

International Trade

Heckscher-Ohlin Model and Political Economy of Trade



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UNIVERSITÀ DI ROMA

International Economic Policy

Finance and Development (LM-81), a.a. 2016-2017

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Presentation taken from *Reinert, K.A. (2012) An Introduction to International Economics, Instructor Materials*
And *Feenstra, R and Taylor (2011) International Economics, Instructor Materials*

Chapter 4: Intra-Industry Trade

An Introduction to International
Economics: New Perspectives on the
World Economy

Analytical Elements

- Countries
- Sectors
- Tasks
- Firms
- Factors

Table 4.1: Types of Trade

| Type of Trade | Phrase | Meaning | Source |
|---------------------------|--------------------|---|---|
| Inter-industry | Either/or | <i>Either</i> imports or exports in a given sector of the economy | Comparative advantage |
| Horizontal intra-industry | Both/and/same | <i>Both</i> imports <i>and</i> exports in a given sector of the economy at the <i>same</i> stage of processing. | Product differentiation |
| Vertical intra-industry | Both/and/different | <i>Both</i> imports <i>and</i> exports in a given sector of the economy at <i>different</i> stages of processing. | Fragmentation (comparative advantage in some instances) |

Global Patterns of Intra-Industry Trade

- Approximately one third of world trade takes place as intra-industry trade
- Especially prominent in manufactured goods among the developed or high-income countries of the world
 - Probably accounts for up to 70% of trade
- Globally, intra-industry trade is becoming more important over time, particularly in Asia

Global Patterns of Intra-Industry Trade

- The increasing extent of intra-industry trade in world trading system has some important implications for the *adjustment* of economies to increasing trade
- Increases in inter-industry trade based on absolute or comparative advantage involve import sectors contracting and export sectors expanding
 - Requires that productive resources, most notably workers, shift from contracting to expanding sectors in order to avoid unemployment
 - Not always an easy process—often gives rise to calls for protection

Global Patterns of Intra-Industry Trade

- The adjustment process in the case of intra-industry trade is very different
 - A given sector experiences increases in imports and exports simultaneously
 - Workers are less likely to need to shift between sectors
 - Demands for protection from increased imports are less likely
- This is known as the “smooth adjustment hypothesis”
- Smoothness:
 - Inter-industry trade: Low (not at all smooth)
 - Vertical intra-industry trade: Medium (somewhat smooth)
 - Horizontal intra-industry trade: High (smooth)

An Explanation of Intra-Industry Trade

- Will develop an explanation of intra-industry trade using the example of US trade in cheese
 - Have to allow for product differentiation among types of cheese
 - Will restrict ourselves to two types of cheese: blue cheese (denoted by B) and food-service cheese (denoted by F)
 - This situation is represented in Figure 4.2
 - Trade implications of these supply and demand relationships are illustrated in Figure 4.3

