

Heckscher-Ohlin Theory

Factor Endowment Theory

Factor Price Equalization

Sources of Comparative Advantage

- Factor-Endowment (Heckscher-Ohlin) Theory
 - Explains comparative advantage by differences in relative national supply conditions
 - Key determinant: Resource endowments
 - Assumptions:
 - Perfect competition
 - Same demand conditions
 - Uniform quality factor inputs
 - Same technology used

Factor Endowments

- Relative price levels differ among nations because:
 - Nations have different relative endowments of factor inputs {labor(skilled or less skilled)}, land, capital
 - Different commodities require factor inputs with differing intensities of production
 - Wheat is land intensive
 - Textiles are labor intensive
 - Aircraft are capital intensive

Relative Factor Endowments

TABLE 3.5

FACTOR ENDOWMENTS OF COUNTRIES AND REGIONS,
AS A PERCENTAGE OF THE WORLD TOTAL

| Country/Region | Capital | Skilled Labor | Unskilled Labor | All Resources |
|---|---------------|---------------|-----------------|---------------|
| United States | 20.8% | 19.4% | 2.6% | 5.6% |
| European Union | 20.7 | 13.3 | 5.3 | 6.9 |
| Japan | 10.5 | 8.2 | 1.6 | 2.9 |
| Canada | 2.0 | 1.7 | 0.4 | 0.6 |
| Mexico | 2.3 | 1.2 | 1.4 | 1.4 |
| China | 8.3 | 21.7 | 30.4 | 28.4 |
| India | 3.0 | 7.1 | 15.3 | 13.7 |
| Hong Kong, South Korea, Taiwan, Singapore | 2.8 | 3.7 | 0.9 | 1.4 |
| Eastern Europe, including Russia | 6.2 | 3.8 | 8.4 | 7.6 |
| OPEC | 6.2 | 4.4 | 7.1 | 6.7 |
| Rest of the world | 17.2 | 15.5 | 26.6 | 24.8 |
| Total | <u>100.0%</u> | <u>100.0%</u> | <u>100.0%</u> | <u>100.0%</u> |

Source: From William R. Cline, *Trade and Income Distribution* (Washington, DC: Institute for International Economics, 1997), pp. 183–185.

Capital Intensities

TABLE 3.2

CAPITAL STOCK PER WORKER OF SELECTED COUNTRIES IN 1997*

| Industrial Country | 1997 | Developing Country | 1997 |
|--------------------|----------|--------------------|----------|
| Japan | \$77,429 | South Korea | \$26,635 |
| Germany | 61,673 | Chile | 17,699 |
| Canada | 61,274 | Mexico | 14,030 |
| France | 59,602 | Turkey | 10,780 |
| United States | 50,233 | Thailand | 8,106 |
| Italy | 48,943 | Philippines | 6,095 |
| Spain | 38,897 | India | 3,094 |
| United Kingdom | 30,226 | Kenya | 1,412 |

*In 1990 international dollar prices.

Source: From A. Heston, R. Summers, and B. Aten, Penn World Table (January 2003, Version 6.0), available at <http://pwt.econ.upenn.edu/>.

Factor Price Equalization

- Trade based on comparative advantage arising from factor endowments
- Redirecting demand away from the scarce factor toward the abundant factor
 - Cheap factor becomes more expensive; expensive factor becomes cheaper
 - Not fully possible in a real world situation:
 - Human capital varies across countries
 - Technology usage not identical
 - Transportation costs and trade barriers

| | In the United States | In the Rest of the World |
|--|--|--|
| Initial prices: | Wheat cheap, cloth expensive | Wheat expensive, cloth cheap |
| | <p>Trade opens: — wheat —> <— cloth —</p> | |
| Prices respond to trade. | P_{wheat} up, P_{cloth} down | P_{wheat} down, P_{cloth} up |
| Production responds to prices.* | Produce more wheat. Produce less cloth. | Produce less wheat. Produce more cloth. |
| Crucial step — National factor markets change. | For each unit of cloth sacrificed, many workers and a small amount of land laid off; extra wheat demands few workers and much land. | For each unit of wheat sacrificed, much land and few workers laid off; extra cloth demands many workers and little land. |
| National factor prices respond. | Wage rates fall and rents rise (in both sectors). | Wage rates rise and rents fall (in both sectors). |
| Long-run results: | Product prices equalized between countries. Net gains for both countries but different effects on different groups. Winners: U.S. landowners, foreign workers. Losers: U.S. workers, foreign landowners. | |

Winners and Losers

Effects of Free Trade in the Short Run

(After product prices change and production attempts to respond, but before factors move between sectors)

| | In the United States | | In the Rest of the World | |
|----------|----------------------|-------------|--------------------------|-------------|
| | On Landowners | On Laborers | On Landowners | On Laborers |
| In wheat | Gain | Gain | Lose | Lose |
| In cloth | Lose | Lose | Gain | Gain |

