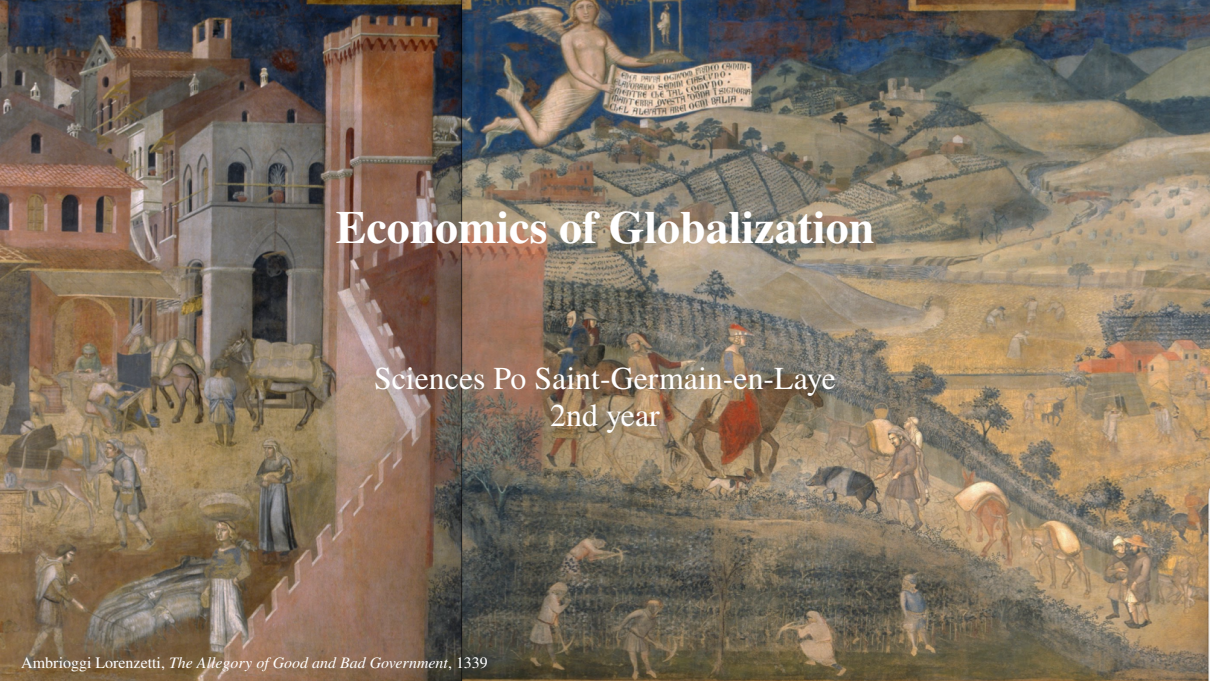
Economics of Globalization

Sciences Po Saint-Germain-en-Laye
2nd year



Ambrioggi Lorenzetti, *The Allegory of Good and Bad Government*, 1339

Opinion **Geopolitics** + Add to myFT

Multilateralism is not idealism, it is a necessity

We need to strengthen our system of co-operation, not replace it

Luiz Inácio Lula da Silva, António Costa, William Ruto and Mark Carney

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The writers are president of Brazil, president of the European Council, president of Kenya and prime minister of Canada

Some may conclude, therefore, the multilateral system has failed. In part, that criticism is understandable. A multilateral system that fails to reflect the realities of today will not survive the test of time. But the need for multilateral co-operation is very much alive. The postwar world is long gone, but the underlying logic that justified multilateral co-operation is more evident than ever.

In this context, we are coming together with a new initiative: ‘Partners for Multilateralism’. P4M is not about creating another exclusive bloc or another international bureaucracy. Its purpose is the opposite: to create a flexible, open framework for countries from different regions and political traditions that are willing to work across divides, to build coalitions for reform and to translate shared principles into practical action. P4M will support the reform of the UN and other multilateral institutions, to make them more representative, legitimate, effective and trusted. It aims to strengthen co-operation between regional organisations, contribute to peace and security, improve global economic governance and develop common approaches to emerging challenges, from AI and climate change to health security and digital transformation.

This week

- Trade theory :
  - Why do countries trade?
  - What are the theoretical gains and losses from trade?
  - Can trade be beneficial to all countries?

