

LECTURE 3

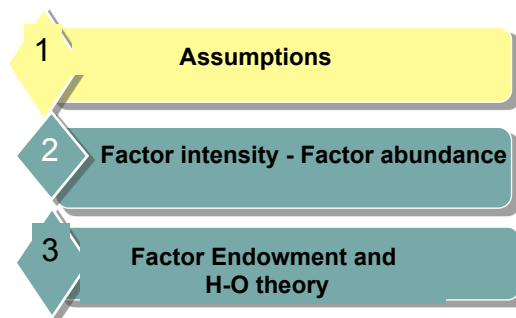
Factor Endowments and the Heckscher- Ohlin Theory (Chapter 5 of the textbook)

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Lecture Overview



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Assumptions of H-O Theory



- Two nations (N1 and N2), two commodities (X and Y), two factors of production (L and K)
- The same technology in production
- X is labor intensive, Y is capital intensive
- Constant returns to scale
- Incomplete specialization in production in both nations
 - What are the implications about the shape of PPF?

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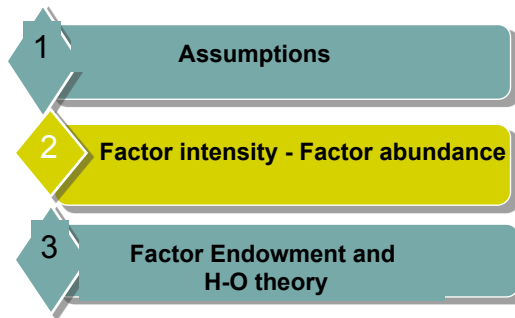
Assumptions of H-O Theory (cont.)



- Equal tastes in both nations
- Perfect competition in both commodities and factor markets
- Perfect factor mobility within each nation but no international factor mobility
- Free trade
- All resources are fully employed in both nations
- International trade in balance

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Lecture Overview



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Basis for trade



- H-O:
 - comparative advantage
- Sources of comparative advantage
 - H-O: factor endowment
 - David Ricardo: productivity

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Factor intensity



- Two commodities (X and Y) and two factors (L and K)
- Y is capital intensive if **capital-labor ratio (K/L)** used in production of Y is greater than K/L used in production of X

$$\frac{K}{L}(X) < \frac{K}{L}(Y) \text{ or } \frac{L}{K}(X) > \frac{L}{K}(Y)$$

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Factor intensity



- E.g: 2K and 2L to produce one unit of Y
1K and 4L to produce one unit of X
 - X: Labor intensive
 - ⇒ Y: Capital intensive
- ⇒ It is not the *absolute* amount of capital and labor used but ratio of K and L determines factor intensity
- E.g: 2K and 2L to produce one unit of Y
3K and 12L to produce one unit of X
 - Y: Capital intensive
 - X: Labor intensive

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Factor abundance



- Two ways: physical units and relative factor price.
- In term of physical units:
 - N2 is capital abundant if the ratio of the total amount of capital to the total amount of labor (TK/TL) available in N2 is greater than that in N1

$$\frac{TK}{TL}(N_2) > \frac{TK}{TL}(N_1)$$

- E.g: N1 has 10 million L and 100 million K
N2 has 20 million L and 800 million K
 - N1: abundant in L
 - N2: abundant in K
- Note: Not the absolute amount of K and L is important.

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Factor abundance (cont.)



- In term of factor prices:
 - Price of labor time (P_L): w
 - Rental price of capital (P_K): r
 - N2 is capital abundant if the ratio of the rental price of capital to the price of labor time (P_K/P_L) is lower in N2 than in N1

$$\frac{P_K}{P_L}(N_2) < \frac{P_K}{P_L}(N_1) \quad \frac{r}{w}(N_2) < \frac{r}{w}(N_1)$$

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Summary



$$\frac{TL}{TK}(N1) > \frac{TL}{TK}(N2) \Rightarrow \text{N1-labor abundant}$$

$$\text{N2-capital abundant} \leftarrow \frac{TK}{TL}(N1) < \frac{TK}{TL}(N2)$$

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Summary (cont.)

