INTERNATIONAL ECONOMICS

Lecture 7 — December 13, 2022

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Last week: Ricardian Model of Trade

- Trade because of relative productivity differences

  $\rightarrow$ comparative advantage!
- Trade increases world output and welfare
- No one loses: worst outcome is no gain
- Smaller countries gain more

Today

HOS and HOV: it's all about endowments.

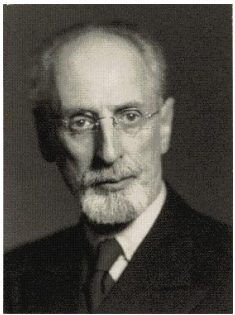
- Last week: better **technology** $\rightarrow$ comparative advantage
- Today: **factor abundance** $\rightarrow$ comparative advantage

Addresses some questions that couldn't be answered with Ricardo

- Redistributive effects of trade
- Countries never fully specialize

.. but raised many new ones

Heckscher, Ohlin, Samuelson and Vanek



Eli Heckscher
(1879 - 1952)

Bertil Ohlin
(1899 - 1979)
Nobel Prize 1977

Paul Samuelson
(1915 - 2009)
Nobel Prize 1970

Jaroslav Vanek
(1930 – 2017)

HO in a nutshell

Like in Ricardo model, HOV

- trade generates **net gains**
- depends on **difference in relative prices**

...however,

- comparative advantage is **endogenous**: factor endowments
- **no full specialization**
- **winners and losers** within country (total net gain)

BASIC SETUP

The basics: 2x2x2

Assume a world where

- **two countries**: home (H) and foreign (F)
- **two goods**: X and Y
- **two imperfectly substitutable factors**: capital (K) and labor (L)
- perfect competition: free market entry $\rightarrow$ zero profits
- labor mobile across sectors but not across countries

The basics: 2x2x2

- Different **factor intensities** across goods:

$$\left(\frac{K}{L}\right)_Y > \left(\frac{K}{L}\right)_X$$

  $\rightarrow$ Y is capital intensive

- Different **factor endowments** across countries:

$$\left(\frac{K}{L}\right)^H > \left(\frac{K}{L}\right)^F$$

  $\rightarrow$ home is capital abundant

The basics: 2x2x2

Production functions for X and Y:

- Identical in both countries
- Increasing
- Concave
- Constant returns to scale

$$Y = f_Y(K, L) \quad \text{and} \quad X = f_X(K, L)$$

$\rightarrow$ e.g. $f_i(K, L) = K^{\alpha} L^{\alpha - 1}$ with $0 < \alpha < 1$

$\rightarrow$ factors are used, not required (as in Ricardo)

$\rightarrow$ imperfect substitution between factors

AUTARKY

Production in autarky

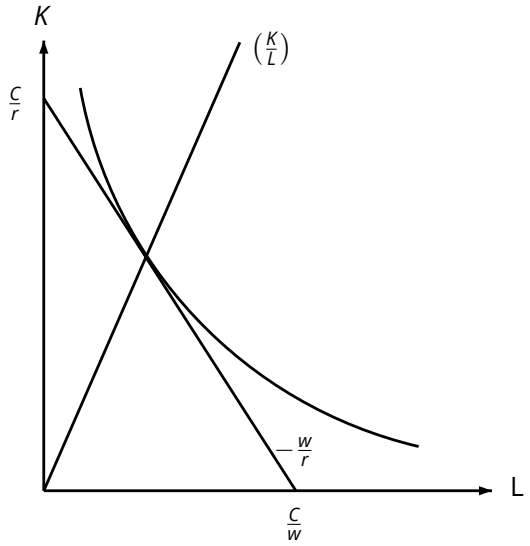
Consider one good only first, e.g. Y:

- Optimize production:

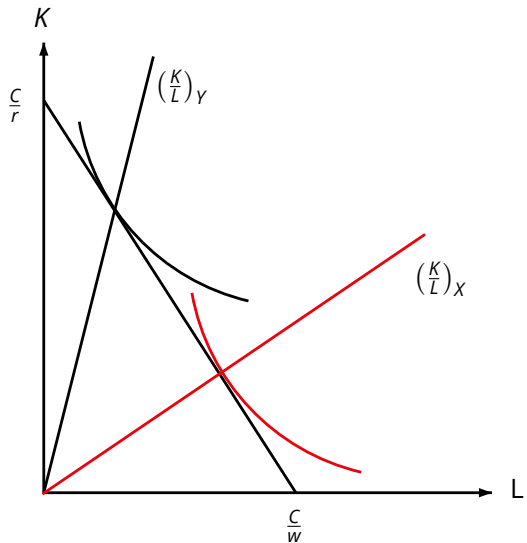
$$\max f_Y(K, L) \quad \text{s.t.} \quad C = w_Y L_Y + r_Y K_Y$$

