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Principles of Economics and Management I

Session 13 · The Open Economy

Introduction



Where We Came From

So far the rest of the world appeared only in pieces: net exports in session 8, the exchange rate channel in session 11, the import leak in the multiplier in session 12. 🌍

Today we open the borders: **trade**, **exchange rates** and **capital flows**.

It is the last session, and the one closest to daily life on a trading floor. 📁



Today's Map

1. 🤝 Absolute and comparative advantage
2. 💵 The exchange rate and the currency market
3. 🛒 Purchasing power parity
4. 📈 Interest rate parity
5. 🌐 The balance of payments and the carry trade

Part 1 · International Trade

Why Trade

We already saw this in session 1: **specialization** and **exchange** make us richer.

The same principle applies to countries. None produces everything well; each focuses on what it does best. 

The interesting question: what if a country is better at producing **everything**? Is trade still worth it?



Absolute Advantage

Absolute advantage: producing a good using **fewer** resources than another country.

It looks as if a country with an absolute advantage in everything gains nothing from trade. But that is wrong. 🤔

What matters is **comparative** advantage.

Comparative Advantage

Comparative advantage: producing a good at a **lower opportunity cost** than another country.

Even a country that is better at everything has to **choose**. It specializes where its advantage is **greatest**.

And leaves to the other the goods where its own disadvantage is **smallest**. Both gain. ✨



An Example

Portugal and Denmark produce wine and cloth. Hours per unit:

	Wine	Cloth
Portugal	1 h	2 h
Denmark	6 h	3 h

Portugal is better at both (absolute advantage). But look at the **opportunity costs**.



An Example

Portugal: 1 wine costs $\frac{1}{2}$ cloth. Denmark: 1 wine costs 2 cloth.

Portugal has the lower opportunity cost in **wine**: it specializes there. Denmark, in **cloth**.

By trading, both consume more than if they produced everything on their own. 🍷 🧵

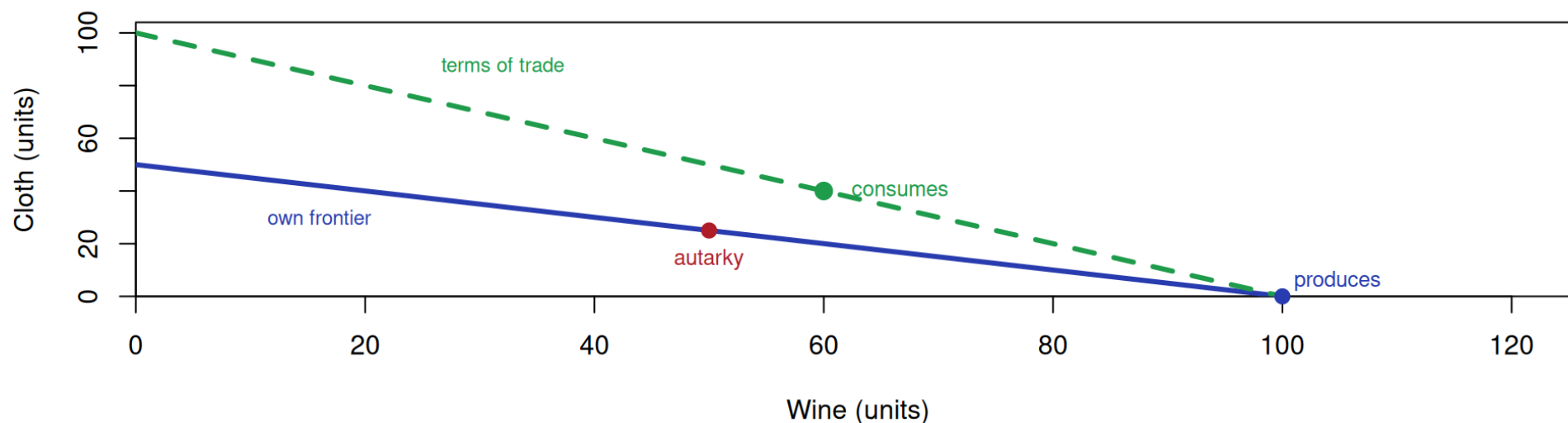
 Source: OpenStax *Macro* 3e, §20.1 “Absolute and Comparative Advantage”, worked with Saudi Arabia and the United States producing oil and corn. The case where one country is better at **everything** is §20.2, with US and Mexican shoes and refrigerators.