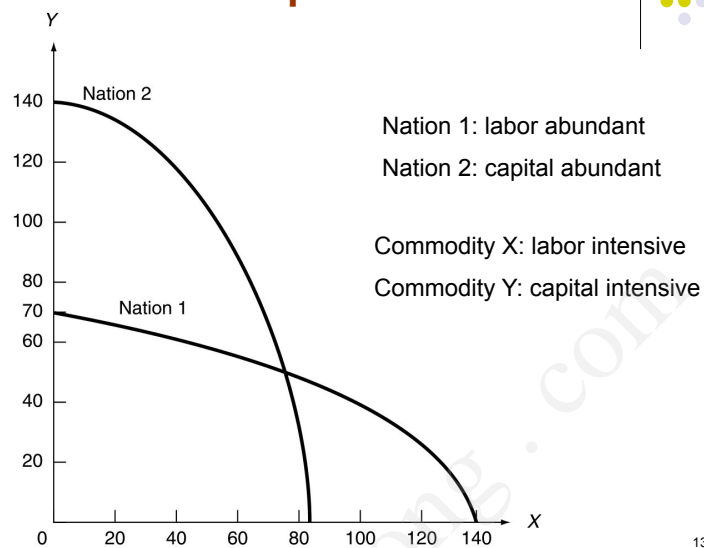


$$\frac{P_L}{P_K}(N1) = \frac{w}{r}(N1) < \frac{P_L}{P_K}(N2) = \frac{w}{r}(N2) \Rightarrow \text{N1-labor abundant}$$

$$\text{N2-capital abundant} \leftarrow \frac{P_K}{P_L}(N2) = \frac{r}{w}(N2) < \frac{P_K}{P_L}(N1) = \frac{r}{w}(N1)$$

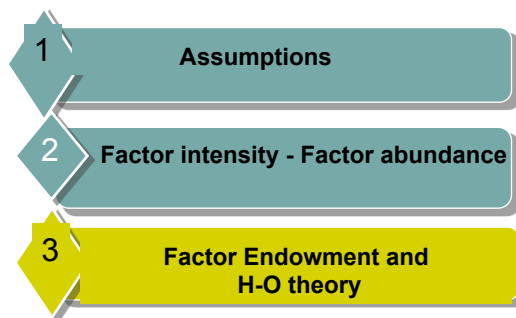
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Factor abundance – Factor intensity and the Shape of PPF



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Lecture Overview



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H-O Theory



H-O theorem deals with the pattern of trade



H-O-S theorem deals with the factor prices

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H-O Theorem



- H-O Theorem:
 - A Nation
 - Export the commodity whose production requires the intensive use of the nation's relatively abundant and cheap factor
 - Import the commodity whose production requires the intensive use of the nation's relatively scarce and expensive factor.
 - E.g: vietnam and China, the US, Australia