Figure 4.2: Markets for Blue and Food-Service Cheese

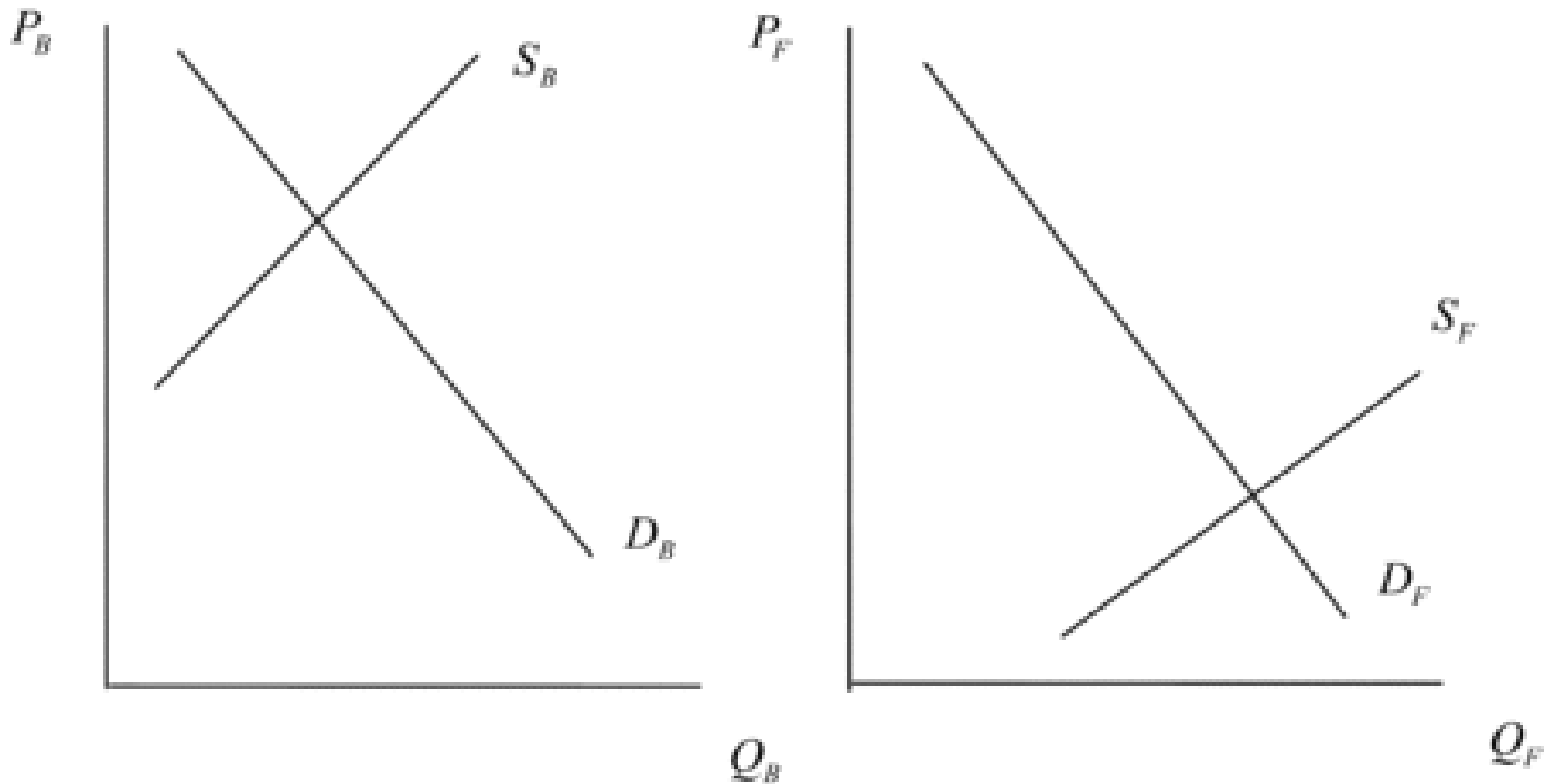
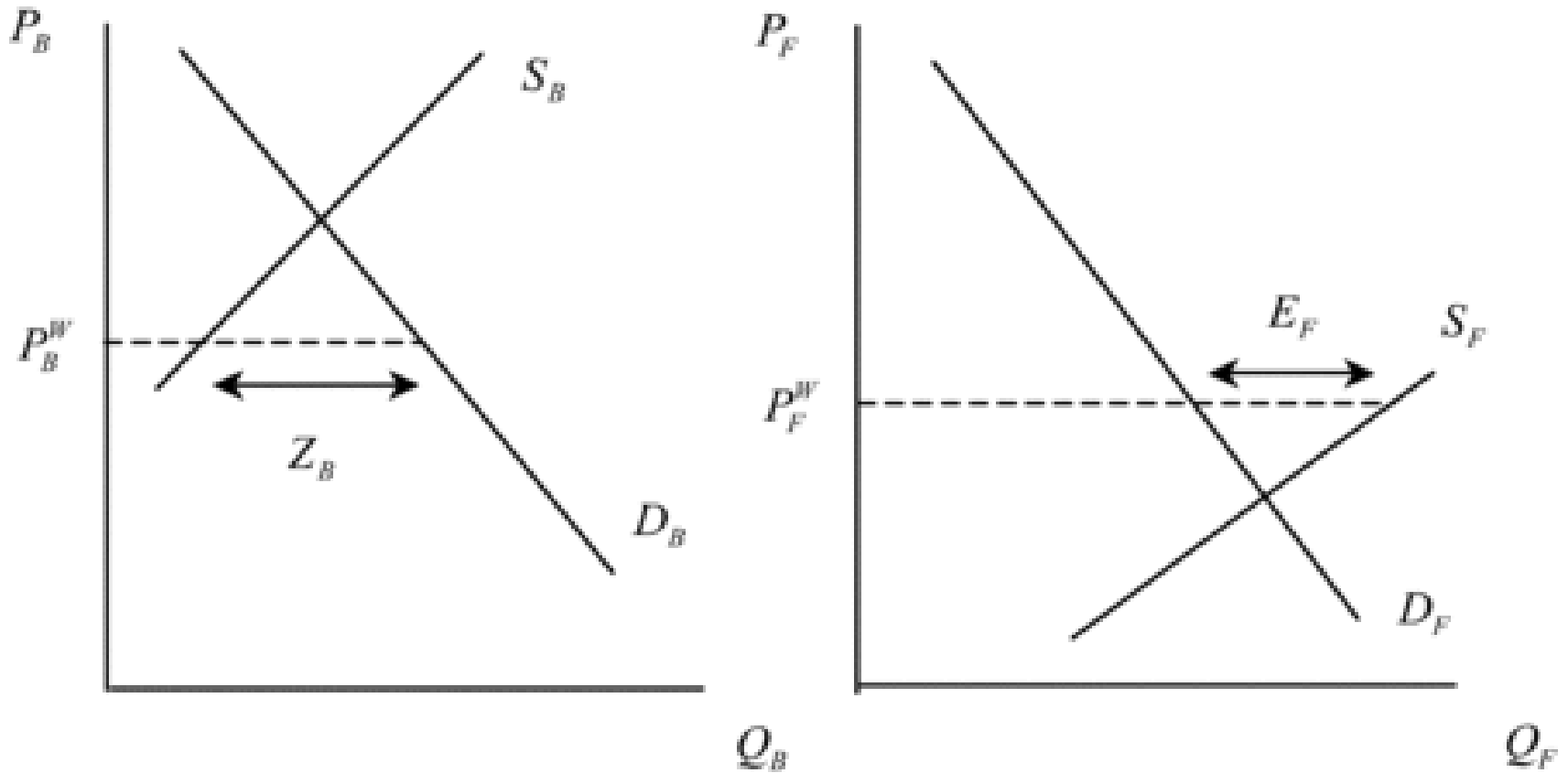


