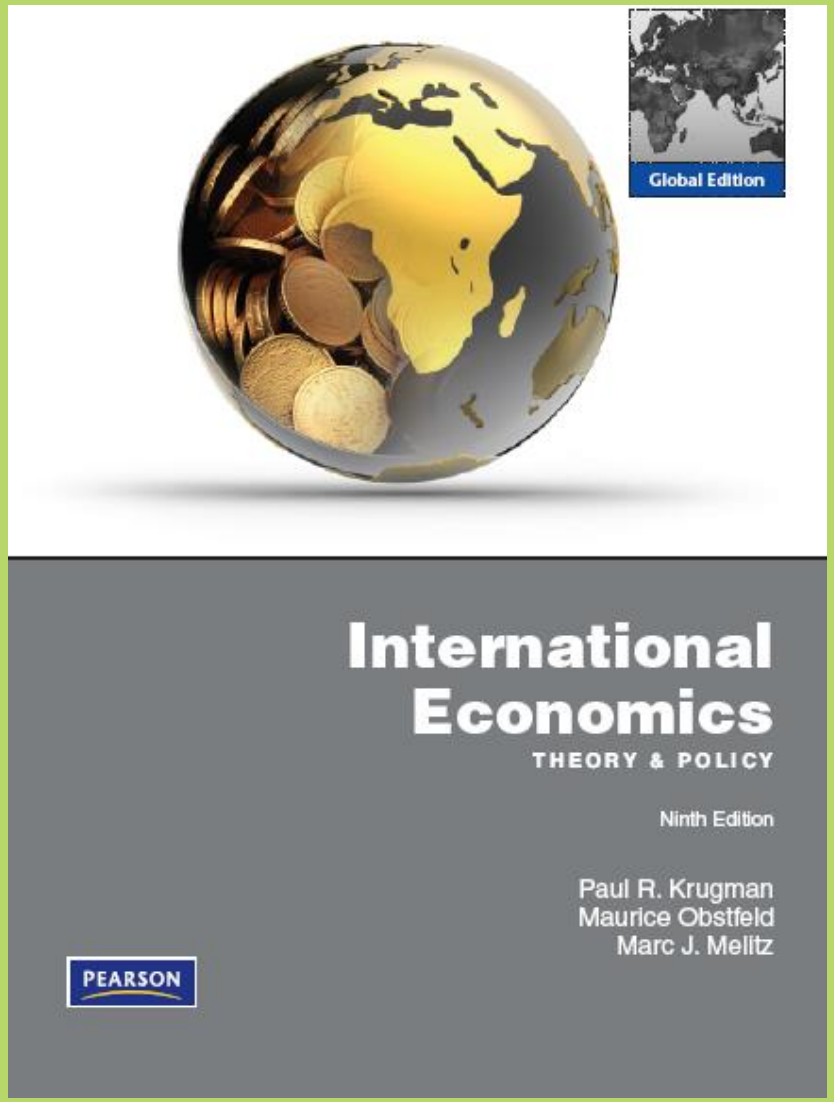
Chapter 6

The Standard Trade Model



Introduction

- Standard trade model is a general model that includes Ricardian, specific factors, and Heckscher-Ohlin models as special cases.
  - Two goods, food (F) and cloth (C).
  - Each country's PPF is a smooth curve.