Nation 1: Labor abundant



X: labor intensive



Nation 1 exports X and imports Y



Nation 2: Capital abundant

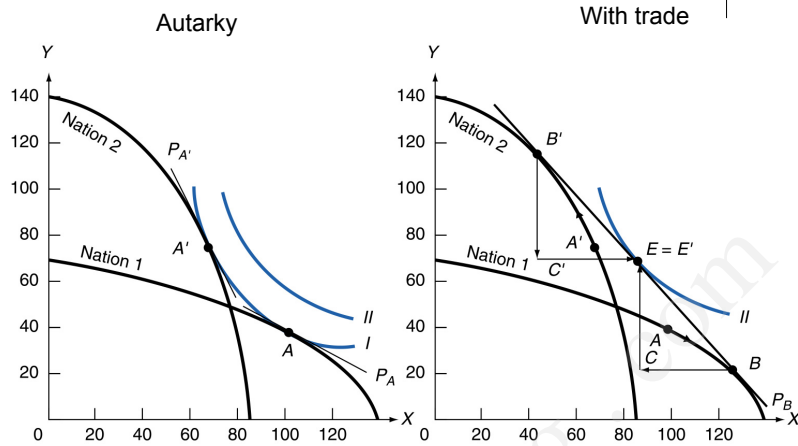


Y: capital intensive



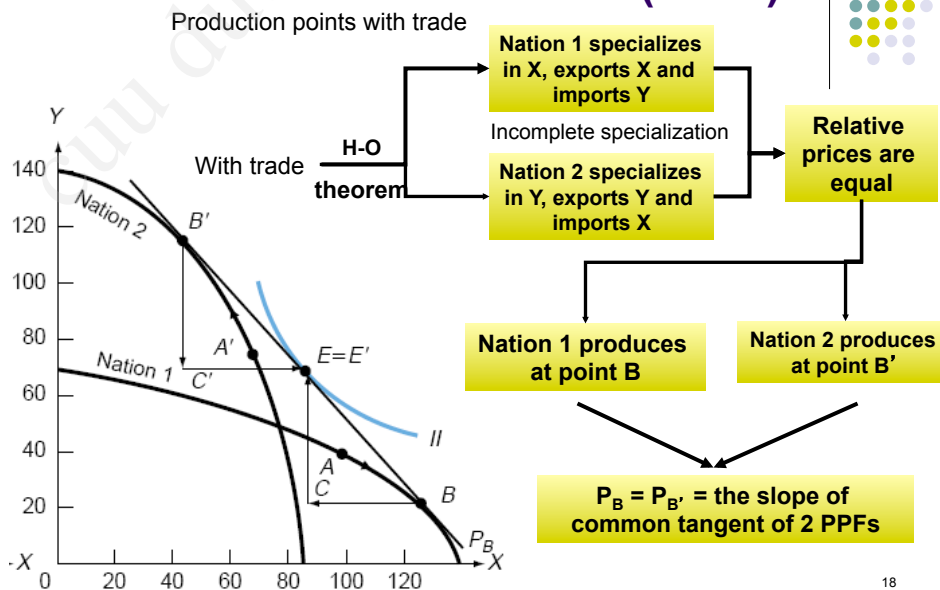
Nation 2 exports Y, imports X

Illustration of H-O theorem



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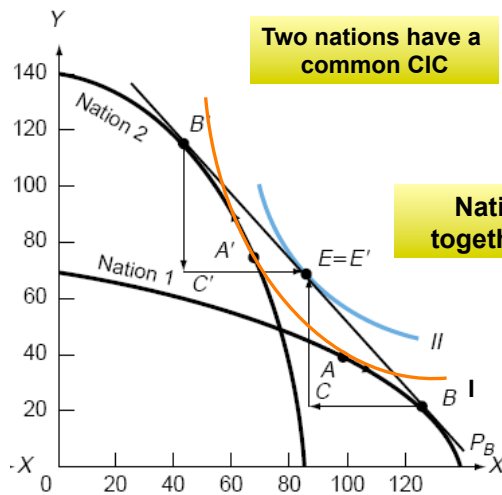
Illustration of H-O theorem (cont.)



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Illustration of H-O theorem (cont.)

Consumption points with trade



Two nations have a common CIC

The common tangent of two PPFs is tangent to CIC on $E = E'$

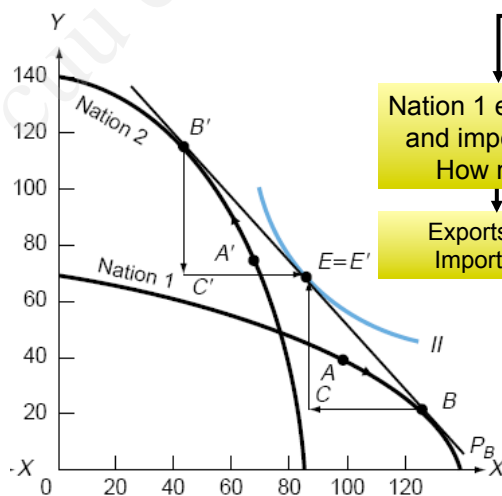
Nation 1 và Nation 2 will together consume at point E

CIC_{II} is higher than CIC_I

Both nations are better off

Illustration of H-O theorem (cont.)

Import and export of each country



In the presence of trade

Nation 1 exports X and imports Y? How much

Nation 2 exports Y and imports X? How much?