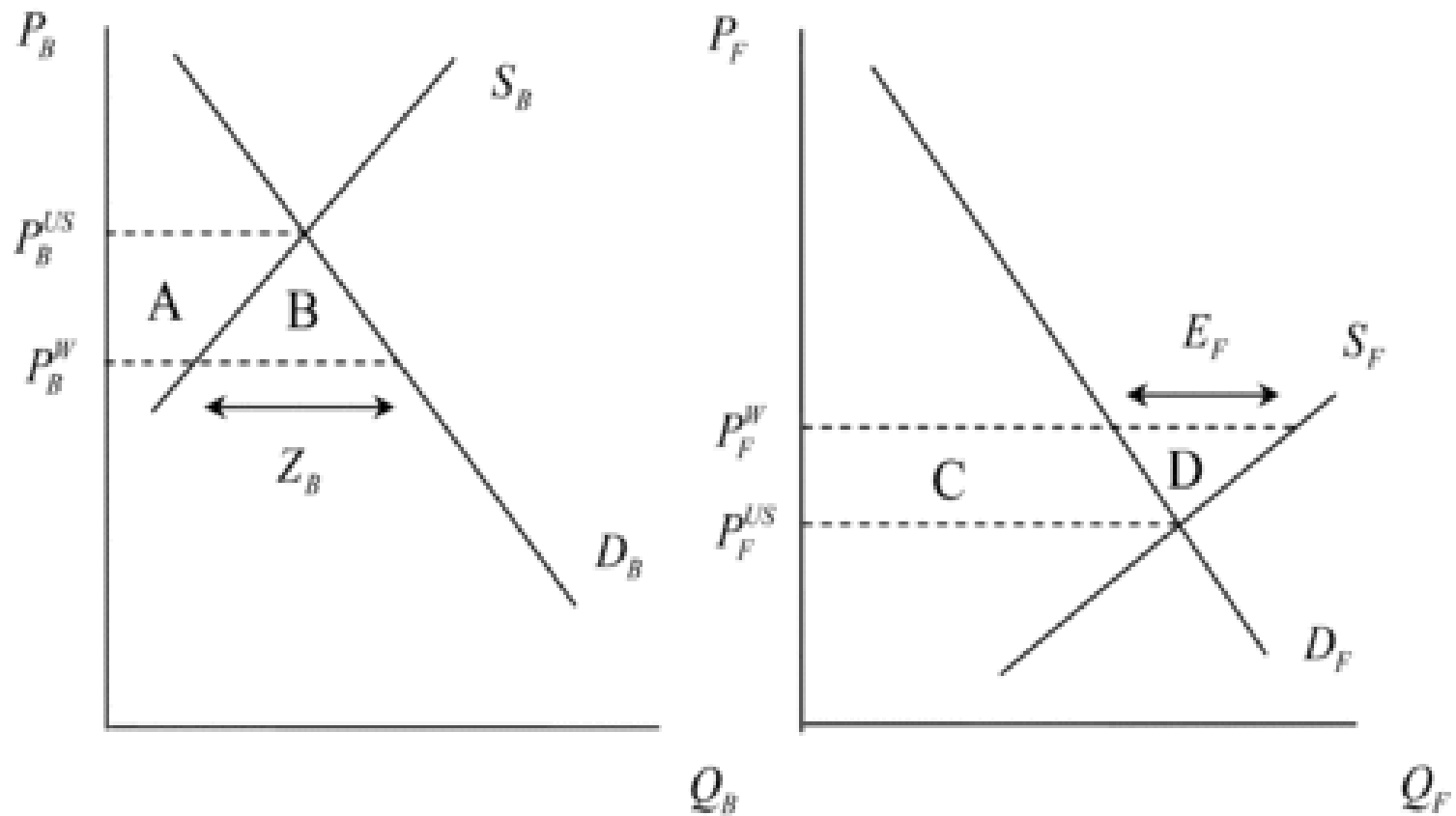
Figure 4.3: U.S. Intra-Industry Trade in Cheese



Gains from Intra-Industry Trade

- Does intra-industry trade in cheese benefit the United States, or is it unnecessary and wasteful?
- Take up this issue in Figure 4.4
- Areas B and D represent gains from trade

Figure 4.4: The Gains from Intra-Industry Trade



Chapter 5: The Political Economy of Trade

An Introduction to International
Economics: New Perspectives on the
World Economy

Introduction

- It is possible for countries to move from autarky to inter-industry trading relationships based on patterns of comparative advantage
 - Involved improvements in welfare for the countries involved
- However, while Japan may experience an economic benefit from importing rice, it has a long history of preventing the importation of rice
 - Reluctance due to economic security and cultural reasons
- Possible (and likely) certain groups lose from this change
 - Japanese rice producers are one such politically powerful group
- Gives rise to political economy of trade
- Theory of international trade begins to merge into political science

The Market for Protection

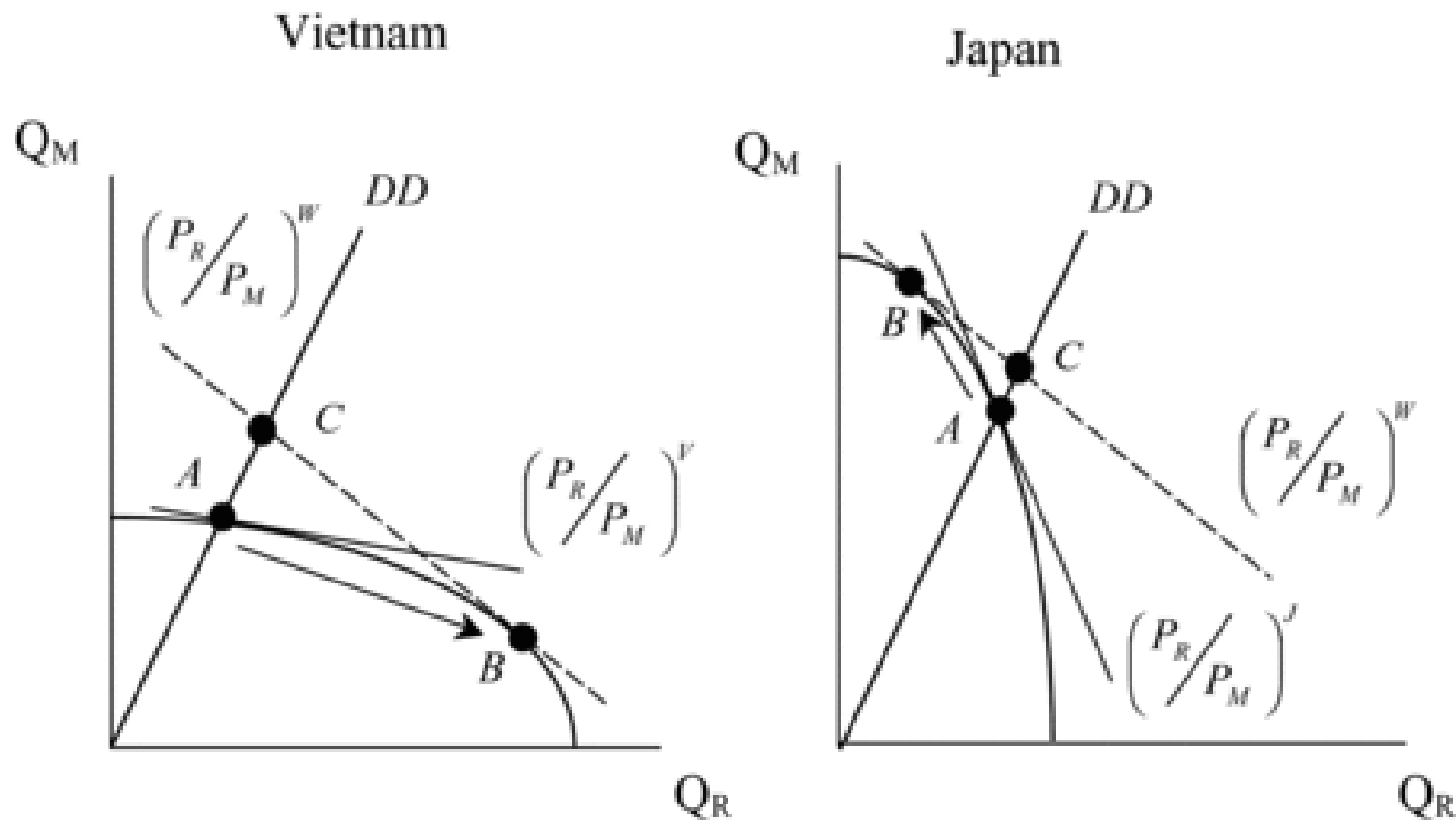
- The market for protection approach emphasizes the supply-side and demand-side factors affecting actual protection levels.
- The supply of protection is provided by national governments.
- The demand for protection can take place through a variety of mechanisms suggested in Table 5.1.