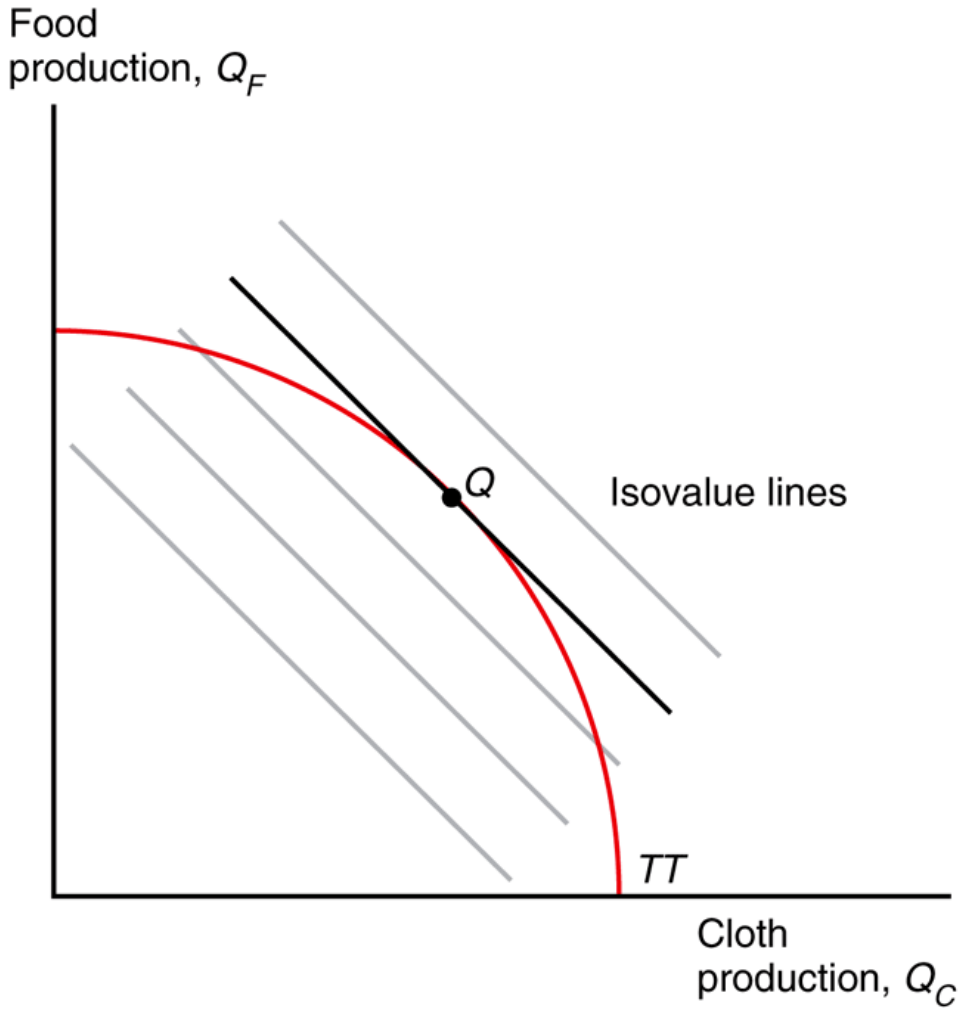
Introduction (cont.)

- Differences in *labor services, labor skills, physical capital, land, and technology* between countries cause differences in production possibility frontiers.
- A country's PPF determines its relative supply function.
- National relative supply functions determine a world relative supply function, which along with world relative demand determines the equilibrium under international trade.

Production Possibilities and Relative Supply

- What a country produces depends on the relative price of cloth to food P_C/P_F.
- An economy chooses its production of cloth Q_C and food Q_F to maximize the value of its output $V = P_C Q_C + P_F Q_F$, given the prices of cloth and food.
  - The slope of an isovalue line equals $-(P_C/P_F)$
  - Produce at point where PPF is tangent to isovalue line.