Effects of Free Trade in the Long Run

(After factors move between sectors in response to changes in factor demands, as shown in Figure 5.1)

| | In the United States | | In the Rest of the World | |
|----------|----------------------|-------------|--------------------------|-------------|
| | On Landowners | On Laborers | On Landowners | On Laborers |
| In wheat | Gain | Lose | Lose | Gain |
| In cloth | Gain | Lose | Lose | Gain |

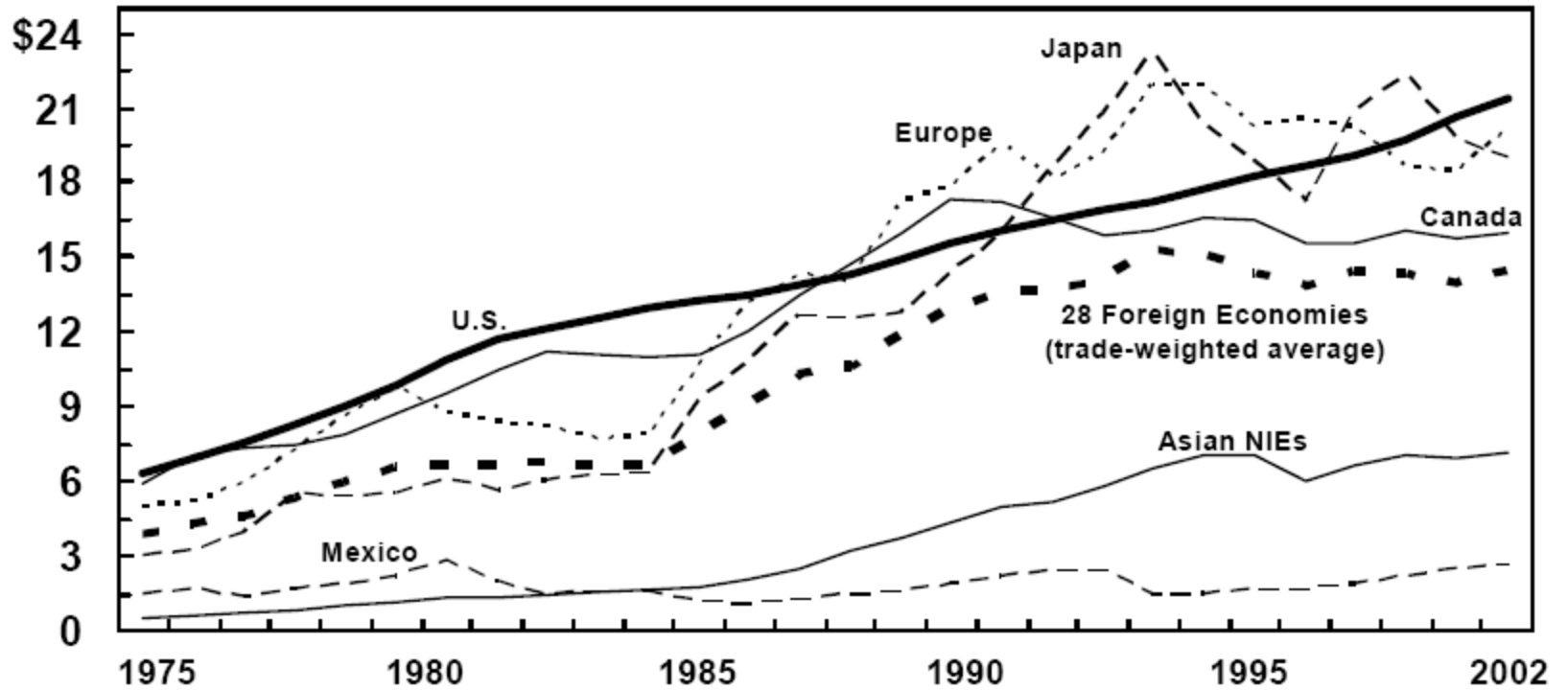
Reminder: The gains and losses to the different groups do not cancel out leaving zero net gain. In the long run, both countries get net gains. In the short run, net national gains or losses depend partly on the severity of any temporary unemployment of displaced factors.

Factor Price Equalization Across Borders

- With free trade between Oregon and Washington states, the real wages of skilled workers in Washington can't be much different than the real wages of workers in Oregon.
- In the limit, the opening of free trade between France, Greece, Spain, and other EU countries will mean that real wages will be the same in all EU countries, or least similar to the variation we observe among the US states.