- Isoquant: factor input combinations given output level
- Iso-cost curve: input combinations for given cost

Isocost, Isoquant and capital/labor ratio

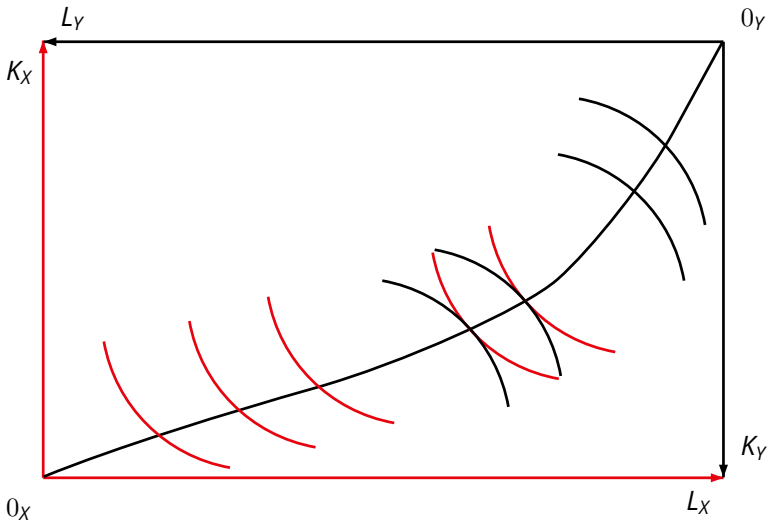


Capital/labor ratio for labor and capital intensive production



Edgeworth box

Now both goods: *X* labor intensive, *Y* capital intensive:



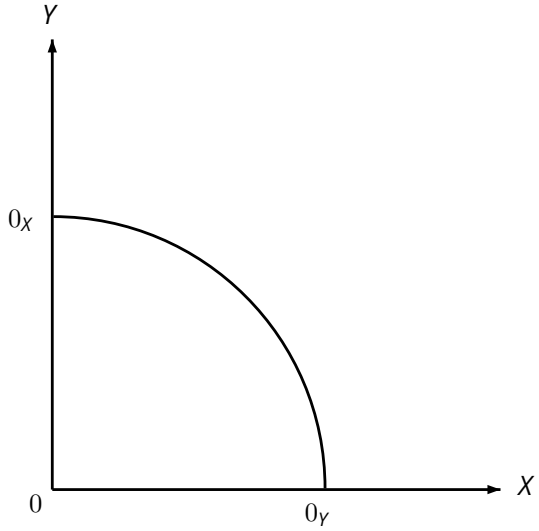
Pareto optima

- Line shows set of Pareto optima

  $\rightarrow$ Production of one good cannot increase without decrease in production of the other good