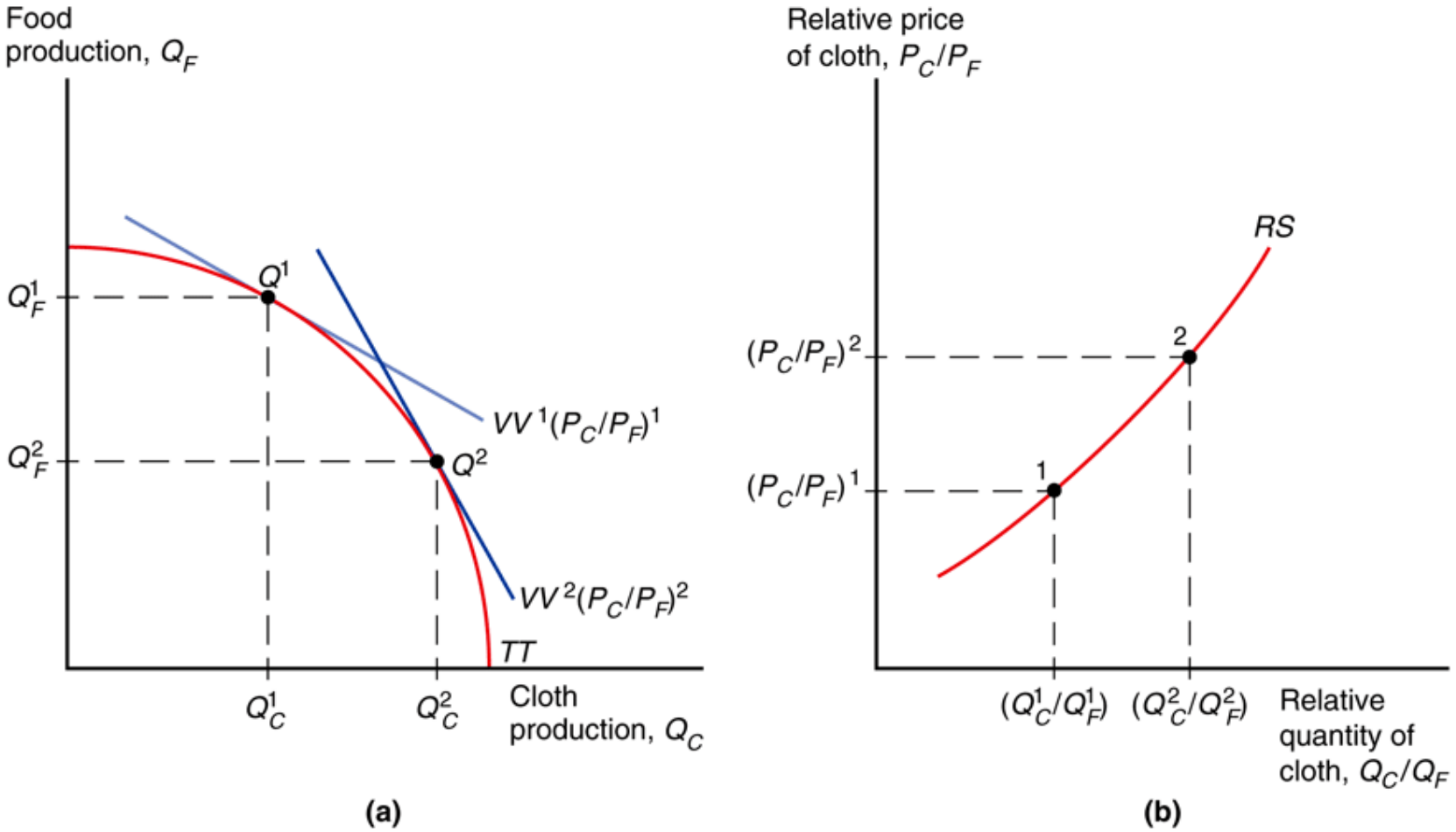
Fig. 6-1: Relative Prices Determine the Economy's Output



Production Possibilities and Relative Supply (cont.)

- Relative prices and relative supply:
  - An increase in the price of cloth relative to food P_C/P_F makes the isovalue line steeper.
  - Production shifts from point Q^1 to point Q^2.
  - Supply of cloth relative to food Q_C/Q_F rises.
  - Relative supply of cloth to food increases with the relative price of cloth to food.

Fig. 6-2: How an Increase in the Relative Price of Cloth Affects Relative Supply



Relative Prices and Demand

- The value of the economy's consumption must equal the value of the economy's production.

$$P_C D_C + P_F D_F = P_C Q_C + P_F Q_F = V$$

- Assume that the economy's consumption decisions may be represented as if they were based on the tastes of a single representative consumer.
- An **indifference curve** represents combinations of cloth and food that leave the consumer equally well off (indifferent).

Relative Prices and Demand (cont.)

- Indifference curves
  - are downward sloping – if you have less cloth, then you must have more food to be equally satisfied.
  - that lie farther from the origin make consumers more satisfied – they prefer having more of both goods.
  - become flatter when they move to the right – with more cloth and less food, an extra yard of cloth becomes less valuable in terms of how many calories of food you are willing to give up for it.