Table 5.1: Approaches to the Political Economy of Trade

| Focus | Name | Insight |
|---------------|--|---|
| Country-based | Realism | There are security externalities associated with international trade. |
| Country-based | Institutionalism | Institutional structures within country governments affect trade policies. |
| Factor-based | Heckscher-Ohlin model Stolper Samuelson theorem | Under factor mobility within a country, different factors can win or lose from trade. |
| Sector-based | Specific factors model | With sector-specific factors, winning/losing depends on export/import factor specificity. |
| Firm-based | Firm-based | Trade exposure of firms can influence their posture to trade liberalization |

Adapted from Walter and Sen (2009)

Figure 5.1: Autarky and Comparative Advantage in Vietnam and Japan



Trade and Factors of Production

- Pattern of comparative advantage may be based on different endowments of factors of production
- For instance, Vietnam may have a comparative advantage in rice due to the fact that it has a relatively large endowment of land
 - Factor endowments \Leftrightarrow Countries
 - Factor intensities \Leftrightarrow Sectors or goods
- Heckscher-Ohlin model of international trade explains comparative advantage in terms of factor endowments

Heckscher-Ohlin Model

- A country exports (imports) the good whose production is intensive in its abundant (scarce) factor
 - For instance, Vietnam's comparative advantage in rice causes an increase in the output of rice at the expense of motorcycles
 - Results in an increase in demand for land and a decrease in demand for physical capital
 - Vietnamese land owners gain from trade, while Vietnamese capital owners (capitalists) lose from trade
 - Japan's comparative advantage in motorcycles causes an increase in the output of motorcycles at the expense of rice
 - Results in an increase in demand for physical capital and a decrease in demand for land
 - Japanese capital owners gain from trade and Japanese land owners lose from trade

1 Heckscher-Ohlin Model

Assumptions of the Heckscher-Ohlin Model

Assumption 1: Two factors of production, labor and capital, can move freely between the industries.

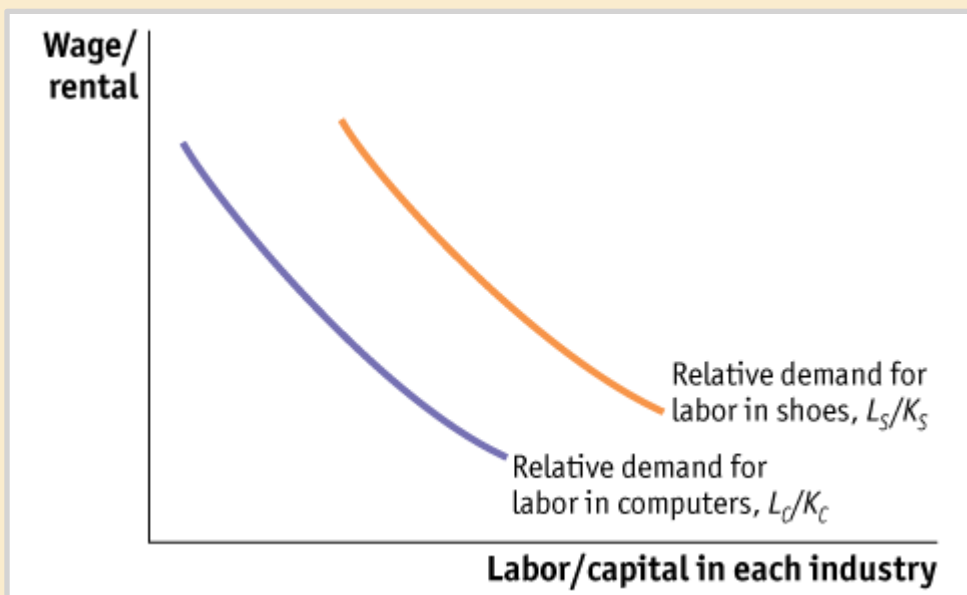
Assumption 2: Shoe production is labor-intensive; that is, it requires more labor per unit of capital to produce shoes than computers, so that $L_S / K_S > L_C / K_C$.

1 Heckscher-Ohlin Model

Labor Intensity of Each Industry The demand for labor relative to capital is assumed to be higher in shoes than in computers, $L_S/K_S > L_C/K_C$.

These two curves slope down just like regular demand curves, but in this case, they are *relative* demand curves for labor (i.e., demand for labor divided by demand for capital).

FIGURE 4-1



1 Heckscher-Ohlin Model

Assumptions of the Heckscher-Ohlin Model

Assumption 3: Foreign is labor-abundant, by which we mean that the labor–capital ratio in Foreign exceeds that in Home, $\bar{L}^*/\bar{K}^* > \bar{L}/\bar{K}$. Equivalently, Home is capital-abundant, so that $\bar{K}/\bar{L} > \bar{K}^*/\bar{L}^*$.

Assumption 4: The final outputs, shoes and computers, can be traded freely (i.e., without any restrictions) between nations, but labor and capital do not move between countries.

