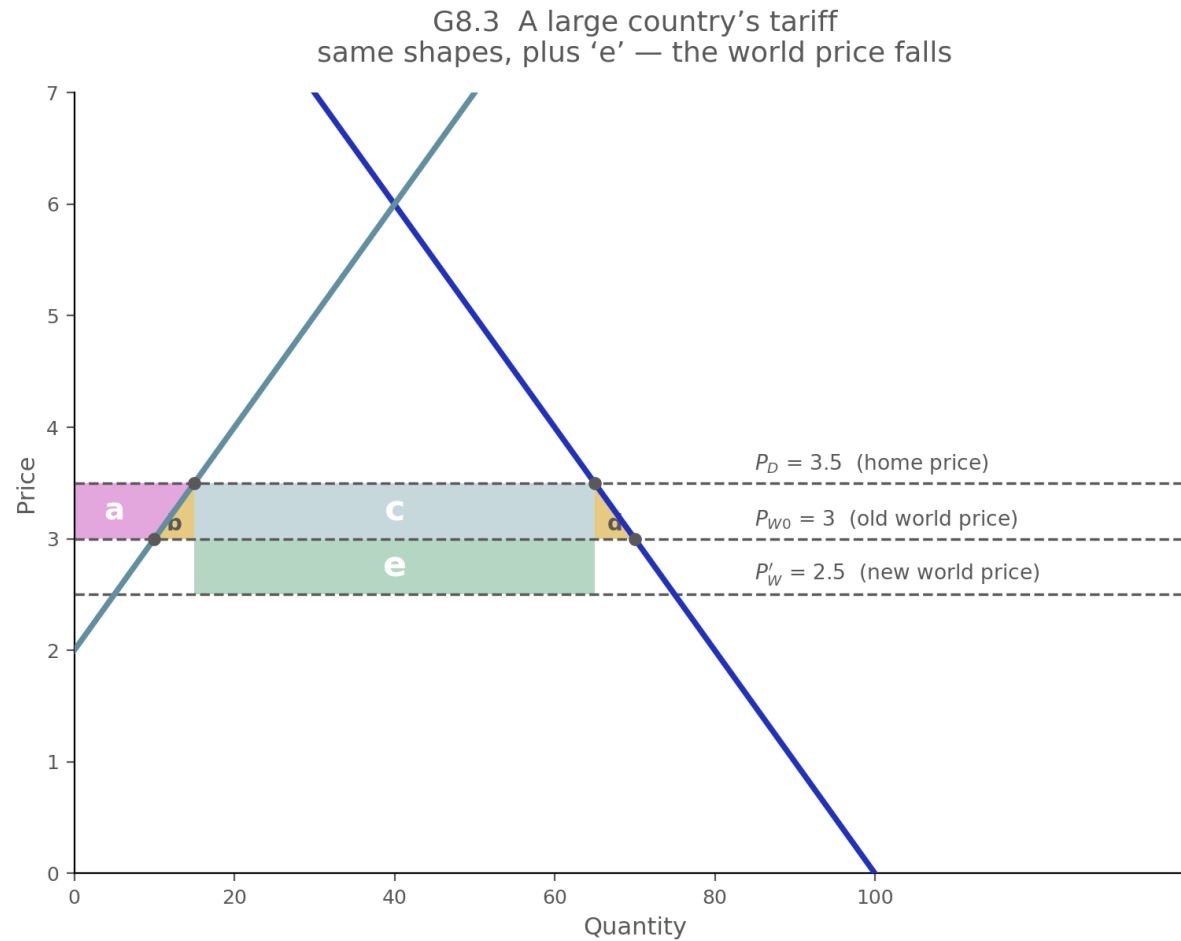
C-8

Exercise C-8

Steel: small country vs large country

Exercise sheet, Week 8 · parts (a) to (h)

A large country's tariff



The same table, one more row

Area	What it is	Value	Who gets it
a	Producer surplus gain	6.25	Home producers
b	Production distortion	1.25	Lost
c	Tariff revenue	25	Home government
d	Consumption distortion	1.25	Lost
e	Terms-of-trade gain	25	Home govt (from FOREIGN exporters)

Net = e – (b+d) = 25 – 2.5 = +22.5. Same instrument, same home market — the country GAINS.

