

The Heckscher-Ohlin Model

Appleyard & Field (& Cobb): Chapters 8 & 9
(Krugman & Obstfeld: Chapter 3 & 4)

Assumptions of the Heckscher-Ohlin- (Samuelson)-Model

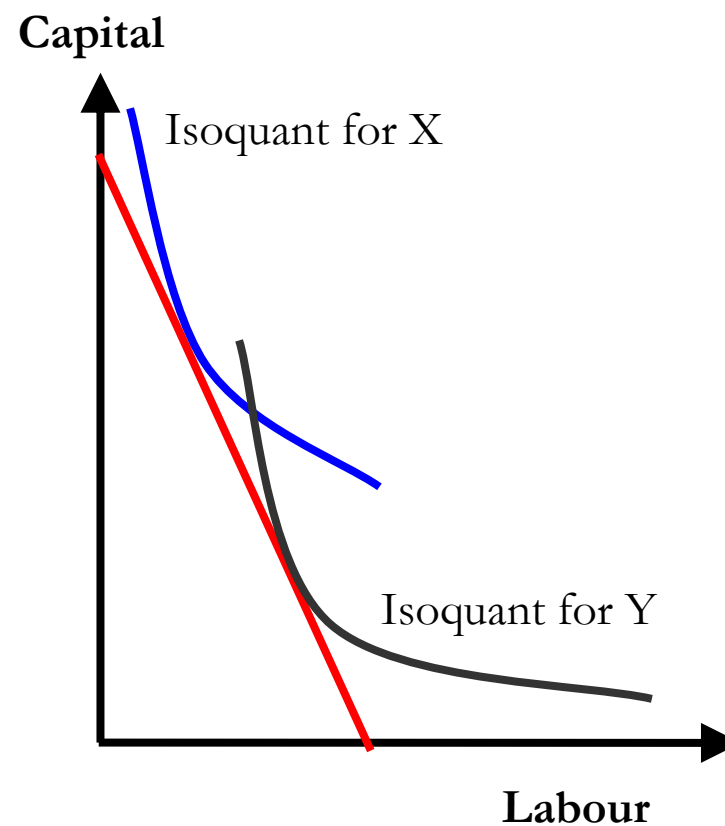
1. Two countries, two (homogeneous) goods and two (homogeneous) factors of production
2. Identical technology, **different factor endowments**
3. Constant returns to scale
4. **Different factor intensities** in production
5. Factors perfectly mobile inside each country and immobile between the countries
6. Identical preferences among everyone
7. Perfect competition in all markets
 - (price of labour) $w = MPP_L * P$, (price of capital) $r = MPP_K * P$
8. No transportations costs