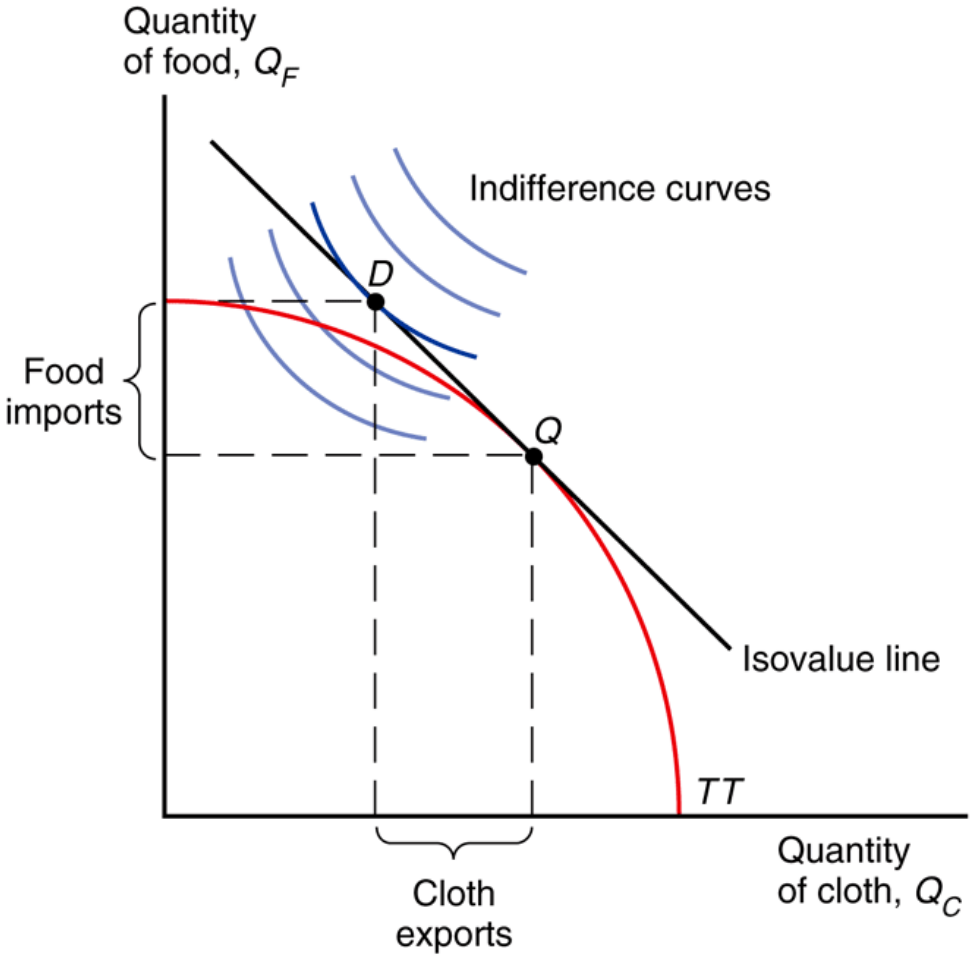
Relative Prices and Demand (cont.)

- Consumption choice is based on preferences and relative price of goods:
  - Consume at point *D* where the isovalue line is tangent to the indifference curve.
- Economy exports cloth – the quantity of cloth produced exceeds the quantity of cloth consumed – and imports food.

Relative Prices and Demand (cont.)

- Relative prices and relative demand
  - An increase in the relative price of cloth P_C/P_F causes consumption choice to shift from point D^1 to point D^2.
  - Demand for cloth relative to food D_C/D_F falls.
  - Relative demand for cloth to food falls as the relative price of cloth to food rises.