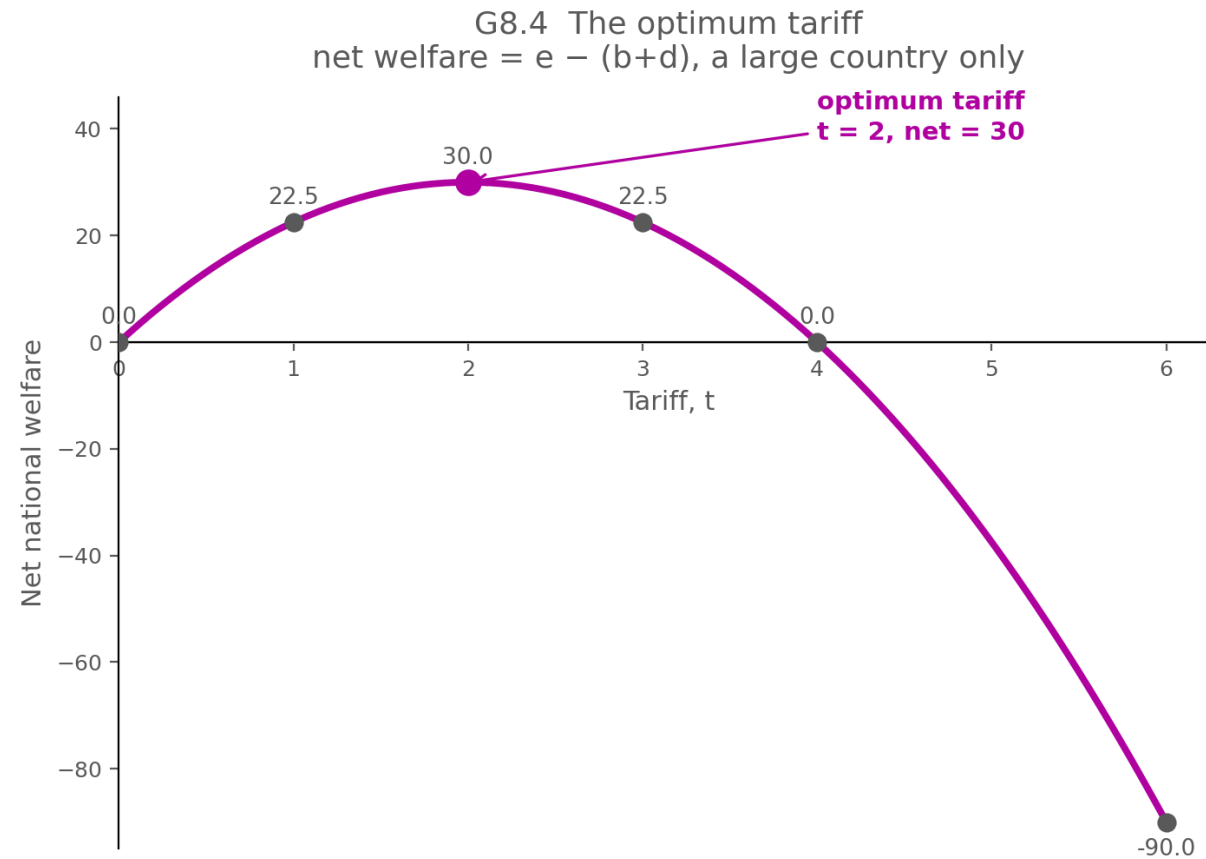
The split depends on the slopes

Fifty-fifty is not a law. Hold the tariff at 1, and the slope of MD at 20 and change only how flat XS is:

XS = kP	MD : XS slope	Foreign share of t
k = 5 (steep)	20:5 = 4:1	80%
k = 20 (baseline)	20:20 = 1:1	50%
k = 80 (flat)	20:80 = 1:4	20%
$k \rightarrow \infty$ (horizontal)	$\rightarrow 0:1$	$\rightarrow 0\%$

The side that responds LESS to price bears MORE of the tariff. The small-country case is just the last row.

How high should the tariff be?



Week 8 in five lines

- MD/XS answers a different question from RS/RD — one good, money price, partial equilibrium.
- A small country's tariff is pure loss — areas b + d, no offsetting gain, ever.
- A large country's tariff can genuinely pay — area e captures value from foreign exporters.
- The split between home and foreign depends on the relative slopes of MD and XS.
- A tariff that helps a large country invites retaliation — next week's subject.

Everything above is in the explanation expansion, §8. Next week: retaliation and trade wars.

International Economics

Week 9

Security, chokepoints, and sanctions

A quick vote

Two countries can each choose free trade or a tariff. Each does best by tariffing **REGARDLESS** of what the other does — but if both tariff, both end up worse off than if both had stayed open.

Does this outcome have a name you may already have met?

A) Nash bargaining B) The Coase theorem C) A Prisoner's Dilemma D) Comparative advantage

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The turn

- Weeks 1–8 all answered one question: what is efficient?
- Week 8 ended on a warning: a country's optimum tariff invites a partner with the same incentive to tax back.
- Efficiency was never the only objective. Countries also care about not being at another country's mercy — and the two goals do not always agree.

Two words, and no more

Game — each side's best choice depends on what the OTHER side does.

Dominant strategy — a choice that is best no matter what the other side does.

The trade-war game

Week 8's steel market: Home's optimum tariff ($t=2$) gives +30, extracting $e=40$ from Foreign.

	Foreign: free trade	Foreign: tariff
Home: free trade	(0, 0)	(-40, +30)
Home: tariff	(+30, -40)	(-10, -10)

Tariff dominates for BOTH sides. Nash equilibrium: (tariff, tariff) = (-10, -10) — worse for both than (0, 0).



Exercise C-9

Steel: retaliation and concentration

Exercise sheet, Week 9 · Part 1 (a)-(d), Part 2 (e)-(g)