Assumption 5: The technologies used to produce the two goods are identical across the countries.

Assumption 6: Consumer tastes are the same across countries, and preferences for computers and shoes do not vary with a country's level of income.

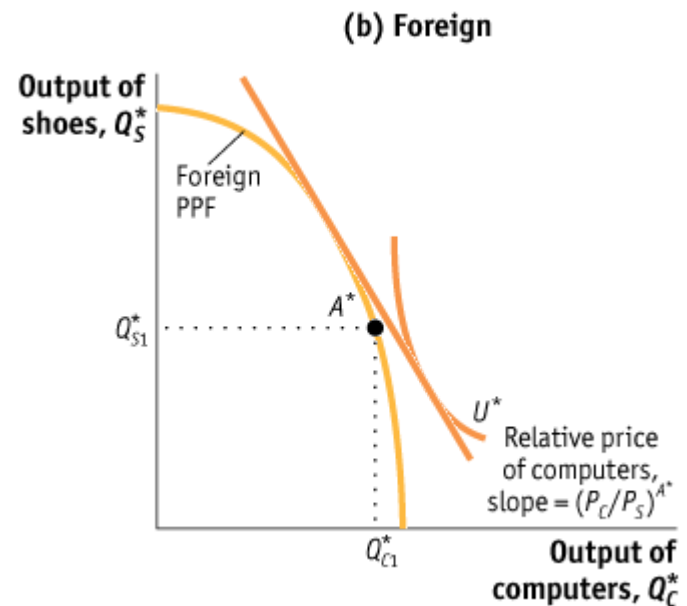
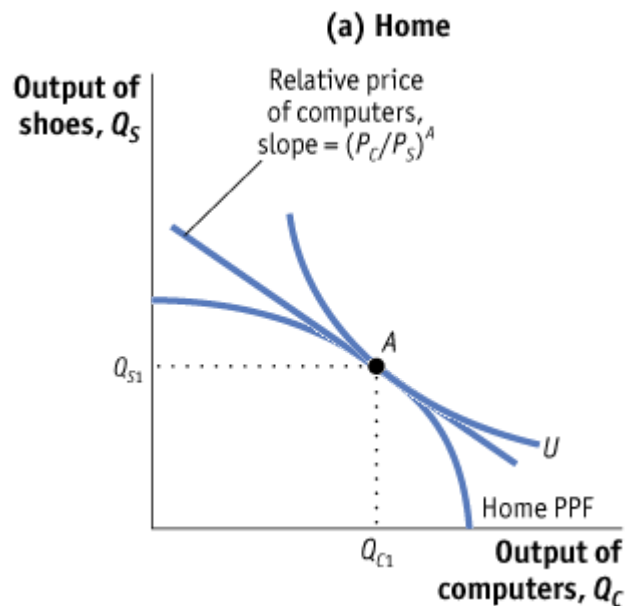
1 Heckscher-Ohlin Model

No-Trade Equilibrium

Production Possibilities Frontiers, Indifference Curves, and No-Trade Equilibrium Price

FIGURE 4-2 (3 of 3)

No-Trade Equilibria in Home and Foreign (continued)



Foreign is labor-abundant and shoes are labor-intensive, so the Foreign PPF is skewed toward shoes.

Foreign preferences are summarized by the indifference curve, U^*

The Foreign no-trade equilibrium is at point A^* , with a higher relative price of computers, as indicated by the steeper slope of $(P_C^*/P_S^*)^{A^*}$.

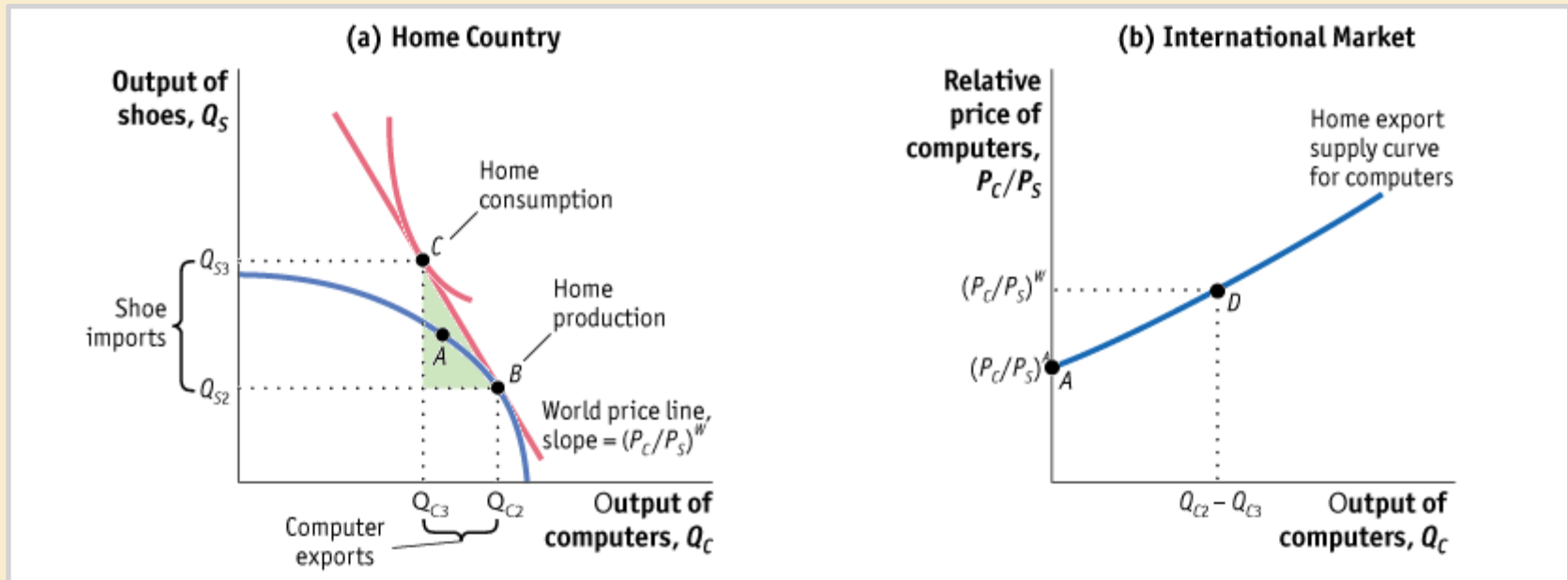
1 Heckscher-Ohlin Model

Free-Trade Equilibrium

Home Equilibrium with Free Trade

FIGURE 4-3 (2 of 2)

International Free-Trade Equilibrium at Home (continued)



The height of this triangle is the Home imports of shoes (the difference between the amount consumed of shoes and the amount produced with trade, $Q_{S3} - Q_{S2}$).