Fig. 6-3: Production, Consumption, and Trade in the Standard Model



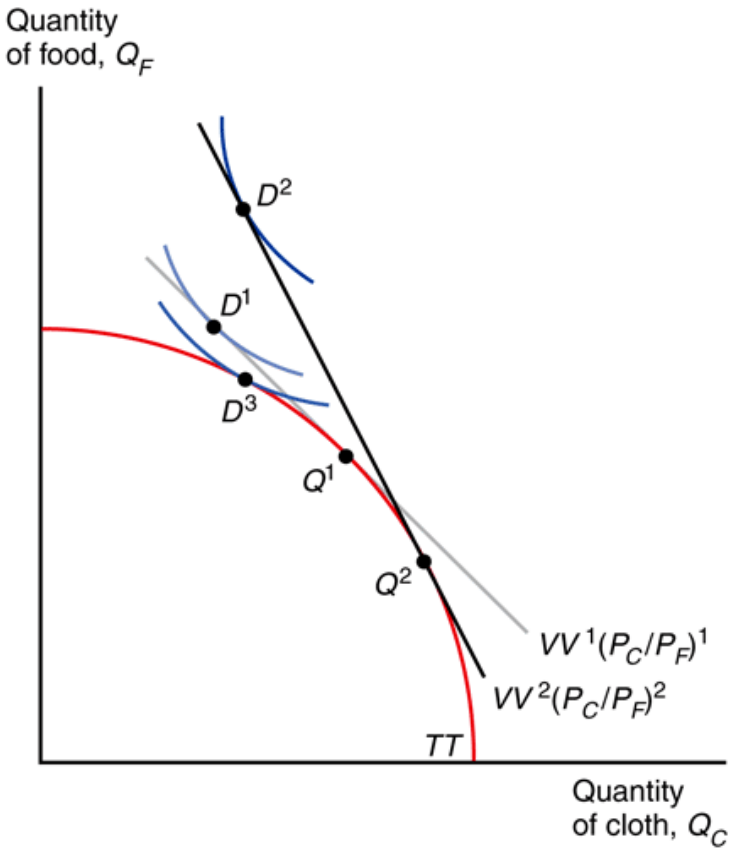
Relative Prices and Demand (cont.)

- An economy that exports cloth is better off when the price of cloth rises relative to the price of food:
  - the isovalue line becomes steeper and a higher indifference curve can be reached.
- A higher relative price of cloth means that more calories of food can be imported for every yard of cloth exported.

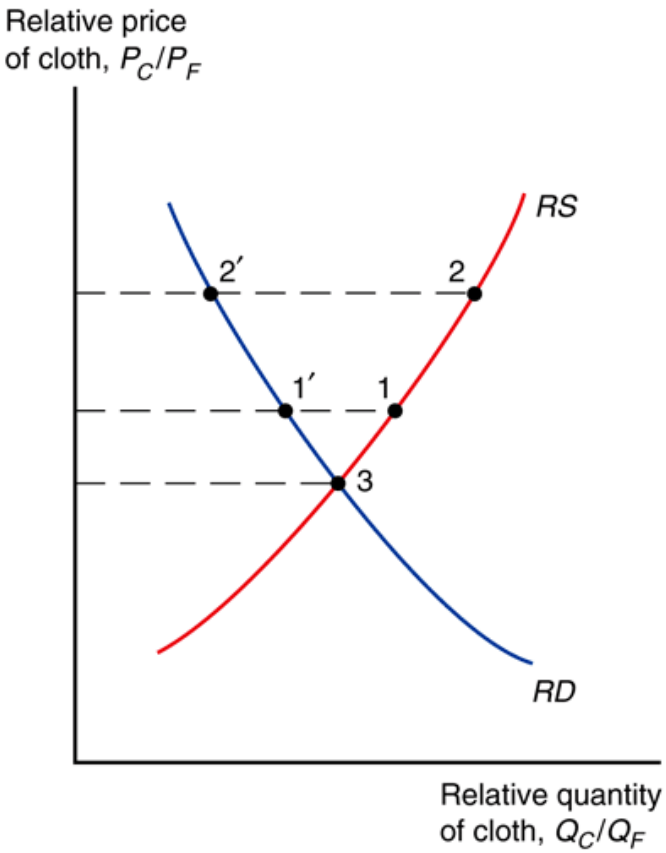
Relative Prices and Demand (cont.)

- If the economy cannot trade:
  - The relative price of cloth to food is determined by the intersection of relative demand and relative supply for that country.
  - Consume and produce at point D^3 where the indifference curve is tangent to the production possibilities frontier.