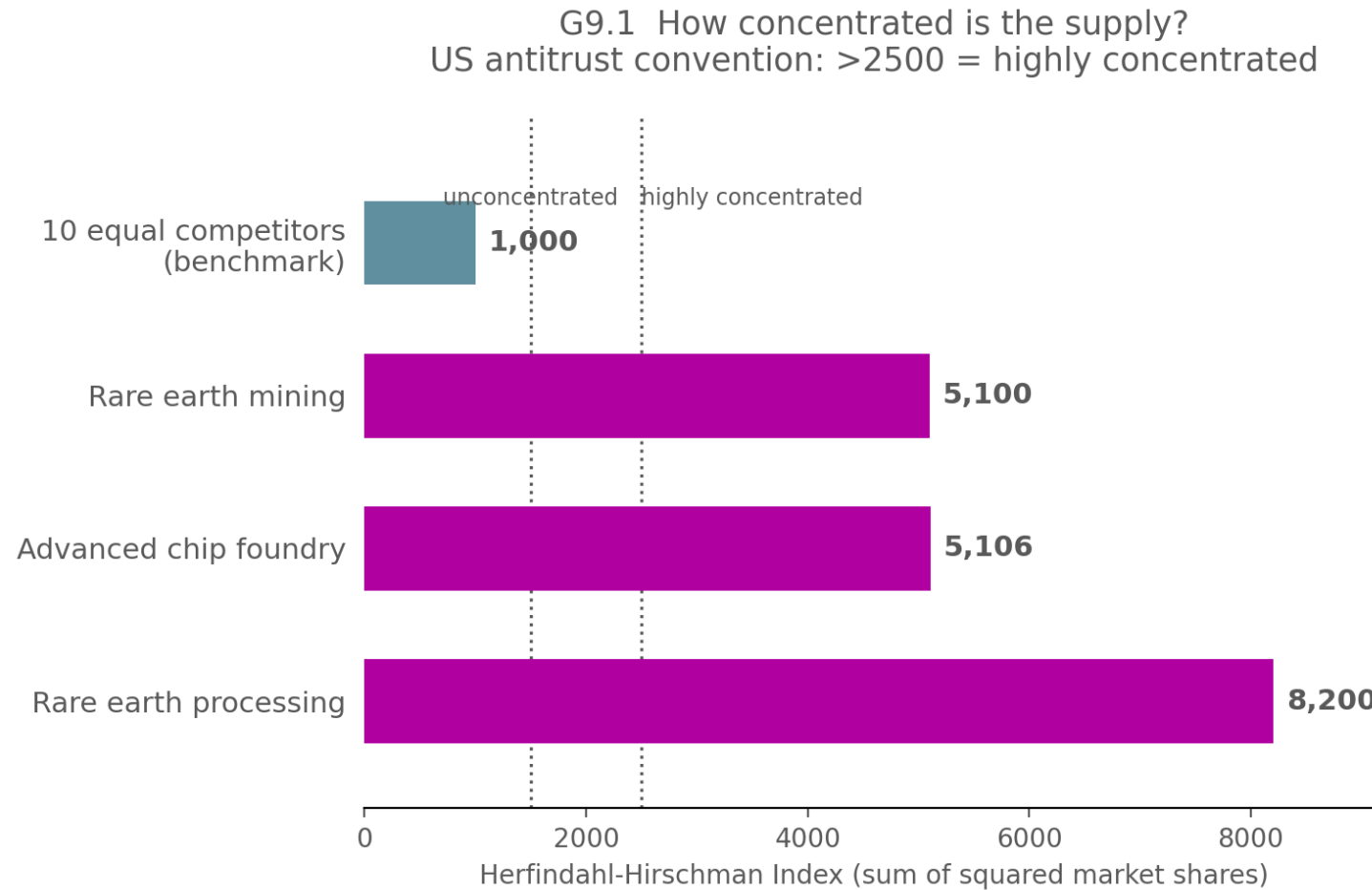
Chokepoints

Chokepoint — a point in a supply chain so concentrated that disrupting it disrupts nearly everyone downstream.

HHI (Herfindahl–Hirschman Index) — square each supplier's % market share, add them up. 0 = many equal suppliers. 10,000 = one monopolist.

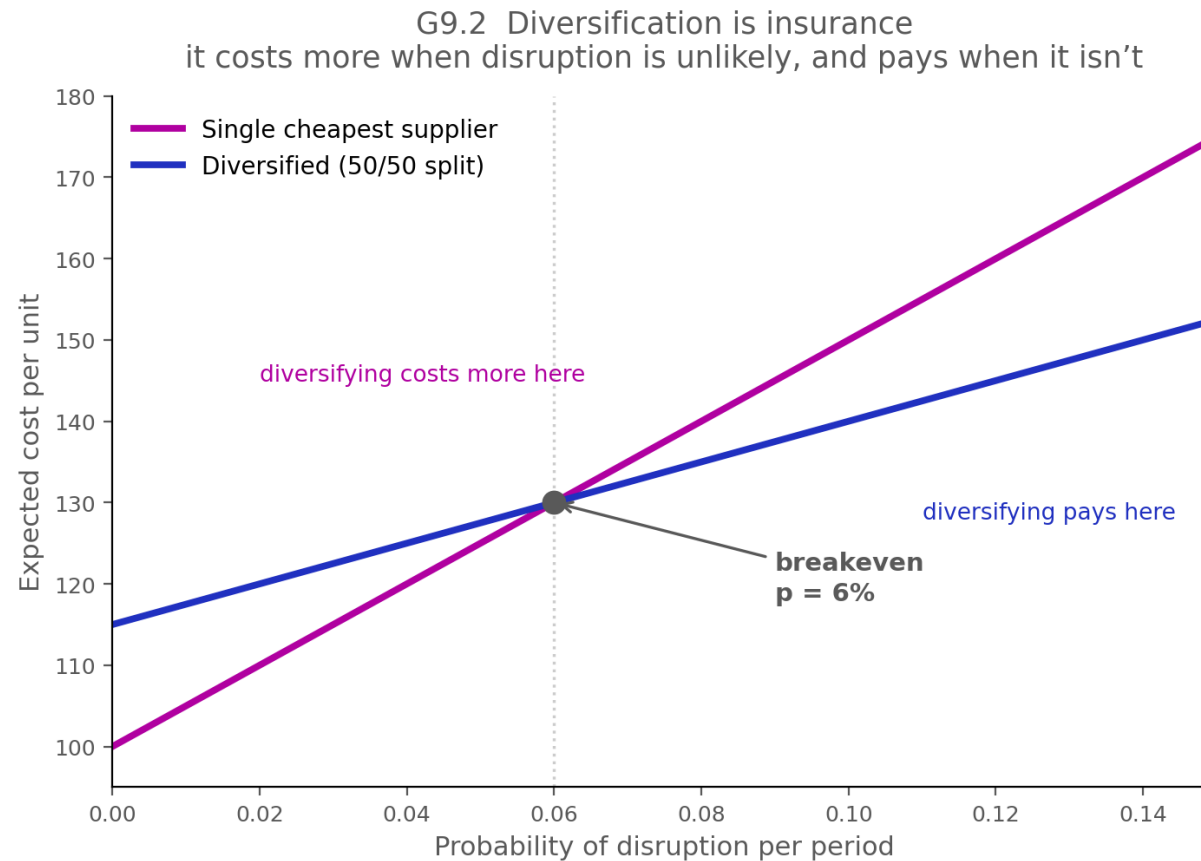
>2,500 = highly concentrated (US antitrust convention)

The bottleneck is rarely where you'd guess



The price of security

Diversifying suppliers is insurance: a certain cost today against an uncertain disruption tomorrow.



