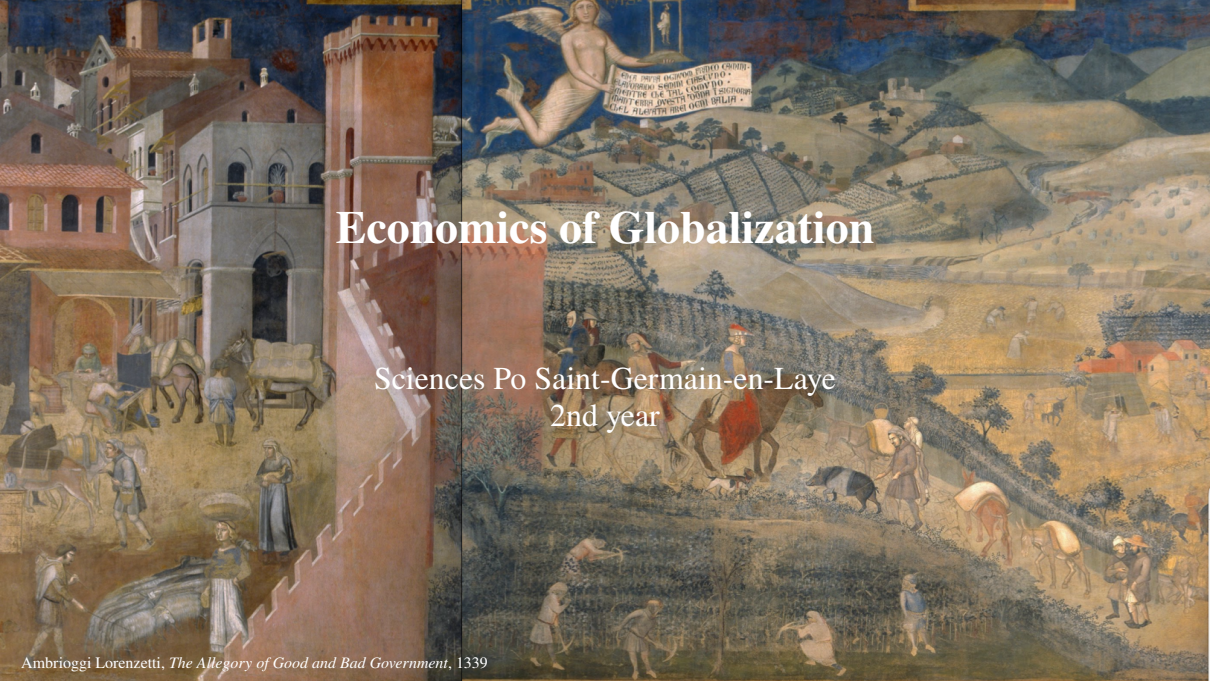
Economics of Globalization

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



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

France and Germany spar over ‘Made in Europe’ as EU moves to protect its own



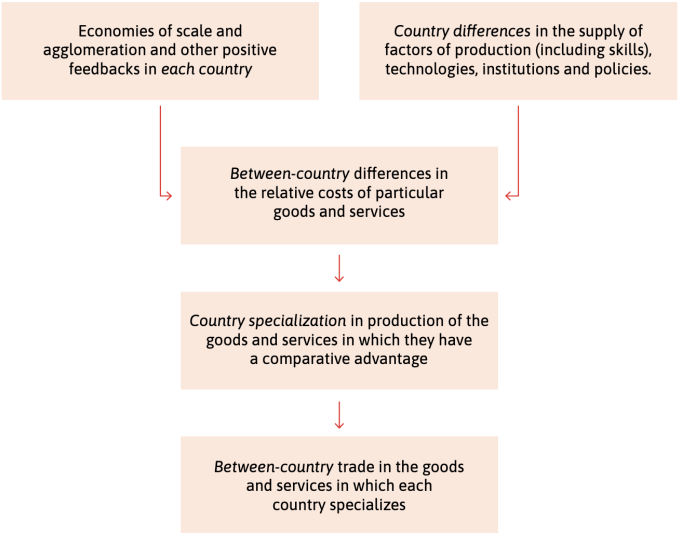
‘Made in Europe’ legislation seeks to protect the continent’s key industries from foreign competitors © Qilai Shen/ Bloomberg

Henry Foy

Last week

- We analyzed the Ricardian model to understand why countries trade, and what they trade.
- Model where two countries differ only by their technology.
- Trade can be beneficial to all countries if they specialize in their comparative advantage.
  - Comparative advantage in the production of one good when the opportunity cost of producing this good is the lowest.
- Gains are coming from the specialization, and the international division of labor.