Chart 1. Hourly compensation costs in U.S. dollars for production workers in manufacturing, 1975-2002

Hourly costs



Internet address: <http://www.bls.gov/fls>

Trade and Income Inequality

- Theoretically, increased trade could increase inequalities in wages
 - Example: US Trade increases the supply of products of industries that intensively use unskilled labor and increases the demand for products of industries that intensively use high skilled workers.
 - Lowers unskilled labor wages in US
 - Raises skilled labor wages in US
 - In the long run this increases the incentive to acquire skills (education, training)

Actual Trade Patterns and the Factor-Endowment Theory

- Wassily Leontief (1954)
 - Data (1947) suggested that capital/labor ratio for U.S. export industries was lower than that of its import-competing industries
 - Conclusion: Exports were less capital-intensive than import-competing goods
 - **Leontief paradox** contradicted the predictions of the factor-endowment theory
 - Study repeated with 1951 data with similar results

Leontief Paradox

(high labor intensity of US exports)

TABLE 3.4

FACTOR CONTENT OF U.S. TRADE: CAPITAL AND LABOR REQUIREMENTS PER MILLION DOLLARS OF U.S. EXPORTS AND IMPORT SUBSTITUTES

| Empirical Study | Import Substitutes | Exports | Import/Export Ratio |
|----------------------|--------------------|-------------|---------------------|
| Leontief | | | |
| Capital | \$3,091,339 | \$2,550,780 | |
| Labor (person years) | 170 | 182 | |
| Capital/Person Years | \$18,184 | \$14,015 | 1.30 |

Source: Wassily Leontief, “Domestic Production and Foreign Trade: The American Capital Position Reexamined,” *Economia Internazionale*, February 1954, pp. 3–32. See also Wassily Leontief, “Factor Proportions and the Structure of American Trade: Further Theoretical and Empirical Analysis,” *Review of Economics and Statistics*, November 1956, pp. 386–407.

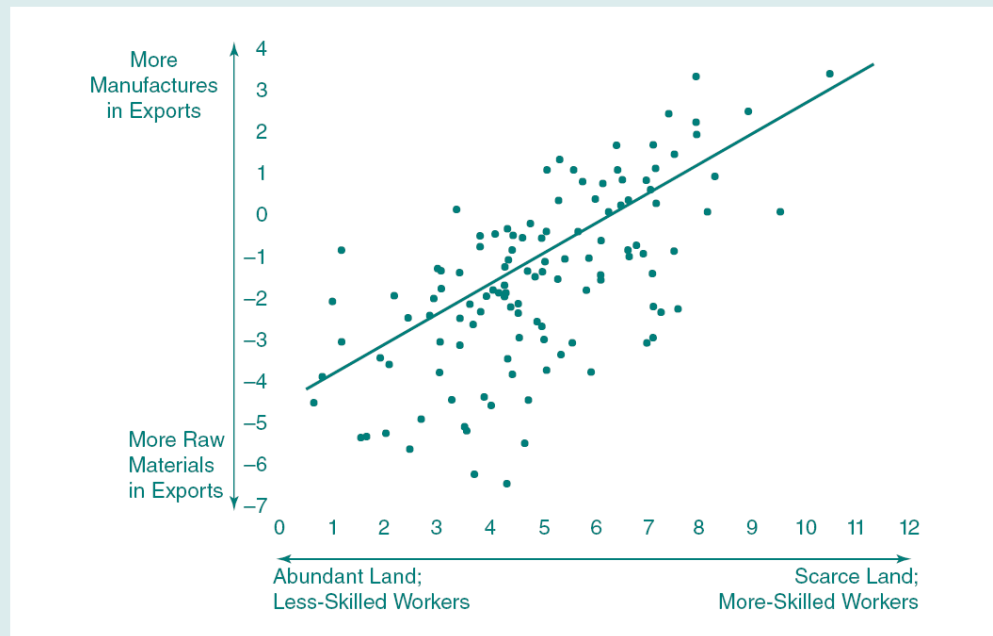
Actual Trade Patterns

- Recent researchers
 - Focus on the importance of worker skills in the creation of comparative advantage
 - Investments in skill, education, and training, which enhance a worker's productivity, create human capital
 - World Bank study included export data for 126 industrial and developing nations (1985)
 - Findings:
 - Nations with large amounts of skilled workers tend to emphasize the export of manufactures
 - Land-abundant nations tend to emphasize exports of primary products

Skilled Labor Endowments and Trade

FIGURE 3.2

HECKSCHER-OHLIN, SKILLS, AND COMPARATIVE ADVANTAGE



The regression line in the figure suggests that a nation endowed with more-skilled workers tends to have a comparative advantage in manufactures. Conversely, a land-abundant nation tends to have a comparative advantage in primary products.

Source: Data taken from World Bank, World Development Report, 1995, Geneva, World Bank, 1995, p. 59.