Hungary's bet on batteries

>€15 billion committed · 87.5+ GWh operational (2026) · ~200 GWh target by 2030 — about ⅓ of European production

CATL Debrecen (€7.3bn, 40 GWh) and BYD Szeged (€4bn) are the two largest. CATL has signed dual-education partnerships with several Hungarian universities — including the University of Miskolc.

Diversification has its own risk: CATL suspended phase 2 of Debrecen; BYD delayed mass production. Betting against supply concentration doesn't remove the risk of betting on future demand.

Sanctions: a wedge with a destination

A sanction is a tariff-like wedge against ONE partner — not the whole world.

Since 2022, Russian oil exports have shifted from mostly-Europe to ~80% China and India — at discounts exceeding \$22/barrel below benchmark, plus higher shipping and insurance costs.

Trade mostly REDIRECTS rather than disappears. Whether the cost changes behaviour is a harder, contested question this course will not try to settle.

Week 9 in five lines

- Efficiency was never the only objective — security against disruption matters too.
- Retaliation turns the optimum tariff into a Prisoner's Dilemma — individually rational, jointly worse.
- HHI measures concentration — the sharpest chokepoint is often processing, not the raw material.
- Diversifying suppliers is insurance — a certain cost against an uncertain disruption, with a real breakeven.
- Sanctions create a wedge against one partner — trade typically redirects at a discount, rather than stopping.

Everything above is in the explanation expansion, §9. Next week: countermeasures, ERP, and industrial policy.

International Economics

Week 10

Countermeasures and the politics of protection

A quick vote

A tariff helps 10 firms by €1.5 million each. It costs 10 million households €6.50 each.

Which side do you expect to lobby harder for this policy?

A) The 10 firms B) The 10 million households C) Both equally

Scan the QR code · vote now

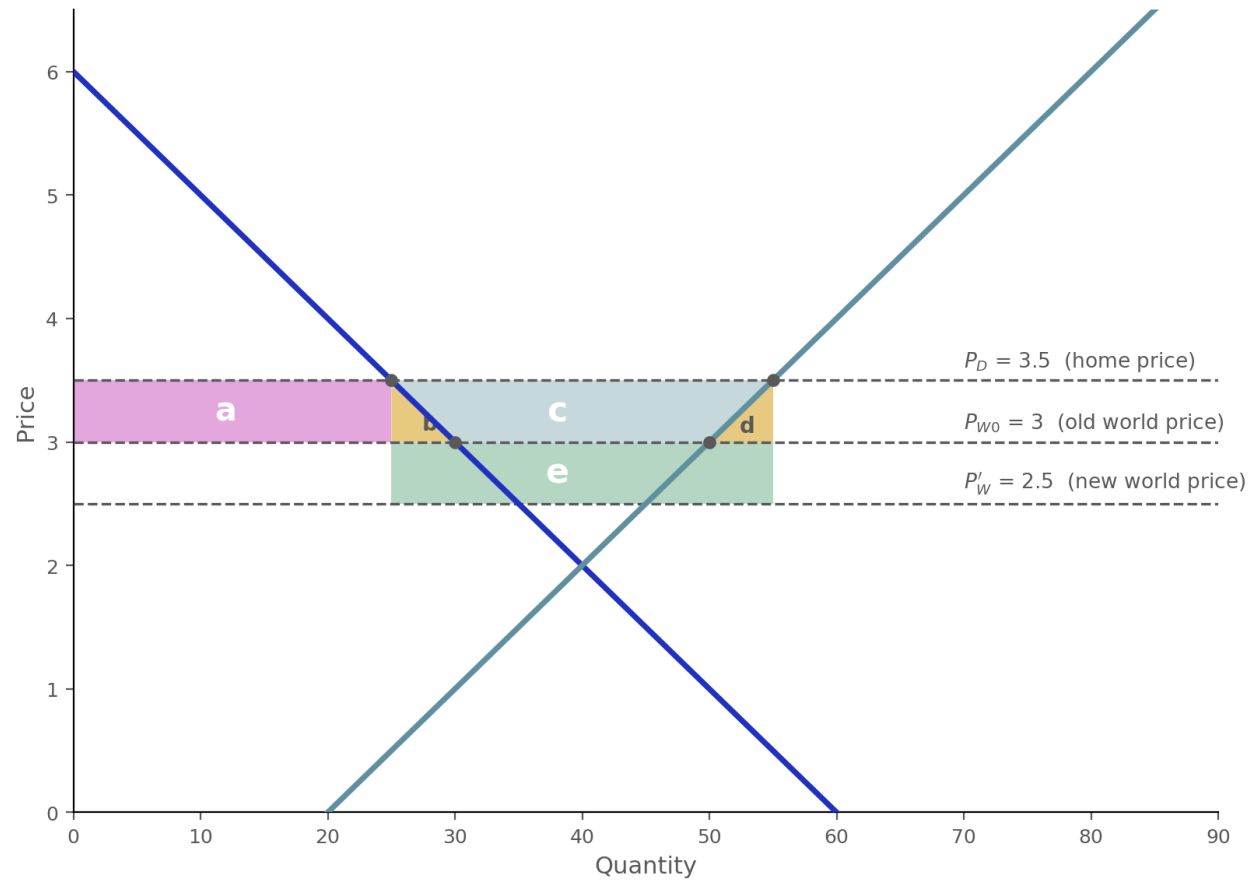
The mirror image: an export subsidy

- Week 8 modelled the tariff. Its mirror is the export subsidy — a payment per unit exported.
- Same a-b-c-d-e machinery as the tariff diagrams.
- But for a LARGE country, the terms-of-trade area e runs the OPPOSITE way.