In panel (b), we show Home exports of computers equal to zero at the no-trade relative price, $(P_C/P_S)^A$, and equal to $(Q_{C2} - Q_{C3})$ at the free-trade relative price, $(P_C/P_S)^W$.

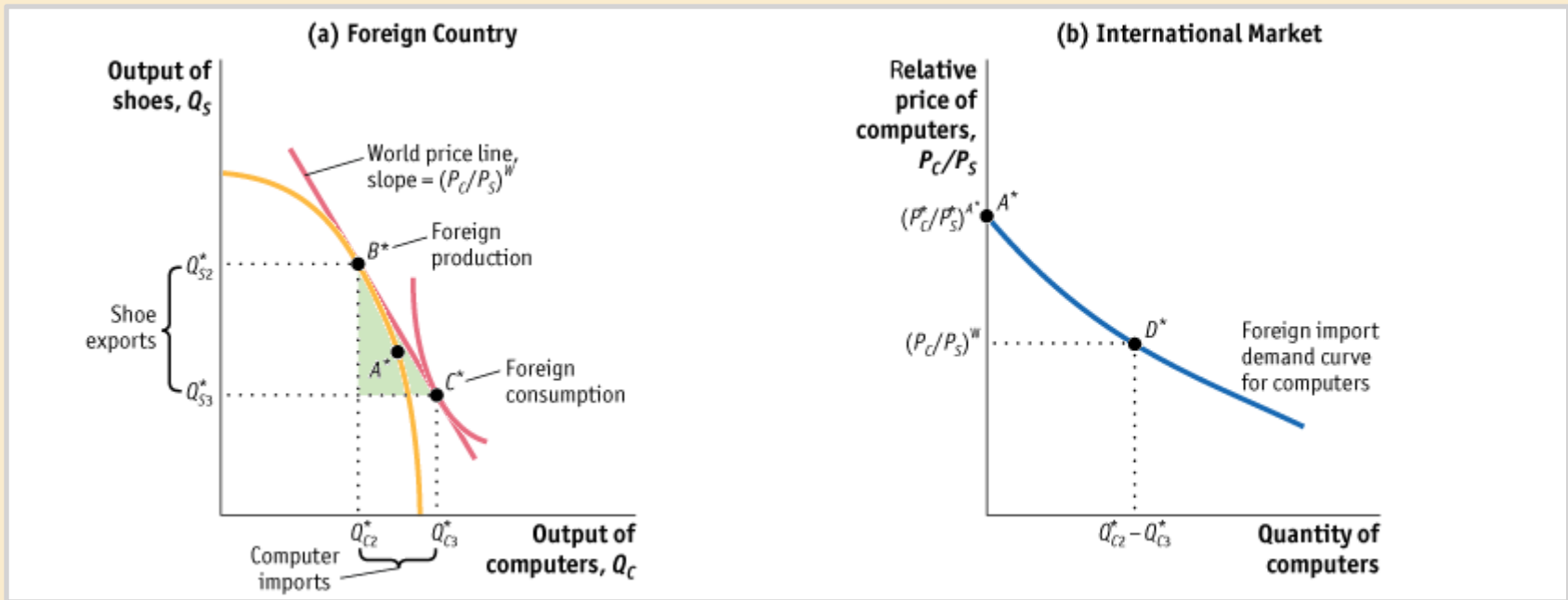
1 Heckscher-Ohlin Model

Free-Trade Equilibrium

Foreign Equilibrium with Free Trade

FIGURE 4-4 (2 of 2)

International Free-Trade Equilibrium in Foreign (continued)



The height of this triangle is Foreign exports of shoes (the difference between the production of shoes and the amount consumed with trade, $Q_{S2}^* - Q_{S3}^*$).

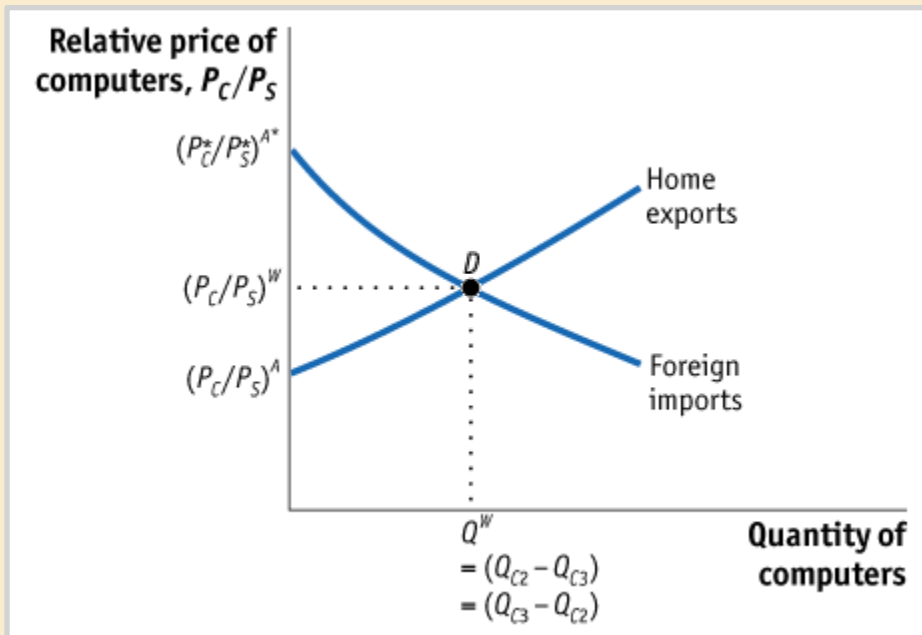
In panel (b), we show Foreign imports of computers equal to zero at the no-trade relative price, $(P_C^*/P_S^*)^{A^*}$, and equal to $(Q_{C3}^* - Q_{C2}^*)$ at the free-trade relative price, $(P_C/P_S)^W$.