Factor Endowments

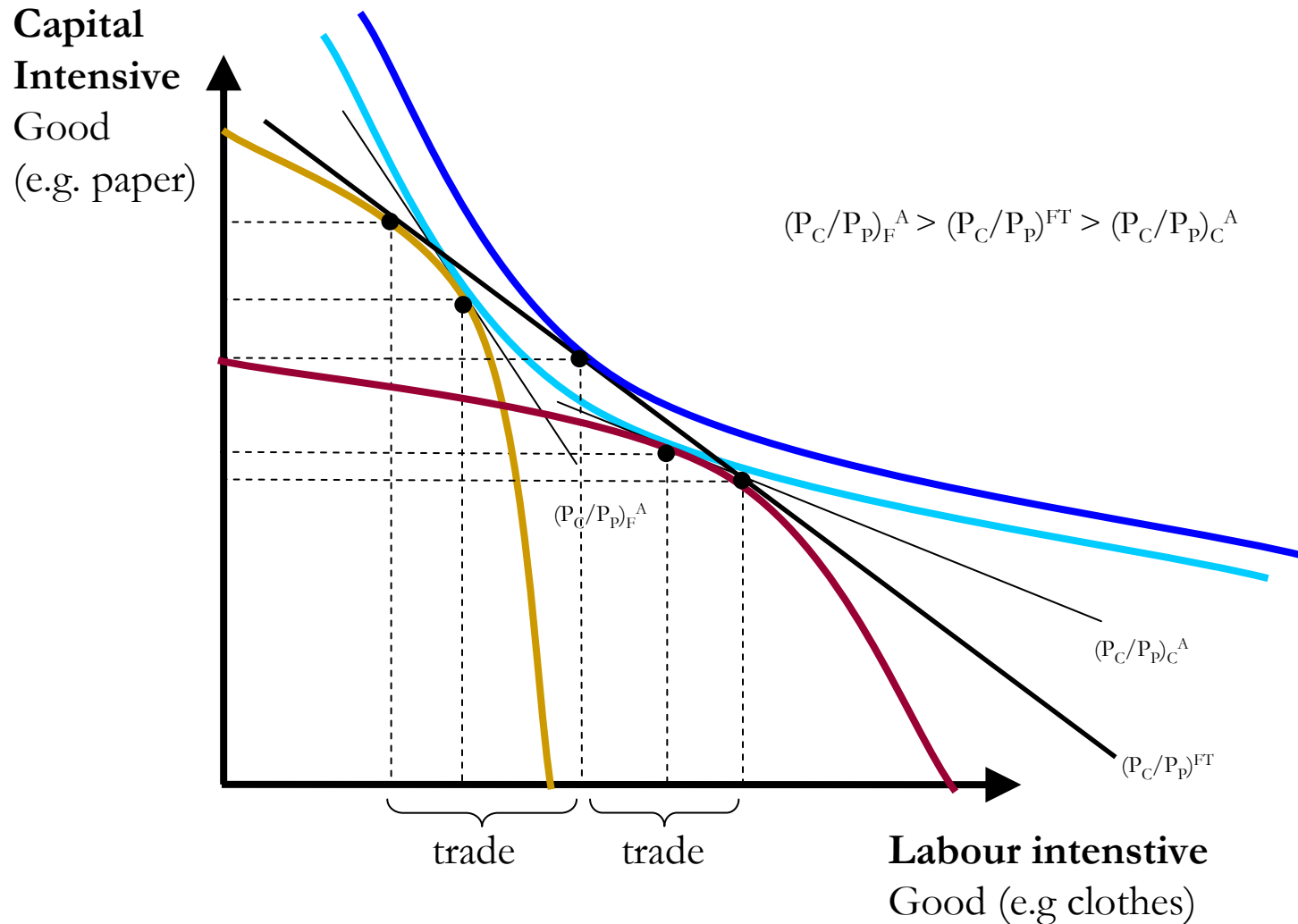
- Countries differ in their **relative** factor endowments
- Notation: K=capital, L=labour, r=price of capital, w=price of labour
- **Physical definition:** $(K/L)_1 > (K/L)_2 \Leftrightarrow$ country 1 is capital-abundant (labour-scarce), country 2 is labour-abundant (capital-scarce)
- **Price definition:** $(r/w)_1 < (r/w)_2 \Leftrightarrow$ country 1 is capital-abundant, country 2 is labour-abundant
- Given assumptions of perfect competition + identical technology and preferences, the physical and price definitions are identical

Commodity Factor Intensity

- **Good X is capital-intensive** and good Y labour-intensive if $K_X/L_X > K_Y/L_Y$ for all relative factor prices (r/w) \Leftrightarrow the firm always maximizes profits / minimizes cost by using relatively more capital in producing X than in producing Y



Gains from Trade in the Heckscher-Ohlin Model



Heckscher-Ohlin Theorem

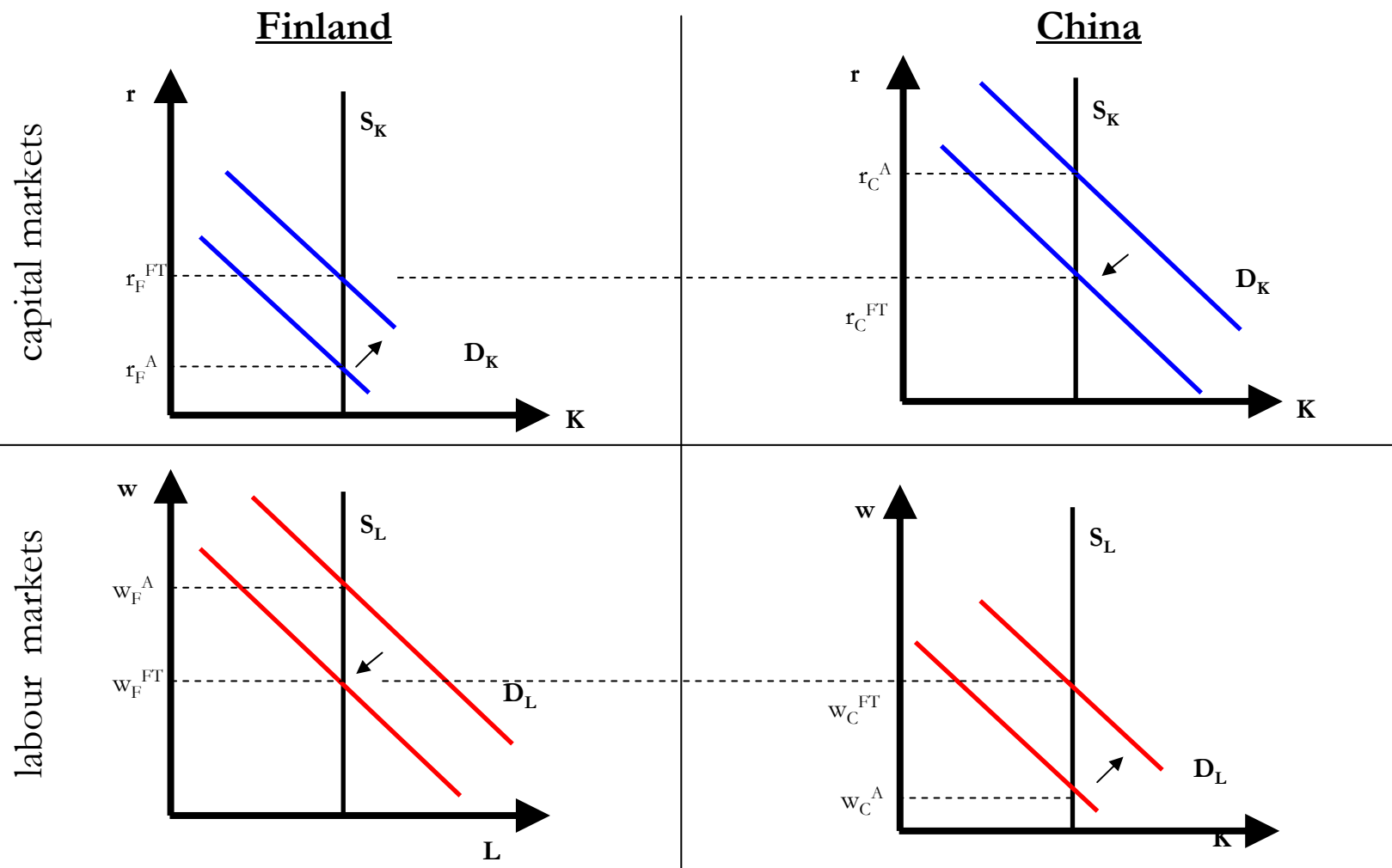
*Country will **export** the commodity that **uses relatively intensively its relatively abundant factor of production***