Home $D = 60 - 10P$, $S = 10P + 20$. No-subsidy: $P=3$, exports=20. Subsidy $s=1 \rightarrow$ home price 3.5, world price falls to 2.5, exports rise to 30.

A large country's export subsidy

G10.1 A large country's export subsidy
same grammar as Week 8's tariff diagrams — but e is now a LOSS



C-10a

Exercise C-10a

Wine: a large country's export subsidy

Exercise sheet, Week 10 · parts (a) to (f)

The question this week answers

China gives its EV producers a 25% subsidy.

How much of an advantage does that give them — and does a matching 25% EU tariff offset it?

The honest answer: not necessarily. It depends on what happens to INPUT costs on both sides.

Value added and effective protection

$$VA = P_{\text{out}} - P_{\text{in}}$$

$$g = (VA' - VA) / VA$$

EV: 30,000 price, 20,000 imported inputs $\rightarrow$ VA = 10,000.

China's side: what does 25% actually buy?

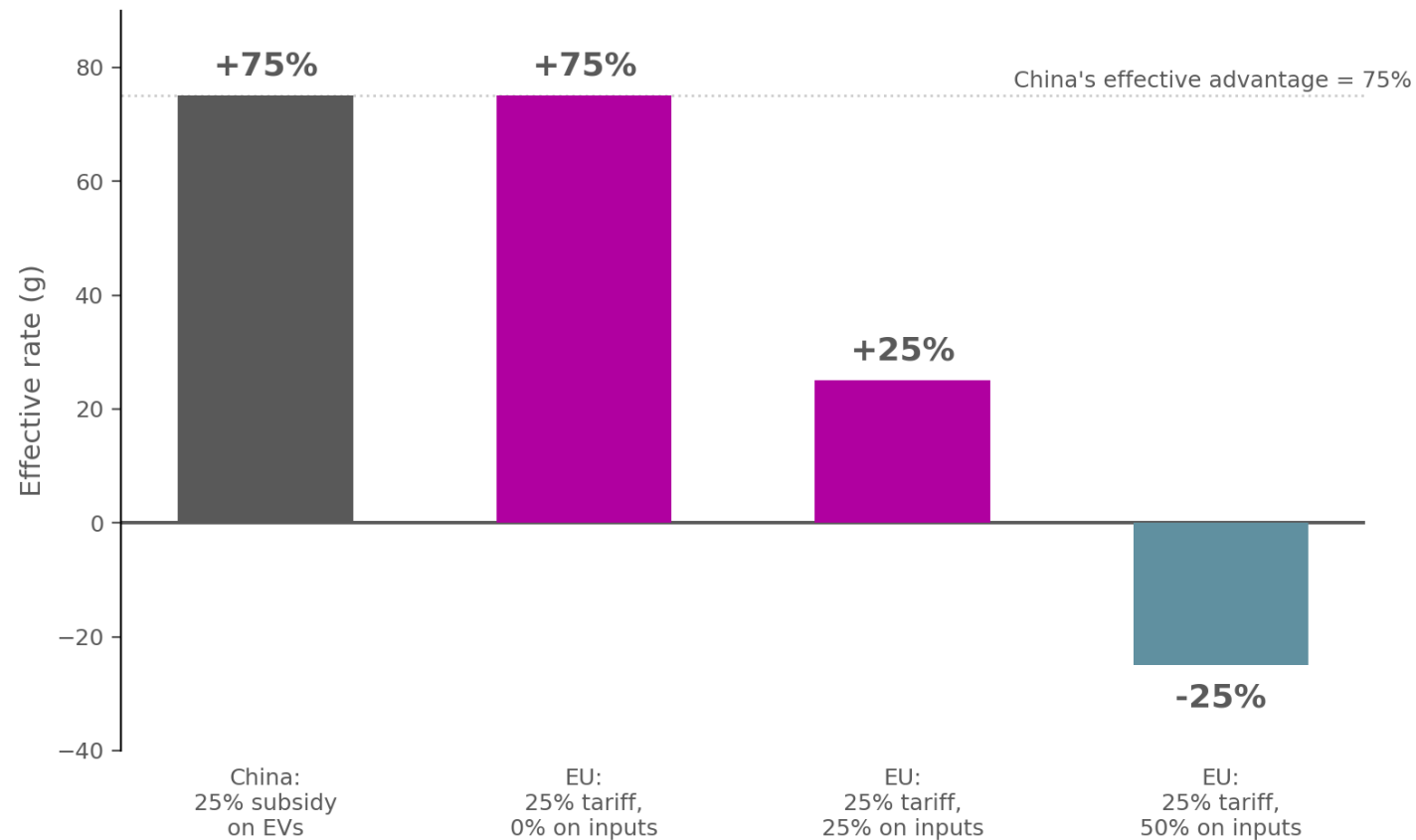
$$VA' = 30,000 \times 1.25 - 20,000 = 17,500$$

$$g = (17,500 - 10,000) / 10,000 = +75\%$$

A 25% nominal subsidy on the OUTPUT delivers a 75% boost to value added — three times the headline number.

Europe's side: does 25% match it?