$\longrightarrow$ Comparative advantage theory

  - Foundational theory of international economics.
  - Applies to any situation where scarce ressources have to find their best use.

What is a model?

- A model is not the real world, it is a simplified version of it.
  - All models are wrong but some are useful.
  - A map is a model.
- It is an abstract construct that aims at understanding how things work.
- It (generally) isolates a few mechanisms and let the other apart (given or not modeled).

$\longrightarrow$ Important part of scientific reasoning: build hypothesis, study their consequences and test them empirically. Discard them if they do not work.

  - That's the hypothetico-deductive method

What is a model?

- A model is composed of assumptions and results.
- Assumptions are the inputs of the model.
- Results are the output: given a set of assumptions about the world, what results do I find?
- Positive vs. normative statements.
  - Positive (or descriptive) statements aim at describing a phenomenon, its causes and/or its consequences. It can be tested against data from the real world.
  - Normative (or prescriptive) statements reflect value judgments, typically about what is "optimal". It necessitates to state what ends are to be followed.
  - Some models and statements mix both types.
- Trade models are both positive (*why and what do country trade?*) and normative (*is trade good for society?*).

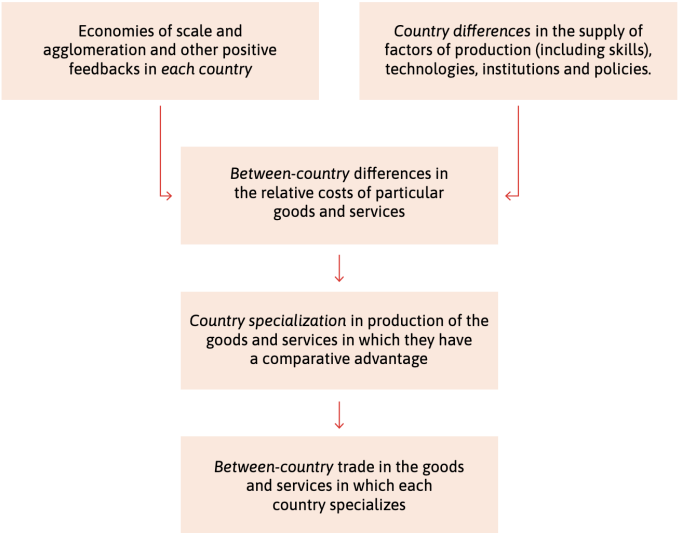
Trade models

- Assumptions:
  - **Setting** (how many countries, industries, goods, factors, etc.).
  - **Endowments** (Labor, Capital, Natural Ressources).
  - **Technology** (how economic inputs are transformed into output *e.g.* constant returns to scale, increaseasing returns to scale, etc.).
  - **Preferences** (how individuals, firms, or governments make decisions).
- Results:
  - What quantities are traded at equilibrium? What are the prices and quantities? How is income distributed?
  - How outcomes change when elements of the model are modified? (*e.g.* how trade moves when trade barriers are relaxed?).