Fig. 6-4: Effects of a Rise in the Relative Price of Cloth and Gains from Trade



(a) Production and Consumption



(b) Relative Supply and Demand

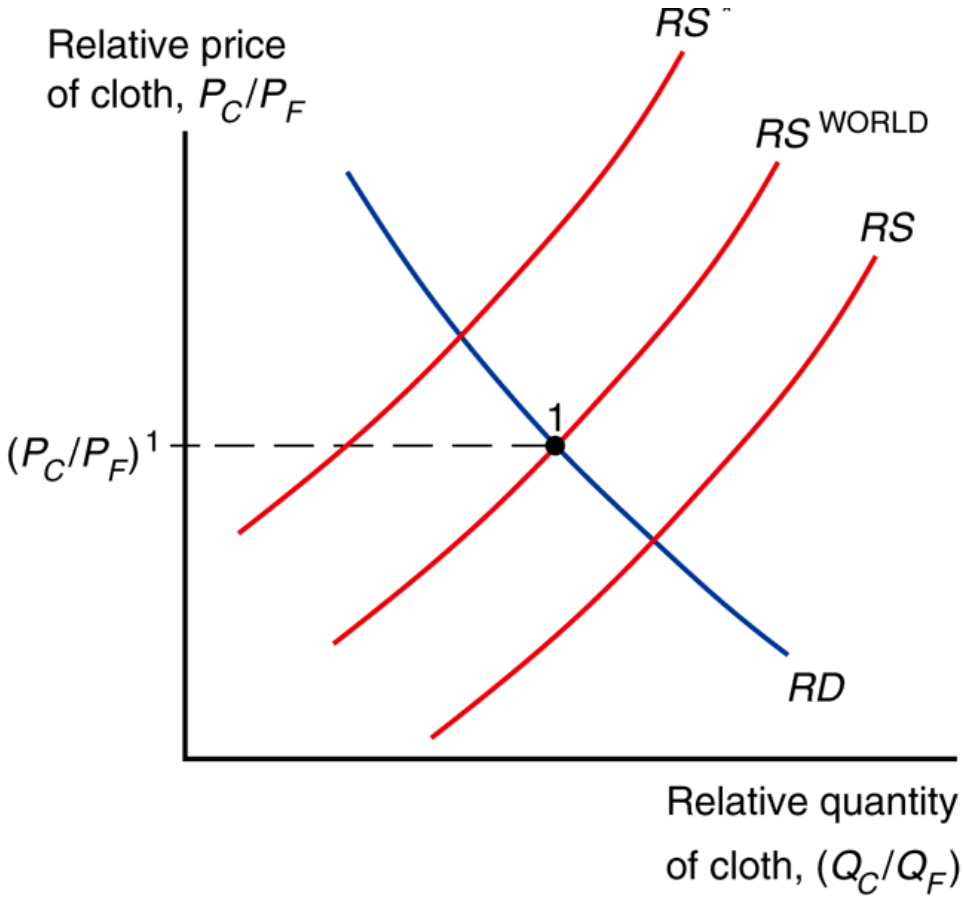
The Welfare Effects of Changes in the Terms of Trade

- The **terms of trade** refers to the price of exports relative to the price of imports.
  - When a country exports cloth and the relative price of cloth increases, the terms of trade rise.
- Because a higher relative price for exports means that the country can afford to buy more imports, an increase in the terms of trade increases a country's welfare.
- A decline in the terms of trade decreases a country's welfare.