G10.2 Matching the nominal rate isn't enough
only ONE of these three EU schedules actually matches China's advantage



C-10b

Exercise C-10b

EVs: China's subsidy and Europe's response

Exercise sheet, Week 10 · parts (a) to (d)

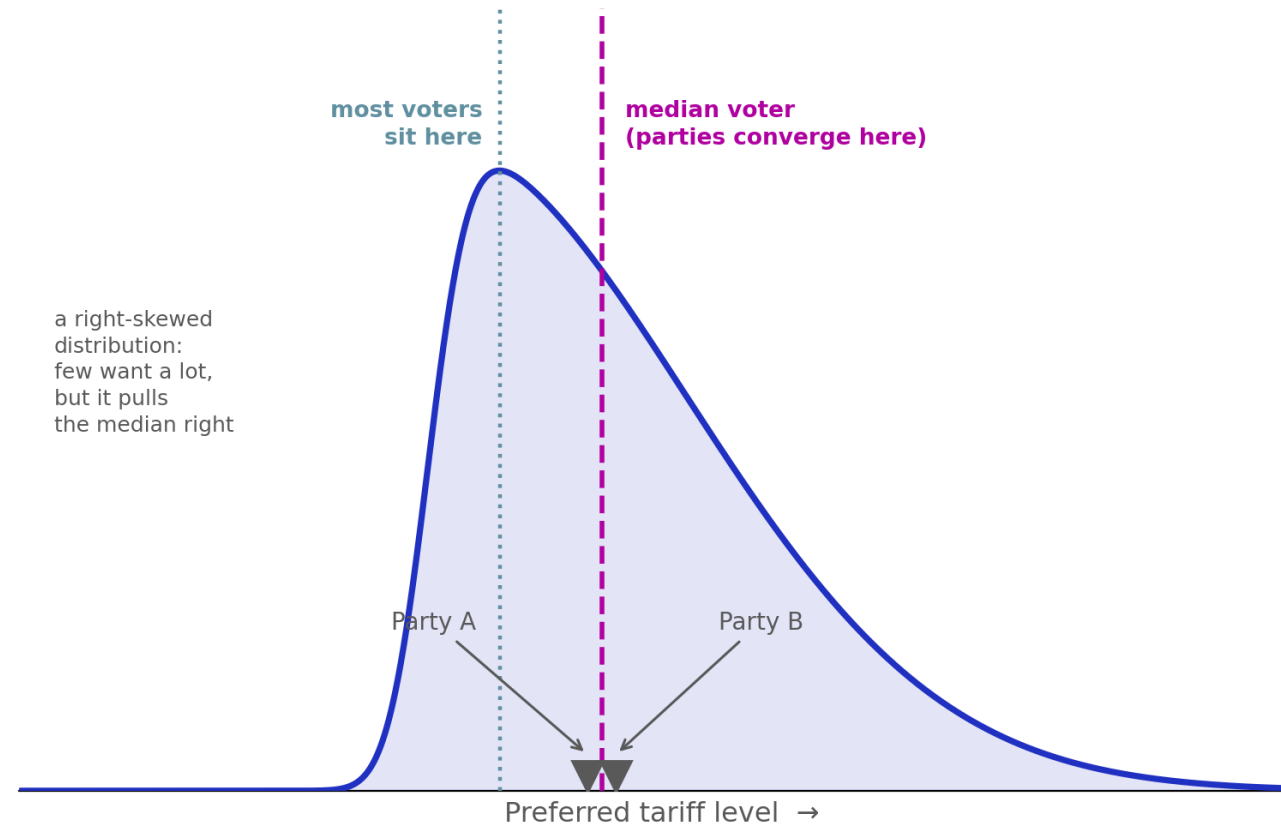
Concentrated gains, diffuse losses

	Producers	Consumers
Total	+15 million	–65 million
Per head	+1,500,000 each	–6.50 each

Nobody organises a campaign over €6.50. Ten firms with €1.5m each, absolutely do.

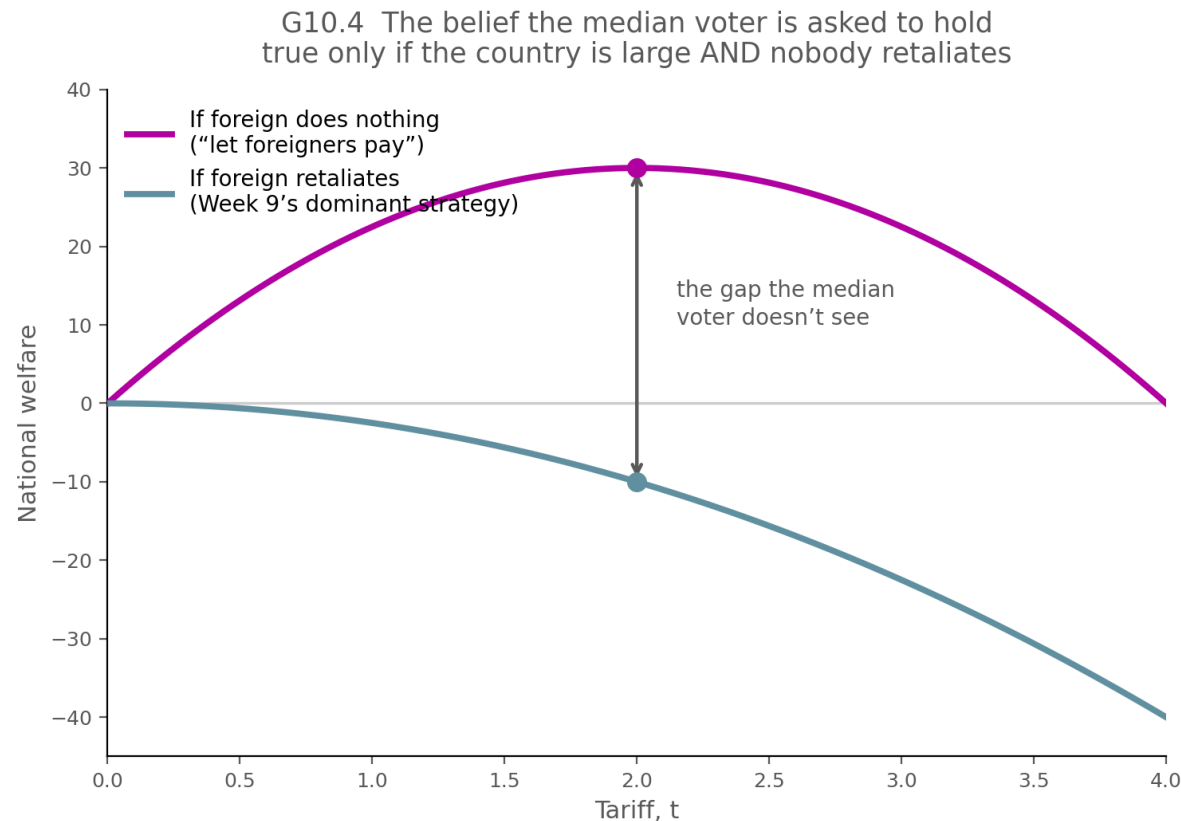
When the majority wants protection

G10.3 Skew moves the median, and parties follow the median not the mode — not where most voters actually are