Session 1, Made Precise

Session 1 built the frontier and left one thing open: the price at which two producers actually trade, and how the gains get split. Here is the frontier again, with the numbers of this example:

Portugal has 100 hours. All wine gives 100 units; all cloth gives 50. It trades at **1 cloth per wine**:



Specialize, then trade along the green line: **consumption outside your own production frontier**.



Where Can the Trading Price Sit?

Not just anywhere. The terms of trade must lie **between** the two opportunity costs, which here are 1/2 for Portugal and 2 for Denmark:

$$\frac{1}{2} < \frac{\text{cloth}}{\text{wine}} < 2$$

Outside that range, one of the two countries does better producing at home and refuses to trade.

Inside it, **both** gain. Where exactly it lands inside the range decides how the gains are **split**, and that is bargaining power, not comparative advantage.

Which is most of what trade negotiations are actually about. 🤝

 Source: OpenStax *Macro* 3e, §20.2, "How Opportunity Cost Sets the Boundaries of Trade", which derives exactly this range and states it as two inequalities per country.



Who Loses From Trade

The gains are real, and they are not evenly spread. That is the model, stated plainly.

A country specializing in wine **contracts** its cloth sector. Owners and workers in cloth lose their jobs and often their industry.

The theorem says the **country** gains: total gains exceed total losses, so the winners **could** compensate the losers. It does not say they do. 

When compensation and retraining do not happen, opposition to trade is a rational response. Keep those two claims apart.

? Multiple Choice 1

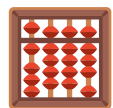
Comparative advantage is based on:

- A. Having the lower opportunity cost.
 - B. Producing with fewer resources in absolute terms.
 - C. Having a larger population or more capital.
 - D. Exporting more than you import.
-  **A.** Opportunity cost, and nothing else, decides where each country specializes. Option B is **absolute** advantage, which is neither necessary nor sufficient for gains from trade.

? Multiple Choice 2

Two countries have **identical** opportunity costs in both goods. Then:

- A. Both gain a great deal, since trade always helps.
 - B. The larger one gains and the smaller one loses.
 - C. There are no gains from specialization: neither has a comparative advantage.
 - D. They should trade anyway, to diversify.
- ✓ **C.** Comparative advantage requires a **difference** in opportunity costs. With none, the terms of trade range collapses to a point and there is nothing to divide. The difference is what creates the gain.



Numerical Question

Country A makes 1 wine in 1 hour and 1 cloth in 2 hours. Country B needs 3 hours for wine and 4 for cloth.

- a) Compute the opportunity cost of 1 wine in each country.
- b) Who exports wine, and who exports cloth?
- c) Give the range of terms of trade at which both gain.
- d) Does country A have an absolute advantage, and does it matter?



Solution

- a) A: 1 wine costs $1/2$ cloth. B: 1 wine costs $3/4$ cloth.
- b) A has the lower opportunity cost in wine, so **A exports wine** and **B exports cloth**.
- c) Any price between $1/2$ and $3/4$ cloth per wine. Outside it, one country prefers autarky.
- d) Yes, A is faster at **both**. And it does not matter: A still gains by concentrating where its edge is largest, and B still gains where its disadvantage is smallest. That is the whole Ricardian point. 