Determining Relative Prices

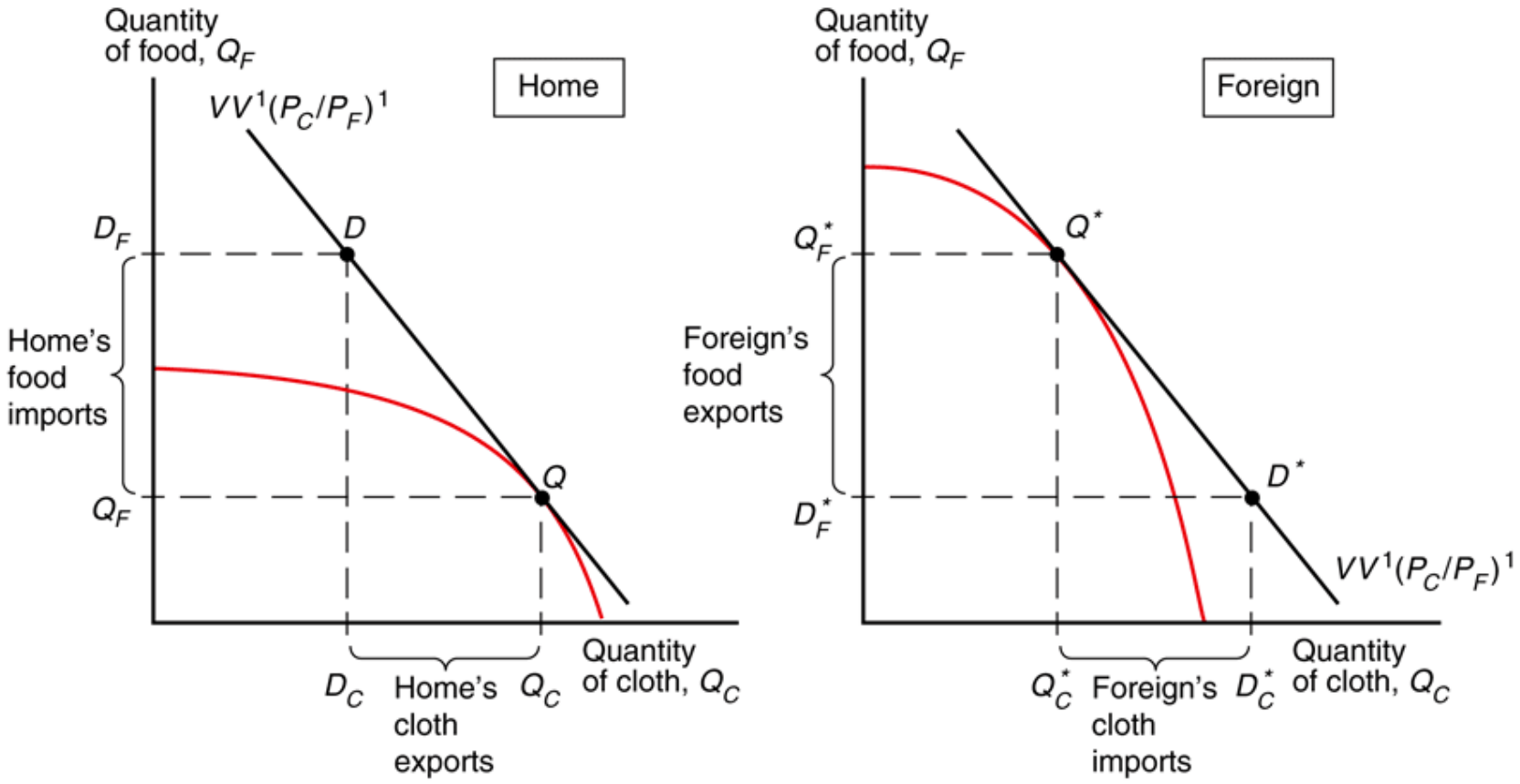
- To determine the price of cloth relative to the price food, use relative supply and relative demand.
  - *World* supply of cloth relative to food at each relative price.
  - *World* demand for cloth relative to food at each relative price.
  - World quantities are the sum of quantities from the two countries in the world: $(Q_C + Q_C^*)/(Q_F + Q_F^*)$ and $(D_C + D_C^*)/(D_F + D_F^*)$.

Fig. 6-5a: Equilibrium Relative Price with Trade and Associated Trade Flows



(a) Relative Supply and Demand

Fig. 6-5b: Equilibrium Relative Price with Trade and Associated Trade Flows



(b) Production, Consumption, and Trade

The Effects of Economic Growth

- Is economic growth in China good for the standard of living in the U.S.?
- Is growth in a country more or less valuable when it is integrated in the world economy?
- The standard trade model gives us precise answers to these questions.

The Effects of Economic Growth (cont.)