“Let foreigners pay” — half true

The belief that moves the median voter is Week 8’s own result: a tariff makes FOREIGNERS pay (area e). True only if the country is large (has market power). National welfare may nevertheless fall once retaliation is included.



Efficient, but too slow

- Free trade is first-best. Its real costs (job losses, chokepoints) have real fixes — retraining, diplomacy. Both take YEARS.
- Protection is visible within ONE political cycle. A short political horizon makes the fast, second-best option rational — even for a politician who knows it isn't the best one.

The Common Agricultural Policy

1962: launched from a genuine postwar food-security emergency. Peaked near two-thirds of the ENTIRE EU budget by the 1980s. Today, 60+ years on, still close to a third — while agriculture is 1.4% of EU GDP.

The emergency ended decades ago. The organised farm lobby it created did not.

Week 10 in five lines

- An export subsidy mirrors a tariff — but a large country's terms-of-trade area e is now a LOSS.
- Effective protection (g) measures value added, not the nominal rate — input tariffs can turn it negative.
- Concentrated producers organise; diffuse consumers do not — Olson's logic, in Week 8's own numbers.
- A majority can also WANT protection, if it believes “let foreigners pay” — true only if nobody retaliates.
- First-best fixes are slow; protection is fast — why the efficient policy often loses on a short political clock.

Everything above is in the explanation expansion, §10. Next week: the balance of payments.

International Economics

Week 11

The balance of payments and exchange rates

THE FINAL WEEK

A quick vote

Hungary ran a CURRENT ACCOUNT SURPLUS in 2024.

Do you expect this was driven mainly by goods, or by services?

A) Goods (physical products crossing the border) B) Services

Scan the QR code · vote now

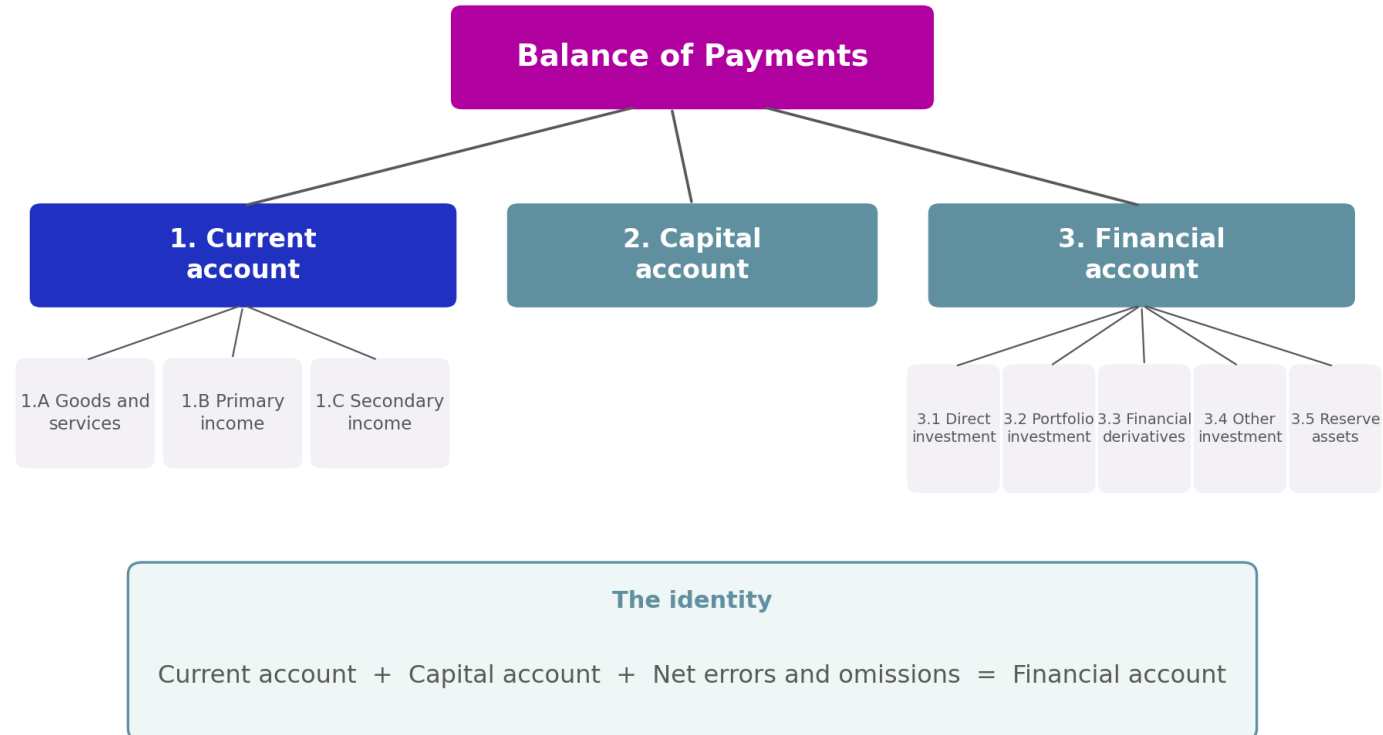
What the balance of payments is

The record of ALL of a country's transactions with the rest of the world over a period, in one consistent accounting system.