Exports = BC
Imports = EC

Export = $B'C'$
Imports = $C'E$

$B'C' = CE$
 $BC = C'E$

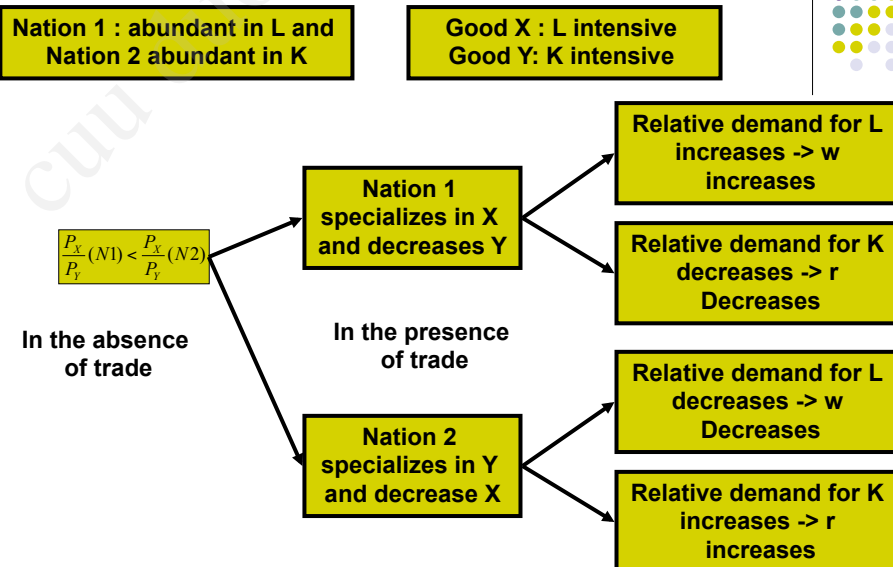
Imports of N1 = Exports of N2 and vice versa

H-O-S Theorem

- H-O-S theorem (The **Factor-Price** Equalization)
 - International trade will bring about equalization in the relative and absolute return to homogeneous factors across nations.
 - International trade will cause the wages of homogenous labor to be the same in all trading nations.
 - International trade will cause the homogenous capital to be the same in all trading nations.
 - International trade will make w and r the same in both nations.
- => **Both relative and absolute factor prices will be equalized.**

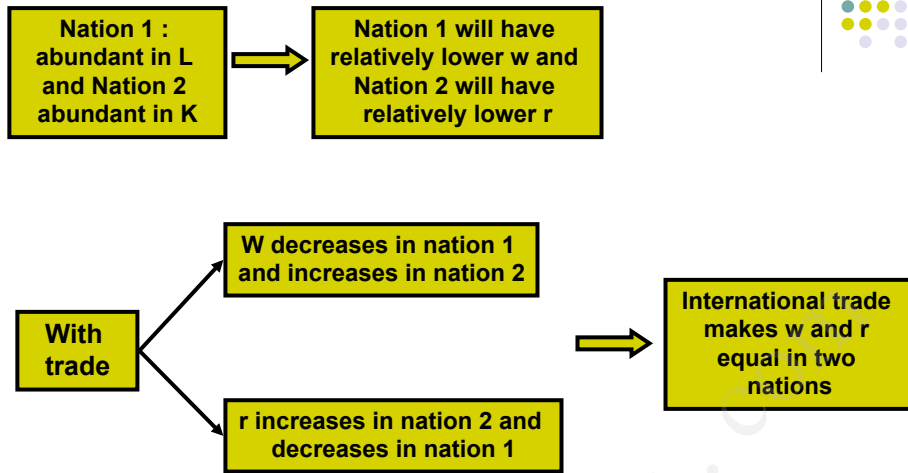
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Illustration of H-O-S theorem



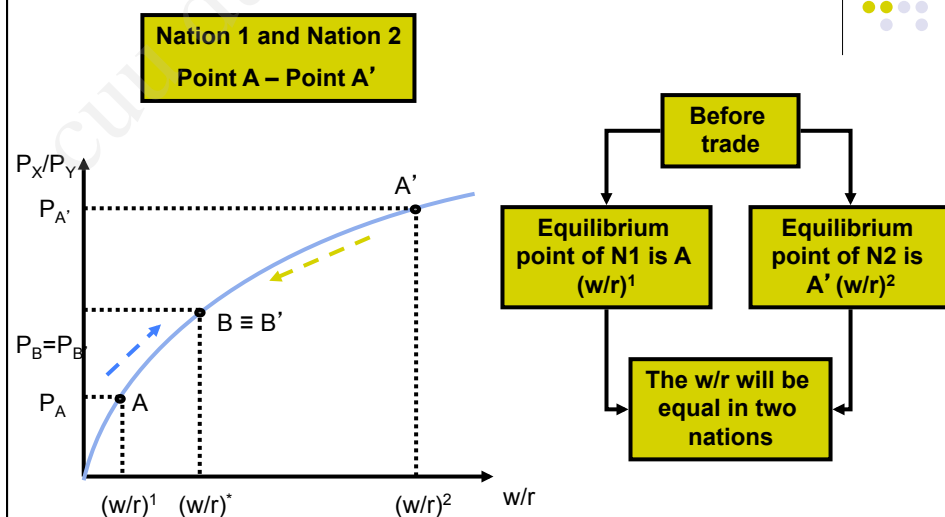
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Illustration of H-O-S theorem (cont.)