Last week


Economies of scale and agglomeration and other positive feedbacks in *each country*
Country differences in the supply of factors of production (including skills), technologies, institutions and policies.
Between-country differences in the relative costs of particular goods and services
Country specialization in production of the goods and services in which they have a comparative advantage
Between-country trade in the goods and services in which each country specializes

This week

- Technology differences are only one reason for which countries trade.
- Today we will study the role of factor endowments: Hecksher-Ohlin (HO) model.
  - Factor endowment: How much of each production factor each country owns.
  - Production factor: High-skilled Labor, Low-skilled labor, Capital, Land, etc.
- We introduce several factors of production.
- **Now that there is within-country heterogeneity, there might be distributive conflicts.**

The role of endowments

- The Ricardian model assumes that there is only one factor of production: labor.
  - Limiting assumption to understand international trade.
  - *e.g.* Indonesia's growing role in the battery supply chain is not simply because Indonesian workers became more productive, but also because the country is exceptionally well endowed with nickel.
- HO is a model of **comparative advantages**, generated by the intersection of:
  - factor abundance (nation resources),
  - production technology (relative use of different resources for production of goods).
- Because different factors will be affected differently by trade, there will be distributional consequences.
  - Is trade with low-wage countries to blame for the observed increase of inequalities in the North?

The HO model

- As in Ricardo, gains are generated by relative price differences.
- As in Ricardo, trade will generate net gains.
- However, the difference in prices emerges from a difference in factor abundance, while technologies are similar.
- It generates incomplete specialization.

  $\longrightarrow$ **Hecksher-Ohlin theorem: countries export the goods which make intensive use of their abundant factors.**

- There are winners and losers to trade.

  $\longrightarrow$ **Stolper-Samuelson theorem: the abundant factor gains from trade and the scarce factor loses from trade.**

The HO model

Assumptions

- 2 goods, 2 countries, **2 production factors**
  - Capital (K) and Labor (L) or high-skilled labor and low-skilled labor.
- Different endowments in each countries.
  - Home country is labor abundant: $\frac{L}{K} > \frac{L*}{K*}$
- Different capital intensities across goods: one is capital-intensive (*e.g.* cars or food), the other is labor-intensive (*e.g.* clothes).

  $\longrightarrow$ The cloth industry employs relatively more labor compared to the food industry.
- Factor abundance is a characteristic of countries while factor intensity is a characteristic of goods.

The HO model

- Contrary to the Ricardian model, producers have to choose the optimal combination of factors to produce a good: $Q_X = f(L, K)$.

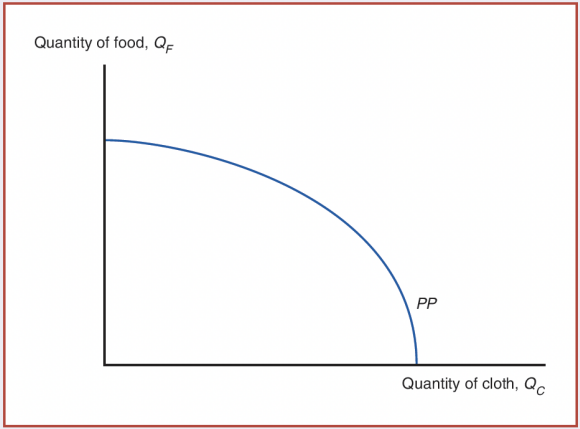
- The choice of inputs depends on their relative price ($\frac{w}{r}$). If capital rental rates are high and wages are low, the producer will chose to employ relatively more labor.

  - e.g. the production of clothes requires labor and capital (e.g. machines). When the price of labor is very low, producers might shift to more labor-intensive production, and conversely.

  - Historical examples: high-labor costs and cheap access to energy and capital was a catalyst for British industrial revolution.

  - Places that lost more people after WW1 were more likely to innovate and automate agricultural production, etc.

The HO model

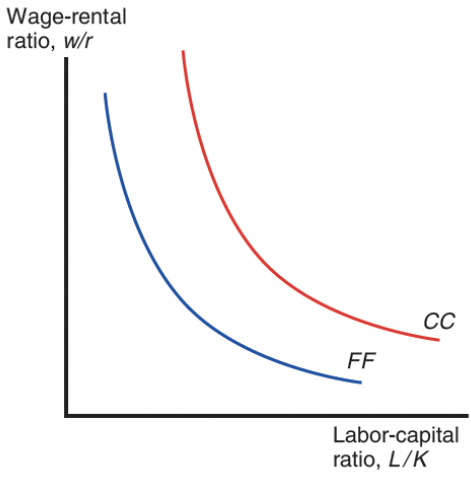


The Production Possibility Frontier with Factor Substitution

$\longrightarrow$ The opportunity cost of cloth in terms of food rises as the production mix shifts towards producing more clothes.