Part 2 · The Exchange Rate

The Price of a Currency

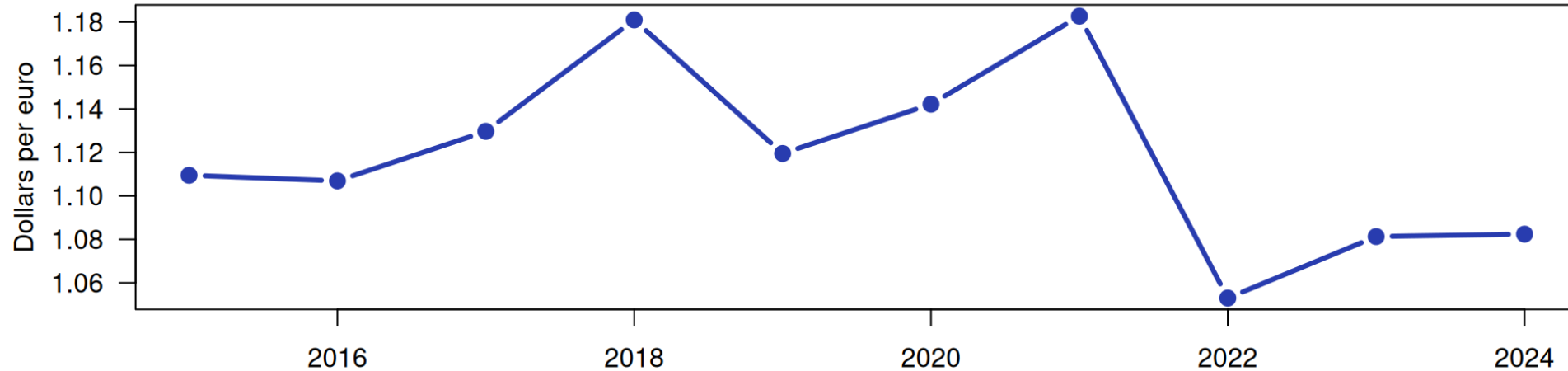
Exchange rate: the price of one currency in terms of another (EUR/USD, for example).

It comes out of the **supply and demand** for each currency in the foreign exchange market.

Whoever wants European goods or assets demands euros; whoever invests abroad supplies euros. 



The Euro Against the Dollar, in Practice



Neither fixed nor predictable: in 2022 the euro reached parity with the dollar. Source: Eurostat. 💵💶



Appreciation and Depreciation



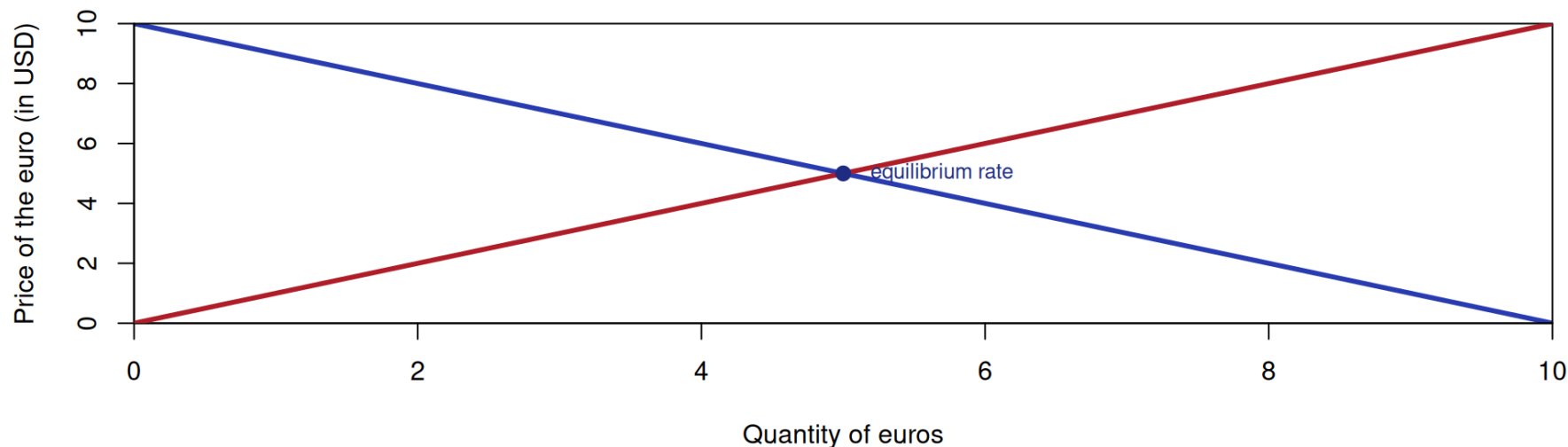
Appreciation: the euro becomes more **expensive** in another currency. European exports become more expensive abroad.



Depreciation: the euro becomes **cheaper**. Exports become more competitive, but imports get more expensive.



Supply and Demand for Euros



Whoever wants to buy European goods demands euros; whoever invests abroad supplies euros.

 Source: OpenStax *Macro 3e*, §16.1 “How the Foreign Exchange Market Works”, “Demanders and Suppliers of Currency in Foreign Exchange Markets”, which lists exactly who sits on each side of this diagram.



Purchasing Power Parity

A first, long-run theory: the **law of one price** applied to baskets.