- PPF is set of Pareto-optimal production possibilities give factor endowment

PPF as Pareto-optima

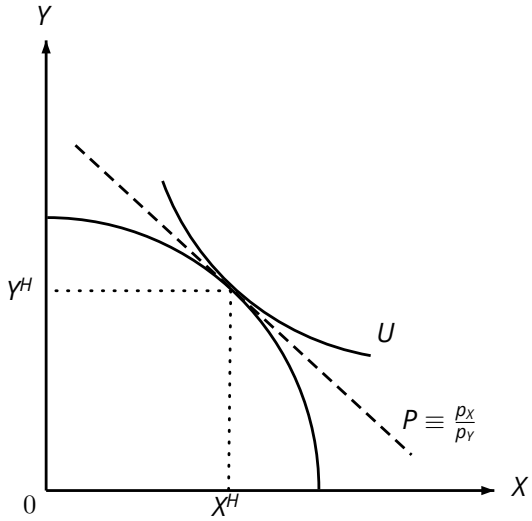


Equilibrium in autarky

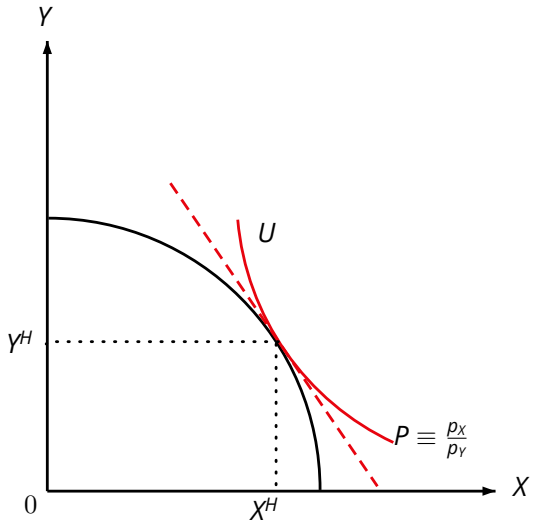
- Demand side: *well-behaved* utility function, e.g. Cobb-Douglas
- Market clearing: production $=$ consumption
- Equilibrium then

$$\text{MRTS} = \text{MRS} = \frac{p_X}{p_Y} \equiv P$$

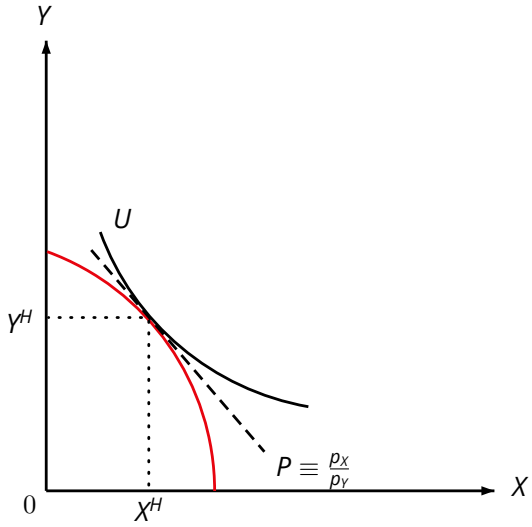
Equilibrium in autarky: PPF and indifference curve



Shift in demand for labor intensive good: move along PPF



Reduction in labor supply: different PPF



Rybczynski theorem

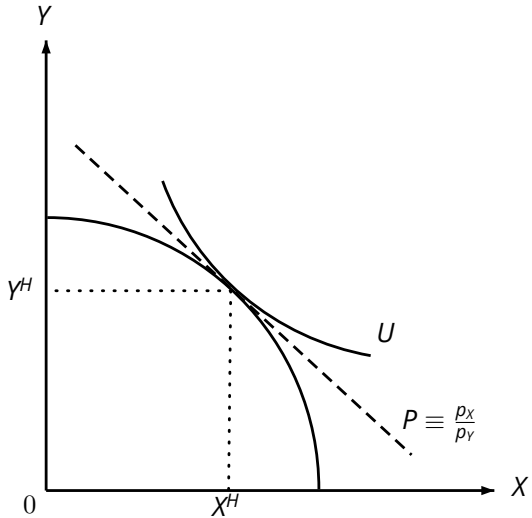
At constant relative goods prices, a rise in the endowment of one factor will lead to an expansion of the output in the sector which uses that factor intensively, and an absolute decline of the output of the other good.

Exogenous price change

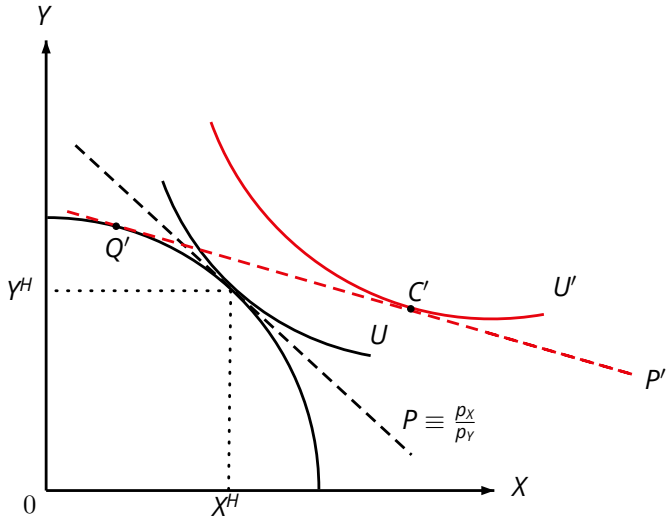
Exogenous price changes: $P' < P$

- $P = \frac{p_X}{p_Y}$ falls
- Country specializes in Y
- Intuition similar as in Ricardo
  $\rightarrow$ triangle of trade
- The larger the price differential, the larger the gain