The HO model

- In each sector, the ratio of labor to capital depends on the ratio of the cost of labor (w) to the cost of capital(r).
- FF shows the choices (demand curve) in the food industry and CC in the clothe industry.
- For a given $\frac{w}{r}$, cloth production uses a higher labor-capital ratio $\longrightarrow$ cloth production is labor-intensive.



The HO model

- Perfect competition implies zero-profit $\longrightarrow$ the price of the good equals its cost of production.
- A rise in wages implies a rise in the good's price.
- If very few labor is used in the production of the good (case of a capital-intensive good), then the price will not increase a lot.

$\longrightarrow$ There is a relationship between relative factor costs and relative prices.

The HO model

- One-to-one relationship between relative prices and relative factor costs.
- Higher relative cost of labor $\longrightarrow$ higher relative price of the labor-intensive good.

$\longrightarrow$ When relative price change (because of trade for instance), relative costs of factors will also change.



The HO model

- What happens when countries open to trade?
- Countries have the same technologies and only differ in terms of endowments.
- Assume that Home has a larger ratio of labor to capital: Home is labor-abundant, and Foreign is capital-abundant.
- For a given price, Home produces a higher-ratio of cloth to food $\longrightarrow$ larger relative supply of cloth to food.

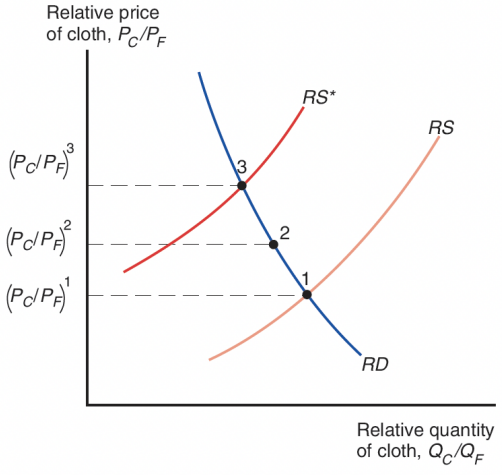
The HO model

- Trade leads to a convergence of relative prices (remember Ricardo).
- For any given ratio of the price of cloth to food, Home produces a higher ratio of cloth to food than foreign.
- Home will have a larger relative supply of the labor-intensive good.
- The price of the labor-intensive good rises in Home and decreases in Foreign.
- The economy exports the good whose relative price increases.
- Home then exports the labor-intensive good and Foreign the capital-intensive good.

The HO model

- In absence of trade, Home is at point 1 and Foreign at point 3: the relative supply of cloth is higher in Home than in Foreign.
- Trade leads to a convergence in world price, to point 2 (for instance)
- Increase in the relative price of clothes in Home

$\longrightarrow$ Countries will export the good for which the price is increasing (Clothes in Home and Food in Foreign)



The HO model

The Hecksher-Ohlin theorem

- **The country that is abundant in a factor exports the good whose production is intensive in that factor.**

- This theorem predicts the patterns of trade.

- Why is it the case?

- Because it is relatively cheaper (lower opportunity cost) to produce the good that is intensive in the factor you are abundant in.

$\longrightarrow$ Factor abundance creates comparative advantages and then determine the pattern of trade.

The HO model

The Stolper-Samuelson theorem

- Trade affects relative prices, which affects in return relative factor earnings.
- A rise in the price of the labor-intensive good increases the purchasing power of labor in terms of both goods.
- What is the impact on inequalities?

The HO model

The Stolper-Samuelson theorem

- Owners of a country's abundant factor gain from trade, but owners of country's scarce factors lose.
  - Western countries (*e.g.* USA, France, Germany) are relatively abundant in capital or high-skill labor $\longrightarrow$ increase in their remuneration while (low-skill) labor loses $\longrightarrow$ increase in inequalities.
  - China was relatively abundant in (low-skill) labor $\longrightarrow$ increase in its remuneration $\longrightarrow$ decrease in inequalities.
- Relatively scarce factors are relatively expensive compared to prices elsewhere when there is no trade.
- When their economies start trading with the rest of the world their price is dragged down towards the world average because they are competing with their abundant counterparts in the rest of the world.