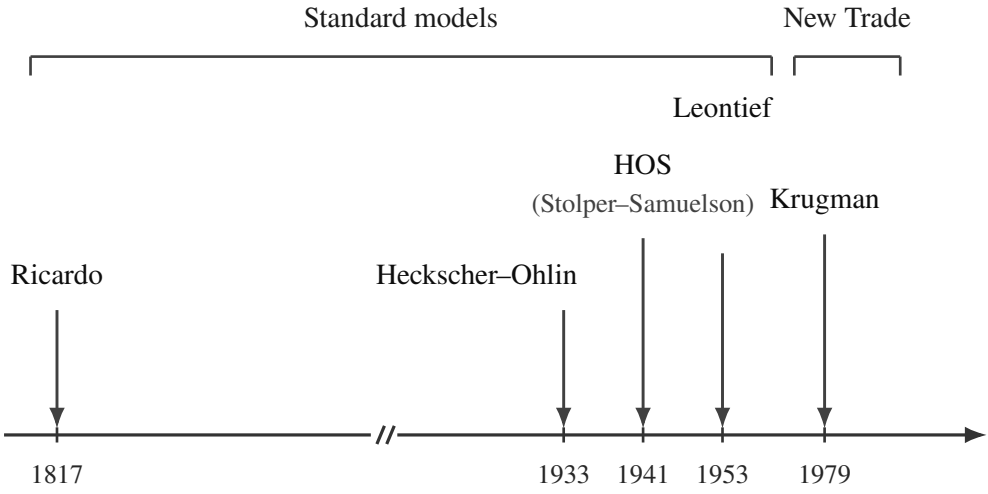
Trade models

- Long history of trade models that target different mechanisms.
- Some of them are focused on the role of cross-country differences to explain trade:
  - **Technology** (Ricardian model): Price differences between countries come from differences in productivity.
  - **Endowments** (Hecksher-Ohlin model): Price differences between countries come from differences in factor endowments.
- Other do not need country differences to explain trade:
  - **Economies of scale** generate the international division of labor through specialization.
- These models need to be seen as complementary (not substitutable). All are useful to understand some characteristics of trade.

The Ricardian Model



Trade models



The Ricardian Model

- What is the impact of opening to trade?
  - Fear of job losses in some industries.
  - Expectations of lower prices.
  - Overall, will trade be good for an economy as a whole?
- The Ricardian model explains trade through international differences in technology.
- Because countries are not all good at producing the same thing, there can be gains if each country specializes in what it does better.

The Ricardian Model

Intuition

- Take France and Cambodia and imagine they produce only two goods, cars and shirts.
- If they devote 100% of their workforce to one of the good:
  - France produces 10000 shirts a year or 10000 cars.
  - Cambodia produces 10000 shirts a year or 3000 cars.
- Assume they allocate 50% of their workforce to each good because trade is closed
  - France produces 5000 shirts a year and 5000 cars.
  - Cambodia produces 5000 shirts a year and 1500 cars.
  - 10000 shirts are produced and 6500 cars are produced
- Now assume that each country fully specializes.
  - France produces 10000 cars.
  - Cambodia produces 10000 shirts.

The Ricardian Model

Intuition

- The world experiences a net gain. With the exact same workforce employed, the world produces 10000 shirts and 10000 cars.
- This is because Cambodia is relatively more productive in producing shirts.
- It is better to specialize in it and let France produce cars.
- These are **specialization** gains.
- There are also **exchange** gains coming from the fact that consumers can consume goods produced abroad.

The Ricardian Model

Definitions

- A country has an **absolute advantage** for a good if its productivity for the production of that good is higher compared to other countries (Adam Smith).

- A country has a **comparative advantage** in a good if its relative productivity for this good is higher than in another country (David Ricardo).

The Ricardian Model

Assumptions

- There are 2 countries, 2 homogeneous goods, one factor of production (labor).
- Production technologies differ across countries. This is the only thing that differs.
- Constant returns to scale.
- Perfect competition (free entry implies 0 profits).
- Identical preferences across countries.
- Workers move freely across sectors but do not move across borders.
- Full employment.
- No transaction costs.

The Ricardian Model

Technology

Table: Number of hours necessary to produce a good

	Boats	Cars
Germany	100	50
France	125	125

- Who has an absolute advantage in the production of boats? And cars?
- Germany has an absolute advantage in both goods.
- Is there still room for specialization?
- Yes, because productivity differences are not the same across sectors.
- German workers are much more efficient in producing cars than boats.

The Ricardian Model

Opportunity costs and comparative advantage

- Think in terms of **opportunity costs**. What do you lose if you produce boats instead of cars?
- If I produce 1 boat, I cannot produce
  - France: $125/125 = 1$ car.
  - Germany: $100/50 = 2$ cars.
- And if I produce one car, I cannot produce?
  - France: $125/125 = 1$ boat.
  - Germany: $50/100 = 1/2$ boat.
- It is less costly to increase the production of boats in France than in Germany.
  - France has a **comparative advantage in boats.**
  - Germany has a **comparative advantage in cars.**

The Ricardian Model

Production possibilities

Assume there are 500 hours of work in each economy.