PPP: the exchange rate adjusts so that the same basket costs the same in both countries.

$$S = \frac{P^*}{P},$$

where S is the exchange rate in dollars per euro, P the euro area price level (in euros) and P^* the US one (in dollars).



The Intuition Behind PPP

If a basket costs €100 in the euro area and \$120 in the US, PPP implies $S = 1.20$ USD per euro.

If the euro sits above that, European goods become expensive, exports fall, and the euro tends to **depreciate** toward PPP.

PPP works in the **long run**. In the short run, exchange rates deviate a great deal. 

 Source: OpenStax *Macro* 3e, [§16.2](#), “Purchasing Power Parity”; the section also points to the **Big Mac index**, which is PPP measured with a single burger.



The Real Exchange Rate

What actually determines competitiveness is not S but the **real** exchange rate:

$$\varepsilon = \frac{S \cdot P}{P^*}$$

It answers: how many foreign baskets does one domestic basket buy? PPP is exactly the statement that $\varepsilon = 1$ in the long run.

Note there are **two** ways to lose competitiveness: the nominal rate appreciates, or domestic prices rise faster than abroad. The second works just as well as the first. 

Which Is the Euro Area's Problem

Inside a monetary union, S against your main trading partners is fixed at one, permanently.

So if P rises faster than P^* , ε rises and competitiveness falls, and **there is no devaluation available** to undo it.

The only route left is to push P down relative to partners: wage restraint and falling costs. That is **internal devaluation**, and it is slow and painful.

Portugal, Spain, Greece and Ireland all did exactly this after 2010. It is the price of the exchange rate stability the euro buys. 

 Source: OpenStax *Macro* 3e, §16.4 "Exchange Rate Policies", "A Merged Currency", and the table comparing floating rates, soft pegs, hard pegs and a merged currency on exactly this tradeoff.



Interest Rate Parity

In the short run, what moves the exchange rate is **capital flows** and interest rates.

Uncovered parity (UIP): the interest differential equals the expected depreciation of the currency.

$$i - i^* \approx \frac{S - S^e}{S}.$$

With S in dollars per euro, the right-hand side is the expected **fall** in S : the expected depreciation of the euro.



Interest Rate Parity

If the euro area raises rates (a higher i), capital flows into the euro, which **appreciates**.

But UIP says that, in equilibrium, that higher rate is offset by an **expected depreciation**.

This is the basis for how currency markets react to ECB and Fed decisions. 

? Multiple Choice 3

A euro area country inside the monetary union sees its prices rise faster than its partners'. Its real exchange rate and competitiveness:

- A. Are unaffected, because the nominal rate is fixed at one.
- B. Improve, because higher prices mean higher value added.
- C. Are corrected automatically by a nominal devaluation.
- D. Worsen, and only internal devaluation can correct them.

 **D.** With $\varepsilon = SP/P^*$ and S fixed, all the adjustment has to come through P . Option C is precisely what union membership removes, and that is the trade-off the euro represents.

? Multiple Choice 4

Under uncovered interest parity, a currency offering a **higher** interest rate is expected to:

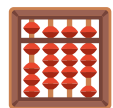
A. Depreciate, by roughly the interest differential.

B. Appreciate, since capital flows in.

C. Stay flat, since parity means equality.

D. Move only if inflation differs.

 **A.** Otherwise there would be a riskless gain from simply holding the high-rate currency. Note this concerns the **expected future** path: on the announcement, that currency typically appreciates **on the spot**, and is then expected to drift back.



Numerical Question

A basket costs 200 euros in the euro area and 240 dollars in the United States.

- a)** What exchange rate does PPP imply, in dollars per euro?
- b)** The market rate is 1.35. Is the euro over or undervalued?
- c)** Compute the real exchange rate at the market rate.
- d)** Euro area rates are 4 percent and US rates 2 percent. What does UIP predict for the euro?



Solution

- a) $S = 240/200 = 1.20$ dollars per euro.
- b) At 1.35 the euro is **overvalued** by about 12.5 percent against PPP. European goods look expensive abroad.
- c) $\varepsilon = SP/P^* = (1.35 \times 200)/240 = 1.125$. Above one, confirming the overvaluation.
- d) UIP predicts an expected **depreciation** of the euro of about 2 percent, which points the same way as PPP here. They usually do not agree, and when they do it is worth noticing. 

Part 3 · Capital Flows

The Balance of Payments

All of a country's transactions with the rest of the world are organized into two accounts.