1 Heckscher-Ohlin Model

Free-Trade Equilibrium

Equilibrium Price with Free Trade Because exports equal imports, there is no reason for the relative price to change and so this is a free-trade equilibrium.

FIGURE 4-5 Determination of the Free-Trade World Equilibrium Price



The world relative price of computers in the free-trade equilibrium is determined at the intersection of the Home export supply and Foreign import demand, at point D .

At this relative price, the quantity of computers that Home wants to export, $(Q_{C2} - Q_{C3})$, just equals the quantity of computers that Foreign wants to import, $(Q_{C3}^* - Q_{C2}^*)$.

1 Heckscher-Ohlin Model

Free-Trade Equilibrium

Pattern of Trade

- Home exports computers, the good that uses intensively the factor of production (capital) found in abundance at Home.
- Foreign exports shoes, the good that uses intensively the factor of production (labor) found in abundance there.
- This important result is called the Heckscher-Ohlin theorem.

2 Testing the Heckscher-Ohlin Model

The first test of the Heckscher-Ohlin theorem was performed by economist Wassily Leontief in 1953.

Leontief supposed correctly that in 1947 the United States was abundant in capital relative to the rest of the world.

Thus, from the Heckscher-Ohlin theorem, Leontief expected that the United States would export capital-intensive goods and import labor-intensive goods.

What Leontief actually found, however, was just the opposite: the capital–labor ratio for U.S. imports was *higher* than the capital–labor ratio found for U.S. exports!

This finding contradicted the Heckscher-Ohlin theorem and came to be called Leontief's paradox.

2 Testing the Heckscher-Ohlin Model

Leontief's Paradox

TABLE 4-1

Leontief's Test

Leontief used the numbers in this table to test the Heckscher-Ohlin theorem. Each column shows the amount of capital or labor needed to produce \$1 million worth of exports from, or imports into, the United States in 1947. As shown in the last row, the capital–labor ratio for exports was less than the capital–labor ratio for imports, which is a paradoxical finding.

| | Exports | Imports |
|---------------------------|----------|----------|
| Capital (\$ millions) | \$2.55 | \$3.1 |
| Labor (person-years) | 182 | 170 |
| Capital/labor (\$/person) | \$14,000 | \$18,200 |

2 Testing the Heckscher-Ohlin Model

Leontief's Paradox

Explanations

- U.S. and foreign technologies are not the same, in contrast to what the HO theorem and Leontief assumed.
- By focusing only on labor and capital, Leontief ignored land abundance in the United States.
- Leontief should have distinguished between skilled and unskilled labor (because it would not be surprising to find that U.S. exports are intensive in skilled labor).
- The data for 1947 may be unusual because World War II had ended just two years earlier.
- The United States was not engaged in completely free trade, as the Heckscher-Ohlin theorem assumes.

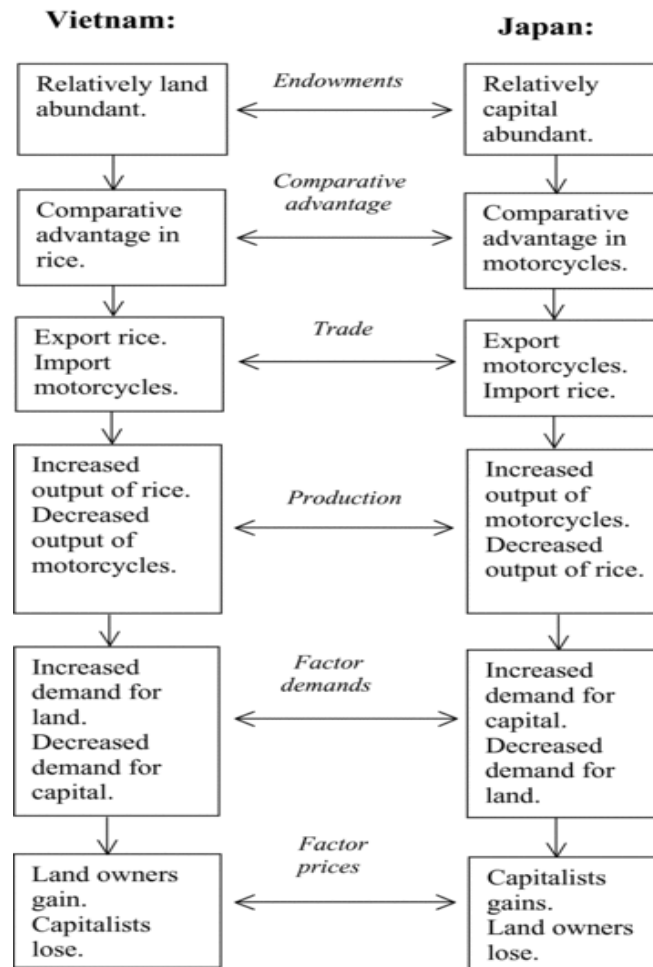
Heckscher-Ohlin Model

- Would expect that land owners in Vietnam and capital owners in Japan would support trade
- Political opposition to trade would come from capital owners in Vietnam and land owners in Japan
 - Thus, strong and persistent opposition to rice imports in Japan
 - Due in part to political clout of Japanese land owners
 - However, it is not “economic security and culture” that explains the opposition but income loss

Stolper-Samuelson Theorem

- When moving from autarky to trade, the country's abundant factor of production (used intensively in the export sector) gains, while the country's scarce factor of production (used intensively in the import sector) loses
- The Stolper-Samuelson theorem cannot be applied blindly
 - Applies only to trade based on different endowments in factors of production
 - Trade based on differences in technology can mitigate effects described by theorem
 - Technological considerations arise in the application of the theorem to the issue of North-South trade and wages