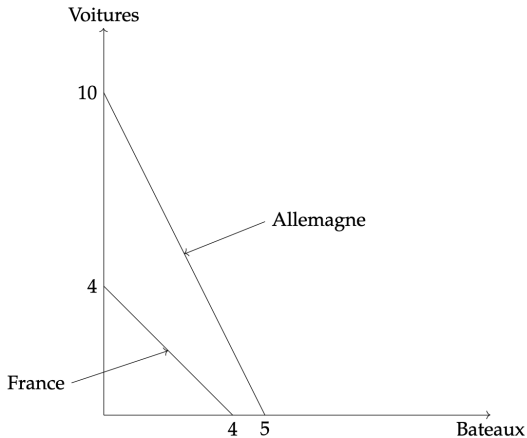


Figure: Production Possibility Frontiers

The Ricardian Model

Comparative advantage and relative prices

- In France, 1 boat costs 1 car:

$$p^{France} = \frac{p^{France}_{boat}}{p^{France}_{car}} = 1.$$

- In Germany, 1 boat costs 2 cars:

$$p^{Germany} = \frac{p^{Germany}_{boat}}{p^{Germany}_{car}} = 2.$$

- **Differences in technology generate differences in opportunity costs and relative prices.**

- These price differences create opportunities for trade.

The Ricardian Model

Opening to trade

- What happens to prices when we open borders to trade?
- Relative prices converge:

$$p^{France} = p^{Germany} = p.$$

- What happens if prices do not adjust?
- Arbitrage opportunities. Law of one price
  - What happens if there are transaction costs?
- For now, assume that the world relative price is between the two autarky prices:

$$p \in (1, 2).$$

The Ricardian Model

Specialization

- France can produce one boat or one car, but can sell one boat for $p > 1$ cars.
  - This generates higher wages in the boat sector, attracting workers to this industry.
- France therefore specializes in boats and produces 4 boats.
- Germany gives up 2 cars to produce one boat, but can buy one boat for only $p < 2$ cars.
- Germany therefore specializes in cars and produces 10 cars.

$\longrightarrow$ **Countries specialize according to their comparative advantage.**

The Ricardian Model

Trade patterns

- France specializes in boats:
  - France exports boats and imports cars.
- Germany specializes in cars:
  - Germany exports cars and imports boats.

$\longrightarrow$ **Comparative advantage determines the pattern of specialization and trade.**

- This is a **positive prediction** of the Ricardian model.

The Ricardian Model

Relative supply

- The world relative price determines specialization.
  - If $p < 1$, France and Germany produce cars only: 14 cars are produced.
  - If $p \in (1, 2)$, France produces 4 boats and Germany 10 cars.
  - If $p > 2$, France and Germany produce boats only: 9 boats are produced.

- This determines the **relative supply** of the model:

$$S(p) = \frac{S_{boats}(p)}{S_{cars}(p)}.$$

Price	< 1	$= 1$	$p \in]1, 2[$	$= 2$	> 2
Boats produced by France	0	$\in [0, 4]$	4	4	4
Boats produced by Germany	0	0	0	$\in [0, 5]$	5
Cars produced by France	4	$\in [0, 4]$	0	0	0
Cars produced by Germany	10	10	10	$\in [0, 10]$	0
Relative supply	0	$\in [0, \frac{4}{10}]$	$\frac{4}{10}$	$\in [\frac{4}{10}, \infty]$	∞

The Ricardian Model

World equilibrium

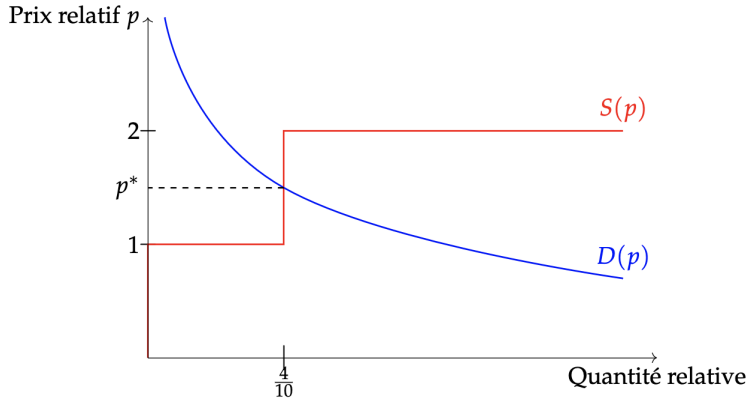


Figure: Relative supply and demand

World relative supply and demand determine the equilibrium terms of trade p.

