ECBS 6060: International Trade
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Comparative statics of the Heckscher-Ohlin model

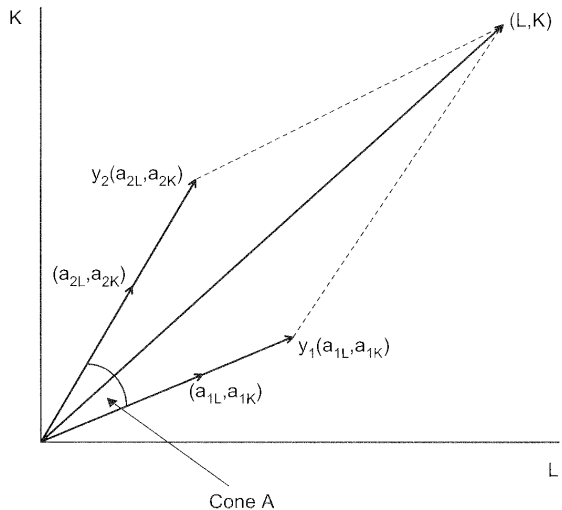
The Rybczynski theorem

- Let us conduct some comparative statics.
- Suppose we are inside the FPE set, and we increase one factor, while holding the others fixed.
- If factor prices are fixed, what gives?
- This exercise gives us the Rybczynski theorem.

Two goods

The Rybczynski theorem

If we increase the abundance of one factor, the sector that uses it intensively will expand *more than proportionally*, the other will *shrink*.


K
(L,K)
$y_2(a_{2L},a_{2K})$
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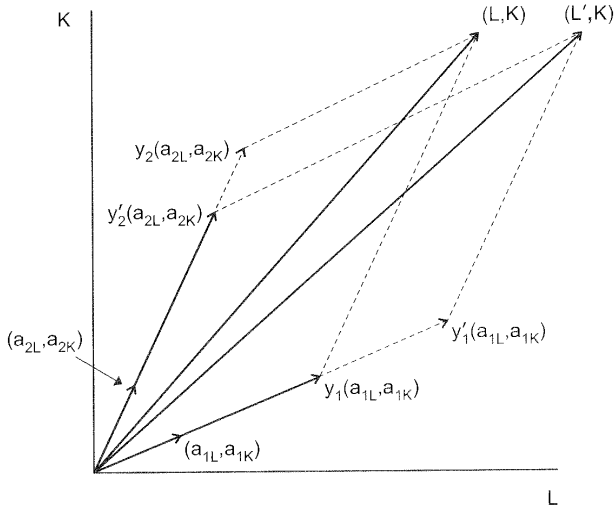
L
Cone A

The Rybczynski theorem



Multiple goods

- Let us increase V_1 by $\delta > 0$. The other factors remain unchanged.
- As long as we remain inside the FPE set,

$$\sum_i a_{ni}(w)\Delta x_i = \Delta V_n.$$

- But $\Delta V_n = \delta > 0$ for $n = 1$ and 0 otherwise.
- The vector of ΔX_i has to be such that this holds.
- Notice that ΔV_n is a weighted sum of the ΔX_is, with different (but positive) weights for each n.
- We show that *some* industry expands ($\Delta X_i > 0$) and *some* industry shrinks ($\Delta X_j < 0$).

Proof

- Prove by contradiction. We rule out
  1. $\Delta X_i = 0$ for all i,
  2. $\Delta X_i \geq 0$ for all i,
  3. and $\Delta X_i \leq 0$ for all i.
- Then it must be the case that $\Delta X_i > 0$ for some i and $\Delta X_j < 0$ for some j.

Proof

1. If $\Delta X_i \equiv 0$, then $\Delta V_n \equiv 0$, and we cannot have $\Delta V_1 = \delta > 0$.
2. If $\Delta X_i \geq 0$ and $\Delta X_i \neq 0$, then there has to be some (maybe more) i for which $\Delta X_i > 0$. But then demand for all factors used in these industries increases:

   $$\Delta V_n > 0 \text{ for all } n \text{ such that } a_{ni} > 0.$$

   We cannot have $\Delta V_n = 0$ for all $n > 1$.
3. The same argument can be used for $\Delta X_i \leq 0$.

Intuition

- If one factor expands, so will some of the sectors.
- These sectors put extra demand on the rest of the factors.
- To counteract the increasing factor demand, some sectors will shrink to restore the equilibrium.
- (Given that the other sectors have shrunk, the expanding sector can expand even more.)
- How is this different from the closed economy case?

Closed economy

- It was key to the proof that a_{ni}s do not change.
- In a closed economy, these will respond, too.
- If a factor increases, its reward will typically fall.
- Then each sector will change its *technique* to use it more intensively, thus absorbing more of it.

Illustration: an extreme case

- Suppose that preferences are Leontief so that α does not depend on p.
- In closed economy, $\mathbf{X}^j = \alpha Y^j$, so the structure of production is also *fixed* in equilibrium.
- Factor market clearing,

$$\sum_i a_{ni}(w^j) x_i^j = V_n^j$$

can only happen through changes in a_{ni}.

An empirical illustration: The Mariel boatlift

- David Card, 1990. The Impact of the Mariel Boatlift on the Miami Labor Market. ILRR.
- From May to September 1980, some 125,000 were permitted to leave Cuba. Most ended up in Miami.
- This inflow of immigrants represented a 7% increase in the Miami labor force.

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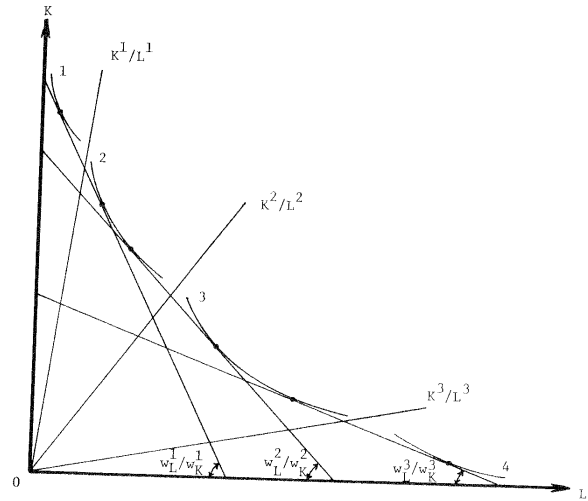
- From May to September 1980, some 125,000 were permitted to leave Cuba. Most ended up in Miami.
- This inflow of immigrants represented a 7% increase in the Miami labor force.
- Still, wages and unemployment rates hardly changed. Why?

Without FPE

Without FPE

- What if the endowment vector is outside the FPE set?
- Clearly, factor rewards will be unequal.
- Countries will use different techniques, and we cannot use the methods above to talk about the pattern of trade.

The Lerner diagram



The Stolper–Samuelson Theorem