- i.e. what we saw in the previous graph
- example: China is labour-abundant and Finland is capital-abundant i.e. $(K/L)_C < (K/L)_F$ and $(r/w)_C > (r/w)_F$
 - China exports labour-intensive products (e.g. clothes) to Finland and imports capital-intensive products (e.g. paper) from Finland

Factor Price Equalization

- Autarky → Free trade
 - relative prices of final goods become identical
 - relative price of paper increases (=relative price of clothes decrease) in Finland
 - Finland produces more paper, China more clothes
- Since producing paper is more capital intensive, demand for capital increases and demand for labour decreases **in Finland** → $w \downarrow r \uparrow$
- Similarly **in China**, demand for labour increases and demand for capital decreases → $r \downarrow w \uparrow$
- **In equilibrium all prices (including factor prices) are identical**

Factor Price Adjustments



Income Distribution and Trade: the **Stolper-Samuelson Theorem**

- Trade affects both the prices of goods and the prices of factors of production: What then is the **impact of trade on distribution of real income?**
 - wages decrease in Finland, but also the price of clothes decreases (i.e. you need less money to buy the same amount of clothes). Which effect dominates?
- Stolper-Samuelson Theorem: **real income of the owners of abundant factor increases** and the real income of owners of **scarce factor decreases**
 - Think about the labour abundant country (e.g. China):
Free trade $\rightarrow r \downarrow w \uparrow \rightarrow$ capital/labour ratio $\uparrow \rightarrow$
labour productivity $\uparrow \rightarrow$ real wages \uparrow

Why Don't We Observe Price Equalization?

- In reality most of the assumptions needed for price equalization do not hold
 - e.g. imperfect competition, transportation costs, tariffs, subsidies, unemployed resources, technological differences, externalities...
- However, the model provides an important insight on the *tendency* of price movements due to increasing international trade

Trade as a Substitute for Capital and Labour Flows

- Suppose that there is no international trade of goods, but capital and labour are internationally perfectly mobile
 - Capital will then flow to the labour-abundant country and labour to the capital-abundant country *until the factor prices are equal in both countries*
 - When all markets are perfectly competitive, this must imply equal commodity prices
- **Trade and factor mobility** are perfect substitutes in the HO-model