Current account: trade in goods and services, income and transfers.



Capital and financial account: the purchase and sale of assets between countries.



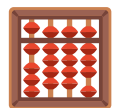
The Two Accounts Mirror Each Other

A fundamental identity of the open economy:

A **deficit** in the current account is financed by a **surplus** in the financial account. The sum balances.

Importing more than you export means capital flows in from abroad to finance the difference. 

 Source: OpenStax *Macro* 3e, [§10.1](#) “Measuring Trade Balances” and [§10.3](#), “The Balance of Trade as the Balance of Payments”.



The Saving-Investment Identity

In an open economy, the current account is linked to saving and investment:

$$CA = S - I,$$

where S is now national **saving**, not the exchange rate of Part 2.

A country that **saves** more than it **invests** domestically exports capital (a current account surplus). If it invests more than it saves, it imports capital. 

 Source: OpenStax *Macro* 3e, §10.4 “The National Saving and Investment Identity”, “Domestic Saving and Investment Determine the Trade Balance”. Whether a deficit is a problem is §10.5.



The Carry Trade

A direct application of interest parity, widely used in finance.

Carry trade: borrowing in a **low** interest currency and investing in a **high** interest one.

You earn the interest differential, **as long as** the exchange rate does not move against the position. \$↔¥



The Risk of the Carry Trade

UIP is the warning: the higher rate should be offset by an expected depreciation.

If that depreciation happens suddenly, the carry trade can suffer large **losses**.

This is **currency risk**: the main risk in any international portfolio.

? Multiple Choice 5

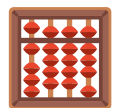
Under the identity $CA = S - I$, a country that invests more than it saves:

- A. Runs a current account surplus.
 - B. Runs a current account deficit and imports capital.
 - C. Does not trade with the rest of the world.
 - D. Has a fixed exchange rate.
- ☒ **B.** Investing above saving requires external financing: a current account deficit.

? Multiple Choice 6

A carry trade earns the interest differential quietly for years, then loses several years of gains in a week. This pattern is:

- A. Evidence that UIP holds exactly at all times.
 - B. Purely bad luck, with no economic content.
 - C. What UIP warns about: the differential is compensation for an expected depreciation that arrives abruptly.
 - D. Impossible, since parity rules out losses.
- ☒ **C.** The strategy is short volatility on the currency. Practitioners call it picking up coins in front of a steamroller, and it is why a carry return series looks safe right up until it is not.



Numerical Question

A country has national saving $S = 120$ billion euros and investment $I = 150$ billion.

- a) Compute the current account.
- b) Does the country export or import capital?
- c) What must the financial account show?
- d) Is a current account deficit necessarily a bad sign?

Solution

- a) $CA = S - I = 120 - 150 = -30$ billion euros: a **deficit**.
- b) It **imports capital**, 30 billion of it, to fund investment above domestic saving.
- c) A **surplus** of 30 billion. The two accounts mirror each other by construction, so this is arithmetic, not a coincidence.
- d) **No**. A country borrowing to fund productive investment is doing what any firm does. It becomes a problem when the borrowing funds **consumption**, or when the maturity is short and the financing can leave suddenly. Which is 2010 to 2012 in the euro area. 

Wrap-Up

What to Take From This Session

Gains from trade come from **comparative** advantage: what counts is opportunity cost.

 In the long run **PPP** anchors the exchange rate; in the short run **interest rate parity** rules.

 The current and capital accounts **mirror** each other: an external deficit is financed by capital inflows.

 The **carry trade** profits from the interest-rate gap between two currencies; currency risk is what can erase that gain.



To Review

OpenStax *Macro* 3e, the sections this session used:

- **Ch. 20, International Trade:** [§20.1](#) · [§20.2](#)
- **Ch. 16, Exchange Rates and International Capital Flows:** [§16.1](#) · [§16.2](#) · [§16.4](#)
- **Ch. 10, The International Trade and Capital Flows:** [§10.1](#) · [§10.3](#) · [§10.4](#) · [§10.5](#)

For the formal treatment: Blanchard, Amighini and Giavazzi, chapters 17, 18, 19 and 20.

Then problem set 13.

End of the Course

We have gone the whole way: from one person's **scarcity** to **capital flows** between countries. 

The final test is in the exam period. Good luck with the studying, and thank you. 