The Ricardian Model

Gains from trade

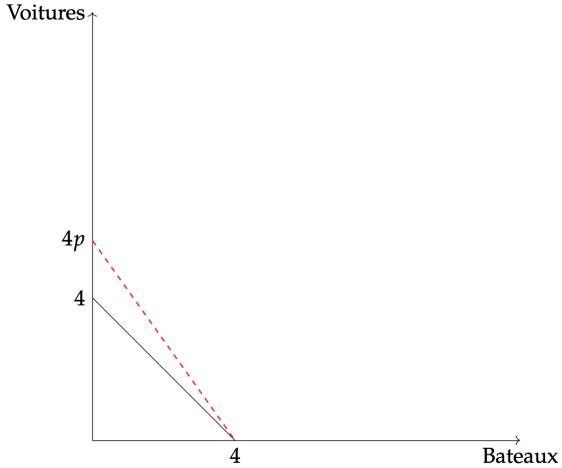


Figure: Production and consumption possibilities in France

The Ricardian Model

Gains from trade

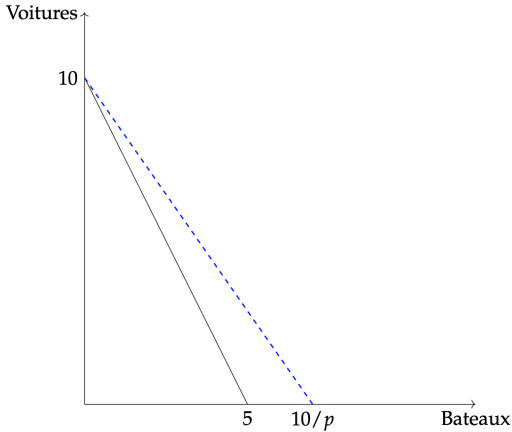


Figure: Production and consumption possibilities in Germany

The Ricardian Model

Gains from trade

- Trade does not change countries' production possibilities.
- It allows countries to consume beyond their production possibility frontier.
- The price level p determines the relative gains from trade.
- If p is close to 2, France can buy more cars with the same number of boats.
- If p is close to 1, Germany can buy more boats with the same number of cars.

- **When $p \in (1, 2)$, both countries gain from trade.**

The Ricardian Model

Main results

- **Technology:** countries differ in their productivity across goods.
- **Comparative advantage:** relative productivity differences generate differences in opportunity costs.
- **Specialization:** countries specialize in goods in which they have a comparative advantage.
- **Trade patterns:** countries export their comparative-advantage goods and import the other goods.
- **Gains from trade:** specialization and trade expand consumption possibilities.
- Here, trade is inter-industry: it is cars *vs.* boats.

First conclusions

- Trade is driven by **relative** productivity differences.
- This is a model of **inter-industry trade**.
- Predicts **full specialization** of countries.
- Countries do not trade if they are equally productive.
- **Free-trade increases world output**.
- **No country loses from free-trade**.
- Trade does not impact inequalities... by definition!
  - Individuals are homogeneous here.

What can go wrong?

- Many goods
  - The conclusions extend to settings with many goods (Dornbush, Fischer, Samuelson, 1977, Eaton and Kortum, 2002).
- Trade costs
  - Some goods become non-traded goods: it is not valuable anymore to trade them, despite the price differences.
- Imperfect mobility of workers across sectors and unemployment
  - Much bigger issue.
  - In reality, changing sector can take many years: (large) transitory costs to trade.

Empirical exploration

In which goods countries have their comparative advantages?

- It would be hard to measure comparative advantages *ex-ante* but we can measure them *ex-post*.
- A country i has a revealed comparative advantage in product k if its share of exports of product k with respect to the world share of export of product k is larger than 1.
- Formally:

$$\frac{\frac{X_{ik}}{\sum_k X_{ik}}}{\frac{X_{Wk}}{\sum_k X_{Wk}}} > 1$$

Empirical exploration

Revealed Comparative Advantage (RCA)

- Measuring comparative advantage *ex-ante* (from theory) is difficult, but we can measure it *ex-post* using observed trade data.

- A country i has a **revealed comparative advantage** in product k if its share of exports of product k is larger than the world share of that product:

$$\text{RCA}_{ik} = \frac{\overbrace{\frac{X_{ik}}{\sum_k X_{ik}}}^{\text{Share of product } k \text{ in country } i\text{'s exports}}}{\underbrace{\frac{X_{Wk}}{\sum_k X_{Wk}}}_{\text{Share of product } k \text{ in world exports}}} > 1$$

- **Where:**
  - X_{ik} = exports of product k by country i and $\sum_k X_{ik}$ = total exports of country i
  - X_{Wk} = total world exports of product k and $\sum_k X_{Wk}$ = total world exports of all products

Empirical exploration

In which goods countries have their comparative advantages?