Changing Assumptions

1. Two countries, two (homogeneous) goods and two (homogeneous) factors of production
2. Identical technology, **different factor endowments**
3. Constant returns to scale
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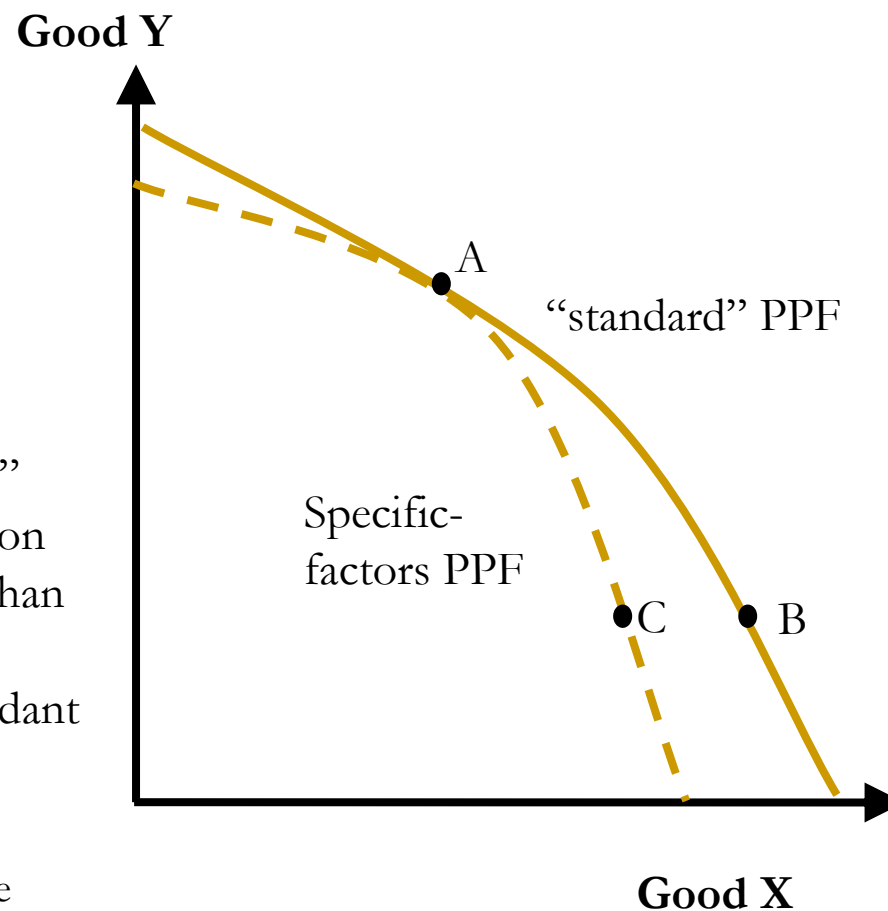
Specific-Factors Model

Three factors of production:

- 1) L = mobile labour
- 2) K_X = immobile capital for producing good X
- 3) K_Y = immobile capital for producing good Y

→ Specific-factors PPF will lie inside “standard” PPF, except in the (initial) point A (production after trade will take place in point C, rather than in point B). Note that trade still leads to expansion of the industry that uses the abundant factor more intensively (labour moves from production of Y to X; $A \rightarrow C$).

- A natural way to think about this is to consider the specific-factors PPF to represent short-run and the “standard” PPF to represent long-run implications



Trade and Income Distribution in the Specific-Factors Model

- Assume that the relative price of good X increases due to introduction of free trade, i.e. $(\mathbf{P}_X/\mathbf{P}_Y) \uparrow$:
 - Production of X \uparrow Production of Y \downarrow
 - Labour flows to production of good X
 - $r_X \uparrow$ $r_Y \downarrow$ [increased demand for K_X]
 - $K_X/L_X \downarrow$ $K_Y/L_Y \uparrow$ [K_X and K_Y are fixed]
 - $MPP^L_X \downarrow$ $MPP^L_Y \uparrow$ [less capital per labour in X, more in Y]
 - $w/P_X \downarrow$ $w/P_Y \uparrow$ [$w = MPP^L_X * P_X = MPP^L_Y * P_Y$]
- Owners of K_X benefit, owners of K_Y lose
- Ambiguous effect on mobile factor (labour)
 - If workers consume only X their real wage has fallen, if only Y real wage has risen \Leftrightarrow impact on real wages depends on consumption bundles

Summary of the Heckscher-Ohlin model

- Differences in relative **endowments of factors of production** → Comparative advantage
- Trade leads to
 - Expansion of the industry using intensively the abundant factor of production (Heckscher-Ohlin Theorem)
 - **Changes in distribution of income** (international factor price equalization, Stolper-Samuelson theorem)

Is trade beneficial in the HO-Model?

- We have seen that trade benefits some* and hurts others**. So, do the gains outweigh the losses?
- To answer this question would require comparison of (subjective) welfares (do the losers suffer more than the winners enjoy), which is outside of the province of economic analysis.
- However, we can ask: **Could those who gain compensate those who lose, and still be better off?** The answer is, **yes**.
- Trade expands the economy's choices (enables consumption outside PPF). Hence, in principle, it is **possible to redistribute income in such a way that everyone will gain**. Of course, this is not to say that redistribution would actually happen.
- The presence of loser and winners in the real world is probably the most important reason why trade is not free.