Figure 5.2: The Heckscher Ohlin Model and the Stolper-Samuelson Theorem



North-South Trade and Wages

- More subtle issue in the ongoing debate concerning North-South trade and wages
- Evidence suggests that
 - Developing countries in South have comparative advantage in unskilled-labor-intensive goods
 - Developed countries in North have comparative advantage in skilled-labor-intensive goods
 - According to the Stolper-Samuelson theorem, Northern workers who lose as a result of increased North-South trade are actually unskilled workers

North-South Trade and Wages

- Concerns have prompted ongoing empirical investigation into effects of trade on Northern wages
 - Important empirical result is that there are two (not one) main causes for the decline in relative wages of Northern unskilled workers
 - Trade and technology
- Stolper-Samuelson theorem suggests that Northern unskilled workers lose because North has a comparative advantage in skilled-labor-intensive goods
 - These effects, however, tend to be smaller than Stolper-Samuelson theorem would suggest

North-South Trade and Wages

- Why might the Stolper-Samuelson theorem not apply?
 - Some evidence that export-oriented industries pay higher wages than other industries.
 - Labor reallocations caused by increased trade can boost average wages.
 - Some North-south trade is based on higher productivity (better technology) in the North rather than in differences in factor endowments.
 - Technology plays a large factor in decline in unskilled labor wages in the North.

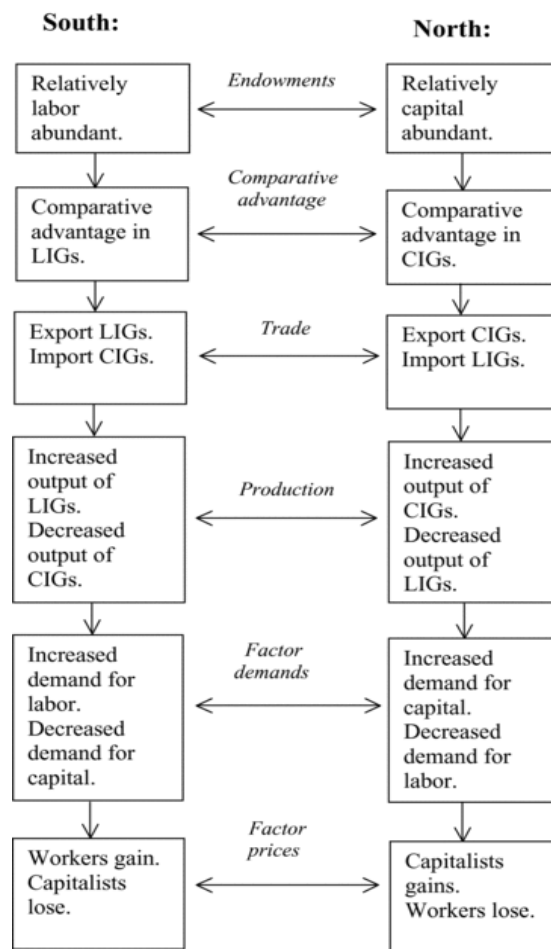
North-South Trade and Wages

- Ongoing process of technological change in the North has increased demand for skilled workers relative to unskilled workers
- Trade restrictions in the North on exports from the South is probably not the best approach to the problem
 - Technology appears to be at least as important as trade
 - Trade restrictions will suppress the overall gains from trade
 - Trade restrictions could violate multilateral commitments at the WTO
 - Restrictions could harm unskilled workers in the South who are in more dire straits than their Northern counterparts.

North-South Trade and Wages

- A more long term and productive policy approach would be to offer other forms of support to unskilled Northern workers
 - Income supports (including trade adjustment assistance) or
 - Support to increase human capital assets (education, training)
 - A major factor contributing to wage and income inequality in the North is failure to complete secondary (high school) education
 - Remedying educational failures is imperative in Northern and Southern countries

Figure 5.3: The Stolper-Samuelson Theorem and North-South Trade



The Role of Specific Factors

- Central assumption of Heckscher-Ohlin model and Stolper-Samuelson theorem
 - Resources or factors of production such as labor, physical capital, and land can move effortlessly among different sectors of trading economies
 - For example, Japanese resources are assumed to be able to shift back and forth between rice and motorcycle production
 - For some types of analysis (particularly that applying to the long run) assumption is reasonable
 - However, sometimes assumption can be at odds with reality
 - Factors of production can be sector specific or specific factors and not easily move from one sector to another

The Role of Specific Factors

- Requires a modification of the Stolper-Samuelson theorem
- For example—steel production in United States
 - United States is relatively abundant in physical capital
 - Theorem suggests capital owners in United States would gain as a result of increased trade
 - But in 2000 US-based Weirton Steel Corporation drew attention to what it called an “import crisis” and pledged to fight the “import war”
- Why would capitalists in a capital abundant country oppose increased trade in violation of Stolper-Samuelson theorem?
 - Weirton Steel Corporation and other US steel firms own large amounts of specific factors (steel mills) which are specific to steel production

The Role of Specific Factors

- Need to modify the Stolper-Samuelson theorem to adjust for specific factors
 - Factors of production that are specific to import (export) sectors tend to lose (gain) as a result of trade
 - Weirton is in an import sector characterized by sector-specific physical capital (and perhaps even labor) and stands to lose as a result of increased trade

The Role of Specific Factors

- Keep the difference between specific and mobile factors in mind when assessing politics of trade
 - Mobile factors of production
 - Stolper-Samuelson theorem applies
 - Abundant factor of production (used intensively in the export sector) gains
 - Scarce factor of production (used intensively in the import sector) loses
 - Specific factors of production
 - Stolper-Samuelson theorem does not apply
 - Factor of production specific to the export sector gains
 - Factor of production specific to the import sector loses
 - Fate of mobile factors is uncertain

Endogenous Protection

- An addendum to the Heckscher-Ohlin model that explains why the demand for and supply of protection interact to lead to positive levels of protection (tariffs).
- This considers ranges in capital-labor ratios for individuals that begin at zero for a number of workers.
- Capital-labor ratios then become increasingly positive for additional workers.

Endogenous Protection

- Associated with these capital-labor ratios is a gain-loss graph that assumes a capital-abundant country.
- The median individual/voter experiences a loss as a result of trade in Figure 5.4.
- The median voter model suggests that politicians will respond to the median voter and offer a supply of protection.

Figure 5.4: Endogenous Protection