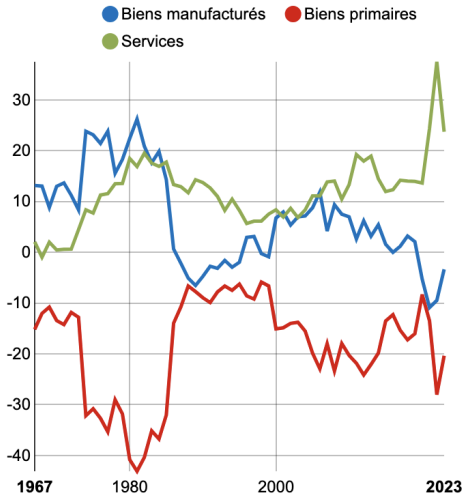
In which goods these countries have their RCA?

Country	Soy Exports ($ bn)	Machinery Exports ($ bn)	Total Exports ($ bn)
Brazil	51	14	328
Germany	0.02	248	1600
World totals	90	2400	29000

- Brazil in soy: $\frac{51/328}{90/29000} \approx 50$
- Germany in soy: $\frac{0.02/1600}{90/29000} \approx 0.004$

Empirical exploration

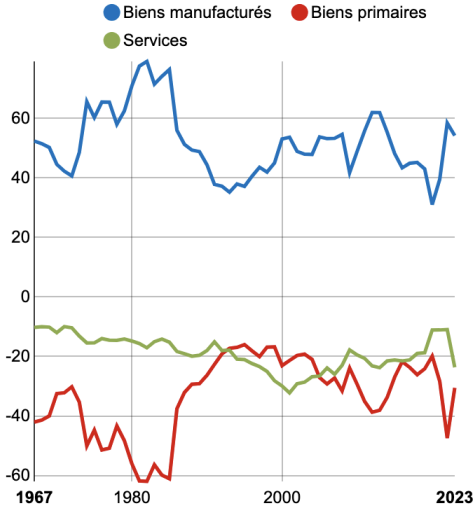
In which goods countries have their comparative advantages?



RCA in France

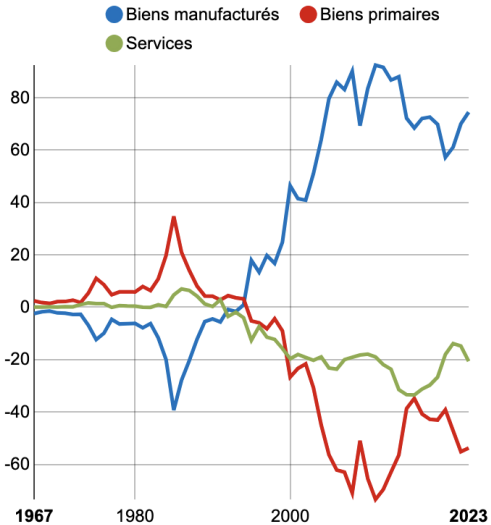
Empirical exploration

In which goods countries have their comparative advantages?



Empirical exploration

In which goods countries have their comparative advantages?



Empirical exploration

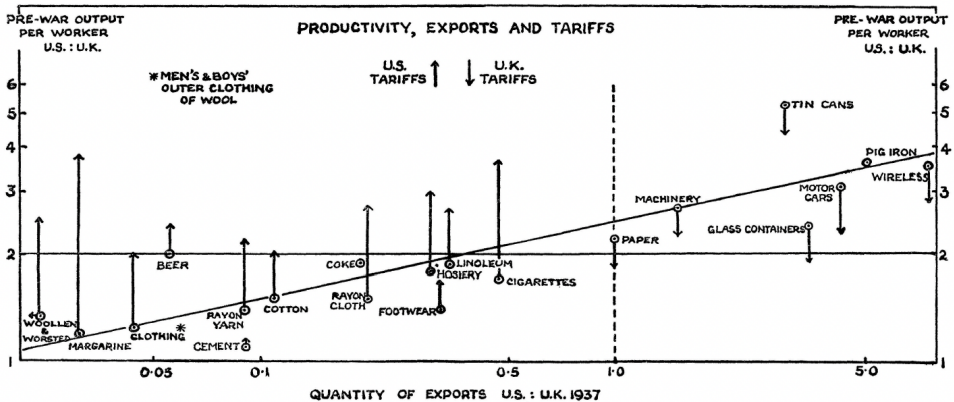
Do pattern of trade follow comparative advantages?