The HO model

Takeaways

- In a world where there are two goods and two factors of production, there is a close relationship between the relative price of goods and the relative price of factors.
- Factor abundance shapes relative factor prices, which shape relative production costs and relative goods prices, hence comparative advantage.
- A rise in the relative price of the capital-intensive good increase strongly the relative remuneration of capital. The real price of capital rises in terms of both goods.
- Similarly, the remuneration of labor (i.e. wages) decreases in terms of both goods.
- The converse is true when the relative price of the labor-intensive good increases.
- HO theory of trade: Countries tend to export goods that are intensive in the factors with which they are abundantly supplied.

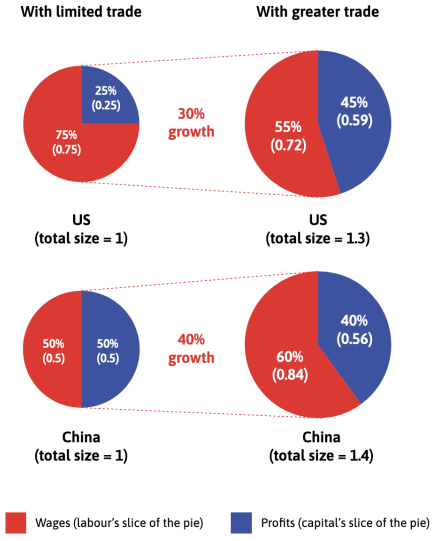
The HO model

Takeaways

- International trade has distributional effects!
- The owners of a country's abundant factors gain from trade, but the owners of scarce factors lose. In theory, there are still gains from trade, in the limited sense that the winners **could** compensate the losers and everyone would be better off.

The HO model

Takeaways



The HO model

Empirical tests

- The HO theory predicts the pattern of trade.
- Empirical tests tend to show that actual trade does follow HO, only when one relax the assumption of identical technologies (Trefler, 1995).
- In reality, a mix of Ricardo and HO seem to explain well many patterns of trade.

The HO model

Empirical tests

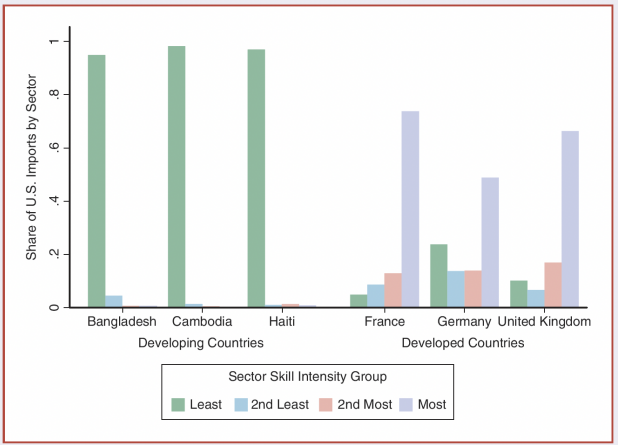


FIGURE 5-13

Export Patterns for a Few Developed and Developing Countries, 2008–2012

Source: NBER-CES U.S. Manufacturing Productivity Database, U.S. Census Bureau, and Peter K. Schott, "The Relative Sophistication of Chinese Exports," *Economic Policy* (2008), pp. 5–49.