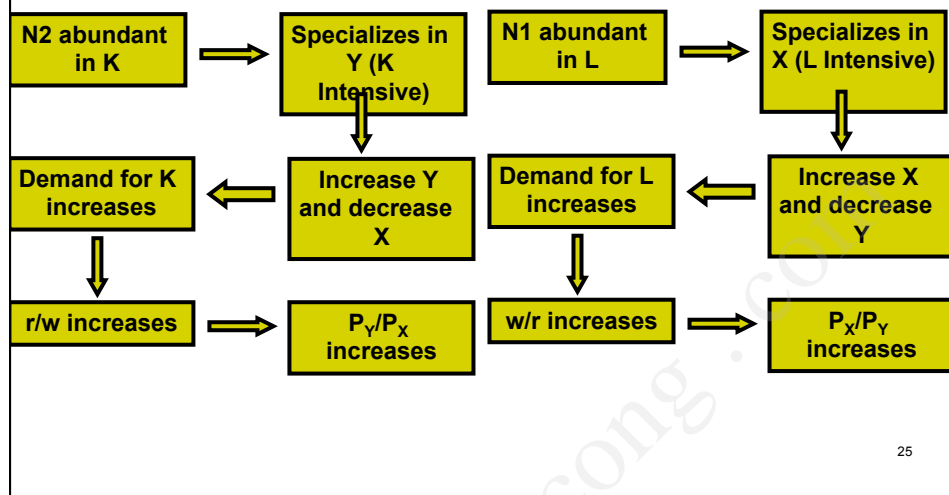
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Illustration of H-O-S theorem (cont.)



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Illustration of H-O-S theorem (cont.)



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Income distribution

- In Nation 1
 - w/r increases
 - Labor: benefits
 - Capital owners: loss
- In Nation 2:
 - w/r decreases
 - Labor: loss
 - Capital owners: benefits
 - ⇒ In developed countries: labor unions favor trade restriction.
 - ⇒ International trade benefits owners of factors that the nations are abundant in.

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The Leontief Paradox



- Tests on US data
 - The US is the most capital-abundant country
 - US exports were less capital-intensive than US imports, **Leontief paradox**.
- Tests on global data
 - Bowen, Leamer, and Sveikauskas tested the Heckscher-Ohlin model on data from 27 countries and confirmed the Leontief paradox on an international level.
- Tests on manufacturing data between low/middle income countries and high income countries.
 - This data lends more support to the theory.

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The Leontief Paradox (cont.)



TABLE 4-2 Factor Content of U.S. Exports and Imports for 1962

	Imports	Exports
Capital per million dollars	\$2,132,000	\$1,876,000
Labor (person-years) per million dollars	119	131
Capital-labor ratio (dollars per worker)	\$17,916	\$14,321
Average years of education per worker	9.9	10.1
Proportion of engineers and scientists in work force	0.0189	0.0255

Source: Robert Baldwin, "Determinants of the Commodity Structure of U.S. Trade," *American Economic Review* 61 (March 1971), pp. 126–145.

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The Leontief Paradox (cont.)



- Possible explanations for these findings include
 - that the U.S. has a special advantage in producing new products made with innovative technologies
 - differences in technology
 - Some assumptions:
 - Same technology
 - Same product

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Implications



- Government policy implications
 - Government can identify and create comparative advantage.
 - Government policies can significantly impact global competitiveness and reallocate benefits
 - Businesses should work to encourage governmental policies that support free trade or trade protection.

Implications



- Location implications
 - Different countries have advantages in different productive activities
 - These differences influence a firm's decision about where to produce and where to export...

Key words



- Same technology
- Perfect competition
- Internal factor mobility
- International factor mobility
- Labor – intensive commodity
- Capital – intensive commodity
- Factor abundance
- Relative factor prices
- H-O theory
- H-O theorem
- Factor – price equalization theorem
- Leontief Paradox

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END OF LECTURE 3



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