- The Ricardian model suggests that a country should export the goods for which it is relatively more productive.

- First empirical tests of the Ricardian model in 1951 (MacDougall).

Empirical exploration

Do pattern of trade follow comparative advantages?



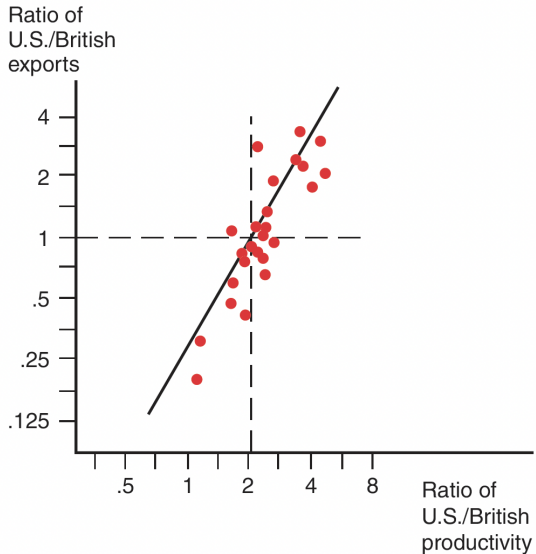
Empirical exploration

Do pattern of trade follow comparative advantages?

- The Ricardian model suggests that a country should export the goods for which it is relatively more productive.
- First empirical tests of the Ricardian model in 1951 (MacDougall).
- British labor productivity is lower than U.S. labor productivity in all sectors!
  - The U.S. have an absolute advantage in everything.
- Though, British exports are as large as U.S. exports at the time.
  - The U.K. exports in sectors in which it has a comparative advantage.

Empirical exploration

Do pattern of trade follow comparative advantages?



Do pattern of trade follow comparative advantages?

- Less clear-cut evidence in recent years.
- The specialization of the economy make that countries simply do not produce goods in which they are bad, so we cannot measure their productivity.
- The example of Bangladesh:
  - Output per worker as % of China in any industry: 28.5%
  - Exports per worker as % of China in any industry: 1%
  - Output per worker as % of China in apparel: 77%
  - Exports per worker as % of China in any apparel: 15.5%

Take-aways

- A simple model of productivity differences generates beneficial trade.
- Trade can be beneficial to both countries if they fully specialize in their **relative advantage**.
- Trade, **through specialization**, is a positive-sum game.
- Results unrealistic, but helpful.
- What we observe reflects Ricardo's predictions.
- Next sessions: introduce new trade models to explain more trade patterns.

The Law of One Price

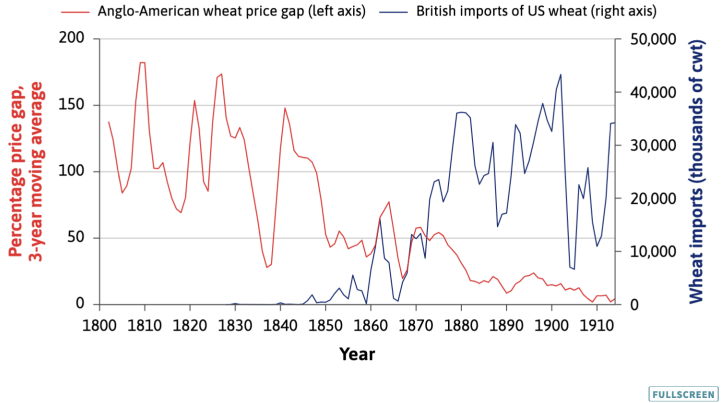


Figure 18.4 The Anglo-American wheat trade (1800–1914).

Figure 3 in Kevin H. O'Rourke and Jeffrey G. Williamson. 2005. 'From Malthus to Ohlin: Trade, Industrialization and distribution since 1500'. *Journal of Economic Growth* 10 (1) (March): pp. 5–34.