PPF and indifference curve



Exogenous price change



TWO COUNTRIES

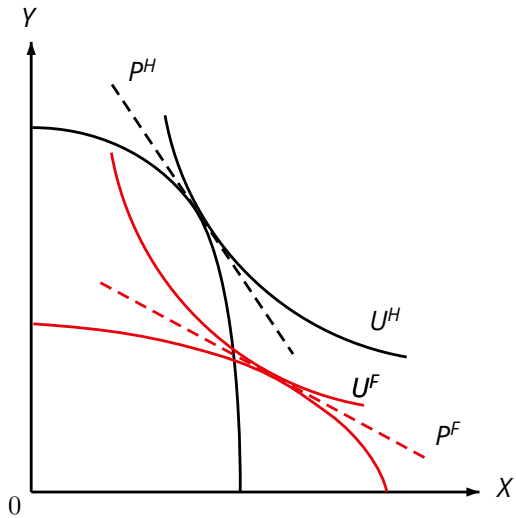
Two countries in autarky

Now consider second country:

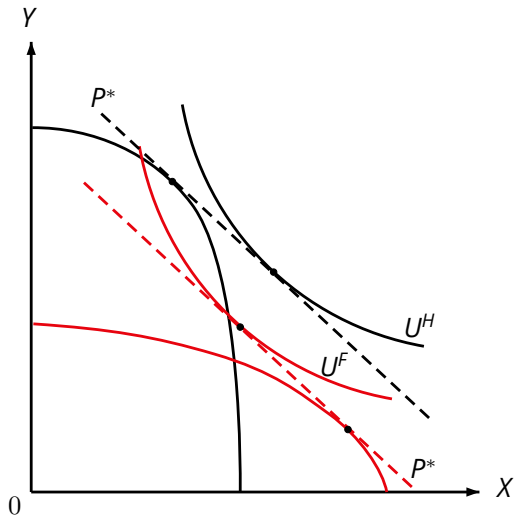
- Identical preferences
- Identical technology (production functions)
- But: different factor endowments
  - $\rightarrow$ Therefore different PPF
  - $\rightarrow$ Hence different autarky prices

$\rightarrow$ possibility for trade!

Two countries in autarky



Two countries open to trade



Two countries open to trade

- When in autarky $P^H > P^F$
- After opening: P^H falls, P^F rises, both converge to $P*$
- Equalization of relative prices

  $\rightarrow$ determined by utility function
- No perfect specialization
- Both countries gain from trade
- Smaller country gains more
- Gain doesn't depend on good of specialization

Heckscher-Ohlin Theorem

Each country exports the good that is using intensively for production the factor the country is abundant in.

Losers and winners

However, there are losers and winners within countries

- If $P^* > P^F$, P^F goes up, more X and less Y is produced
- Sector X is labor intensive: $\left(\frac{K}{L}\right)_Y > \left(\frac{K}{L}\right)_X$
- Price of labor (wage) increases relative to price of capital (rent)

  $\rightarrow$ lower inequality!
- But: opposite happens in H, higher inequality!

Stolper-Samuelson theorem

A rise in the relative price of a good will lead to a rise in the relative return to the factor that is used intensively in the production of the good.

Factor price equalization

The relative prices for factors of the production of goods will be equalized across countries as a result of the trade in these goods.

Factor price equalization

Trade in goods is a perfect substitute for trade in factors of production

- Careful, strong assumptions
  - $\rightarrow$ Frictionless trade
  - $\rightarrow$ Identical technologies and preferences
- works in tendency only

WRAP UP

Conclusion

- Trade because of relative abundance

  $\rightarrow$ comparative advantage!
- Export of goods that are intensive in abundant factor
- Factor price equalization through trade

Next week

- Next class: New Trade Theory
- Read: Chapter on Heckscher-Ohlin Model
- Questions? E-Mail or office hours