The HO model

Empirical tests

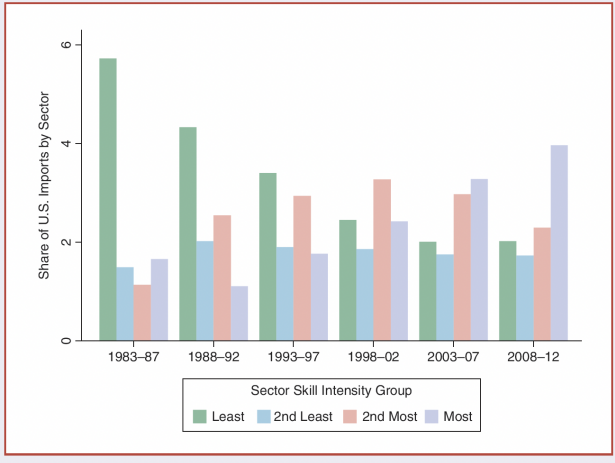


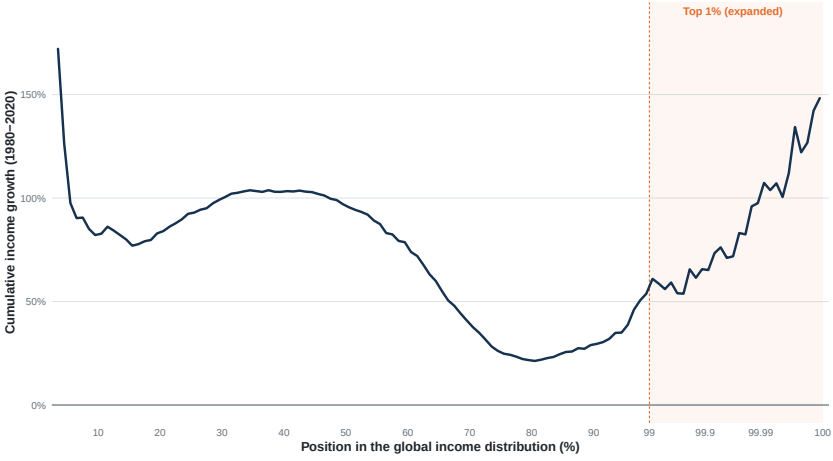
FIGURE 5-14

Changing Pattern of Chinese Exports over Time

Source: NBER-CES U.S. Manufacturing Productivity Database, U.S. Census Bureau, and Peter K. Schott, "The Relative Sophistication of Chinese Exports," *Economic Policy* (2008), pp. 5–49.

The HO model

Empirical tests



Cumulative real pre−tax income growth by global income group, 1980−2020. Source: WID.world, pre−tax national income per equal−split adult.

What is the prediction of the model on the shape of the elephant curve?

How does trade affect exposed workers?

What has HOS missed?

- Workers are not perfectly mobile across sectors and regions.
  - Trade shocks can therefore have persistent local effects on wages and employment.
  - *e.g.* U.S. regions more exposed to Chinese import competition experienced larger declines in manufacturing employment and wages (Autor, Dorn, Hanson, 2013).

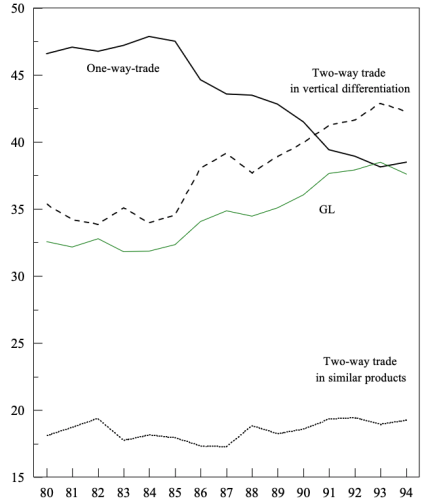
- Labour markets adjust not only through wages, but also through employment.
  - Workers may become unemployed or leave the labour force rather than immediately moving to another sector.

- Firms and products differ in productivity and quality.
  - Trade can induce the most productive firms to expand, export and upgrade quality.
  - This can increase the demand for skilled workers even within a low-skill industry.

New trade theories

- The Ricardian model and the HO model only predict inter-industry trade between different countries
- But a lot of trade happens intra-industry...
- ... and between similar countries.

New trade theories



Source: Eurostat-Comext, calculations by the CEPII.

Source: Fontagne and Freudenberg, 1997

New trade theories

- They also assume perfect competition and constant returns to scale.
- **Internal returns to scale**:
  - Output increases faster than the quantity of inputs.
  - *e.g.* you double the number of workers and the quantity of output more than doubles (for instance through more efficient assembly line).
- **External returns to scale**:
  - Productivity depends on external factors that create positive externalities.
  - Customer/suppliers networks.
  - Technological and knowledge spillovers (within-industry like in the Silicon Valley or between industry like GPS for instance).
  - Market size impacts firm performances! This justifies trade and industrial policies (Graham, 1923).

New trade theories

Krugman (1979, 1980)

- Why is it important for trade?
- Actors are not countries anymore but firms.
  - Assume firm's have internal returns to scale.
- Goods are not homogeneous anymore
  - Assume monopolistic competition: each producer has a monopoly over his variety of a good.
- Assume that consumers love variety, they want to consume all of them.
  - Not necessarily true at the individual level, but on aggregate.

New trade theories

Krugman (1979, 1980)

- Then, when trade opens, there is **intra-industry trade**.
  - Because consumers want to consume foreign goods.
- Each firm faces a larger market generating **gains from scale**.
  - Thanks to increasing returns to scale.
- Price decrease due to higher-competition: **pro-competitive effect of trade**.
- Less efficient firms exit the market because of the competition (*rationalization effect*).
  - Average productivity increases.
  - But there are adjustment costs $\longrightarrow$ unemployment.
- **Gains from variety**: More varieties are available to consumers.
  - Uniformization of consumption patterns.