Nothing new economically — it is the bookkeeping everything from Weeks 1–10 eventually shows up in.

The BPM6 structure

G11.1 The structure of the Balance of Payments (BPM6)



The sign-convention trap

MNB: financial account = NET LENDING, same sign as current account.

Textbook: all accounts SUM TO ZERO — financial account gets the OPPOSITE sign.

Same 504.6 billion HUF. Opposite sign, depending which report you're reading.

Same data, two conventions

G11.2 Same transactions, two conventions
only the financial account changes sign — everything else is identical



A structural feature, not a mistake

Recording every good, service, income payment, and financial transaction crossing a border — in real time, from thousands of sources — is genuinely difficult. Every country, every year.

Hungary's 2024 quarters: -524, +272, -287, -652 bn HUF — large and volatile, exactly what a hard measurement problem looks like.

C-11

Exercise C-11

Hungary, 2024 — the whole week in one sheet

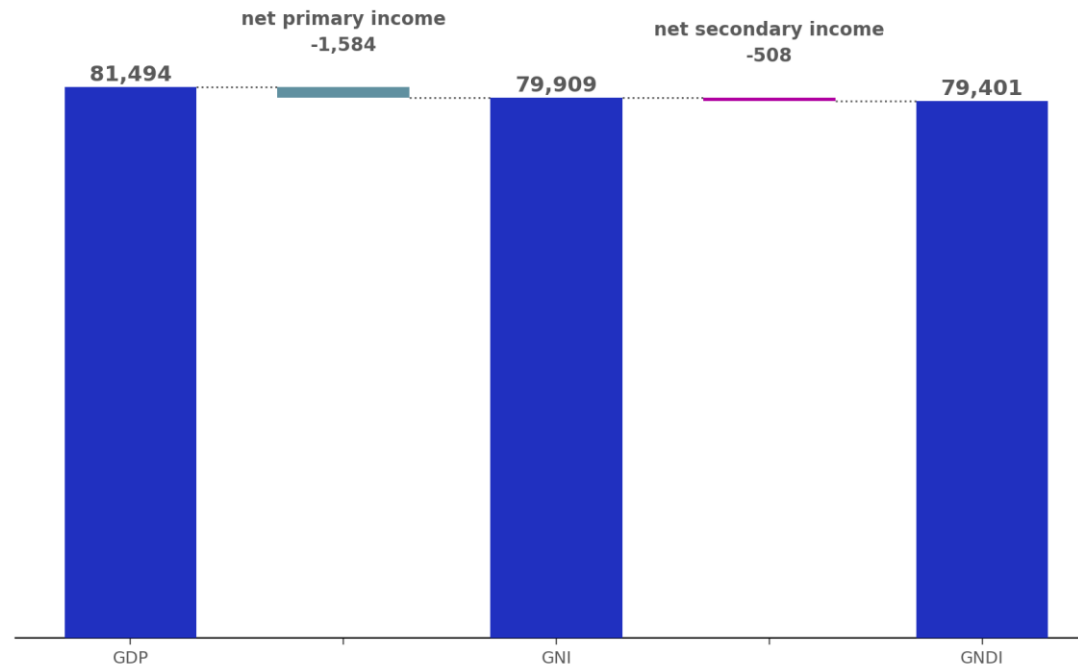
Exercise sheet, Week 11 · parts (a) to (h) — the final exercise of the course

GDP to GNI to GNDI

GNI = GDP + net primary income received from abroad (= BoP item 1.B)

GNDI = GNI + net secondary income received from abroad (= BoP item 1.C)

G11.3 GDP to GNDI, Hungary 2024 (revised)
billion HUF (KSH, revised vintage; secondary income per MNB)



Resolving last year's puzzle

An earlier vintage looked like a genuine KSH/MNB disagreement: +507bn vs –508bn, same size, opposite sign.

The +507bn EU subsidy/tax flow was never secondary income — both KSH and MNB (item 1.B.3.1) classify it as PRIMARY income. Correctly classified, the two agencies AGREE almost exactly.

A classification question, not a measurement failure — worth checking before concluding two agencies simply disagree.

Exchange rate (E)

E = the price of one unit of foreign currency in home currency.
For Hungary: E = the HUF price of one euro.

E RISES → more forint per euro → DEPRECIATION (weaker)

E FALLS → fewer forint per euro → APPRECIATION (stronger)

Regimes: who does the adjusting?

Regime	A deficit is resolved by...
Floating	E rises automatically — no policy needed (Hungary)
Fixed	the central bank sells reserve assets to hold E steady — finite, not self-correcting
Managed float	mostly market-driven, with occasional central-bank intervention

The reserve-assets line in the financial account is where the regime choice becomes visible in the accounts.

A depreciation acts like a tariff and a subsidy at once

E rises 380 → 400 (5.3% depreciation)

Import (€20,000 car): 7,600,000 → 8,000,000 HUF — dearer, like a TARIFF

Export (3,800 HUF wine): €10 → €9.50 — cheaper, like an EXPORT SUBSIDY

Uniform across every good and partner. No revenue collected. No budget spent.

What the balance of payments does not record

Week 1: trade makes countries better off.

Week 9: efficiency was never the only objective — it carries a security cost.

Week 11: does the balance of payments capture any of that?

A deficit financed by a diversified set of partners, and one financed overwhelmingly by a single partner you'd rather not depend on, look IDENTICAL in the accounts. Same numbers. Same accounting identity satisfied either way.

Where this course started

Week 1: a car got CHEAPER in hours of work (−9.4%). A home got DEARER (+23.1%).

Eleven weeks later: trade explains the car. Chokepoints and security explain what trade alone can't. The balance of payments records all of it — completely, and without judgement.

That is the whole course, in one sentence.