- Growth is usually **biased**: it occurs in one sector more than others, causing relative supply to change.
  - Rapid growth has occurred in U.S. computer industries but relatively little growth has occurred in U.S. textile industries.
  - In the Ricardian model, technological progress in one sector causes biased growth.
  - In the Heckscher-Ohlin model, an increase in one factor of production causes biased growth.

Fig. 6-6: Biased Growth

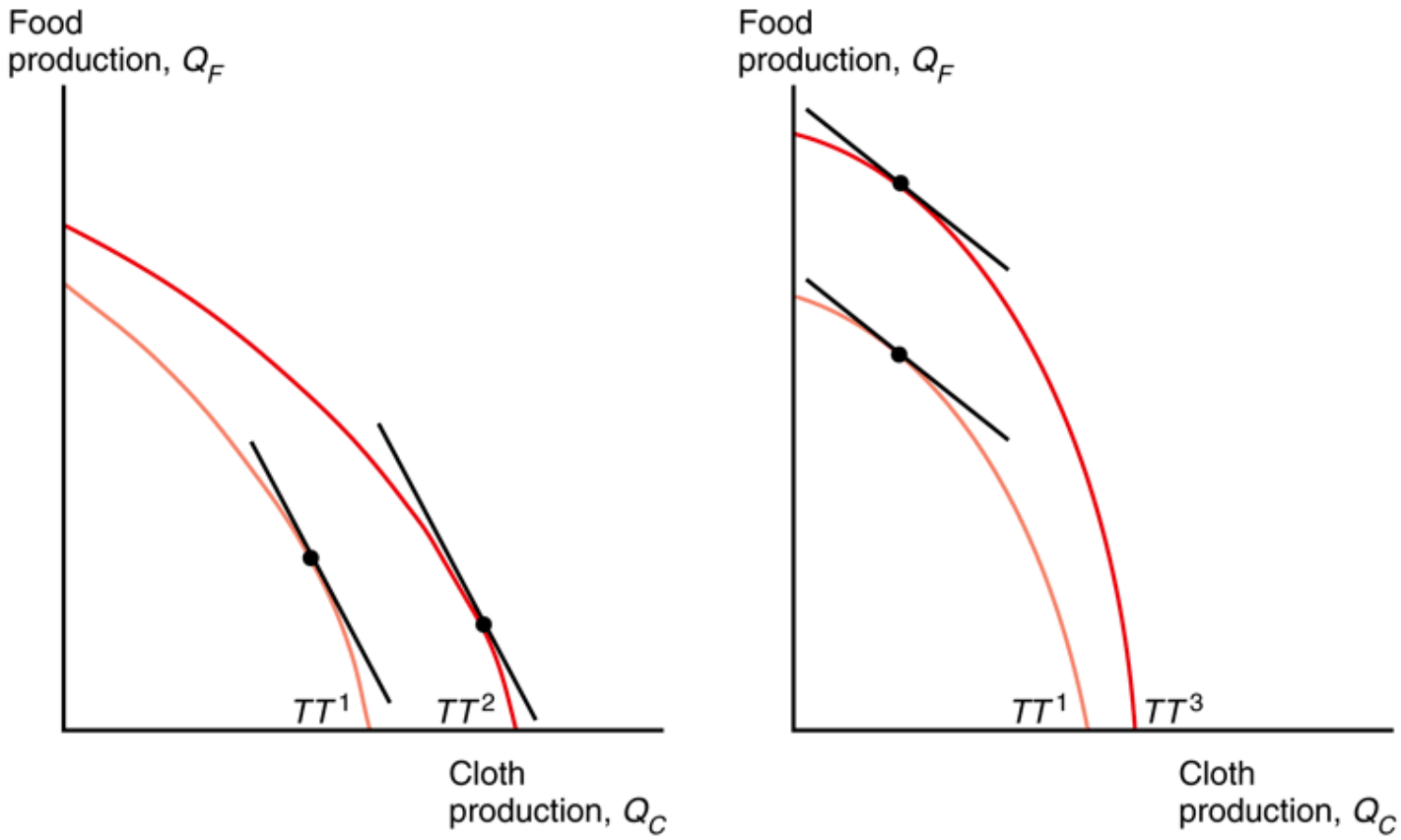
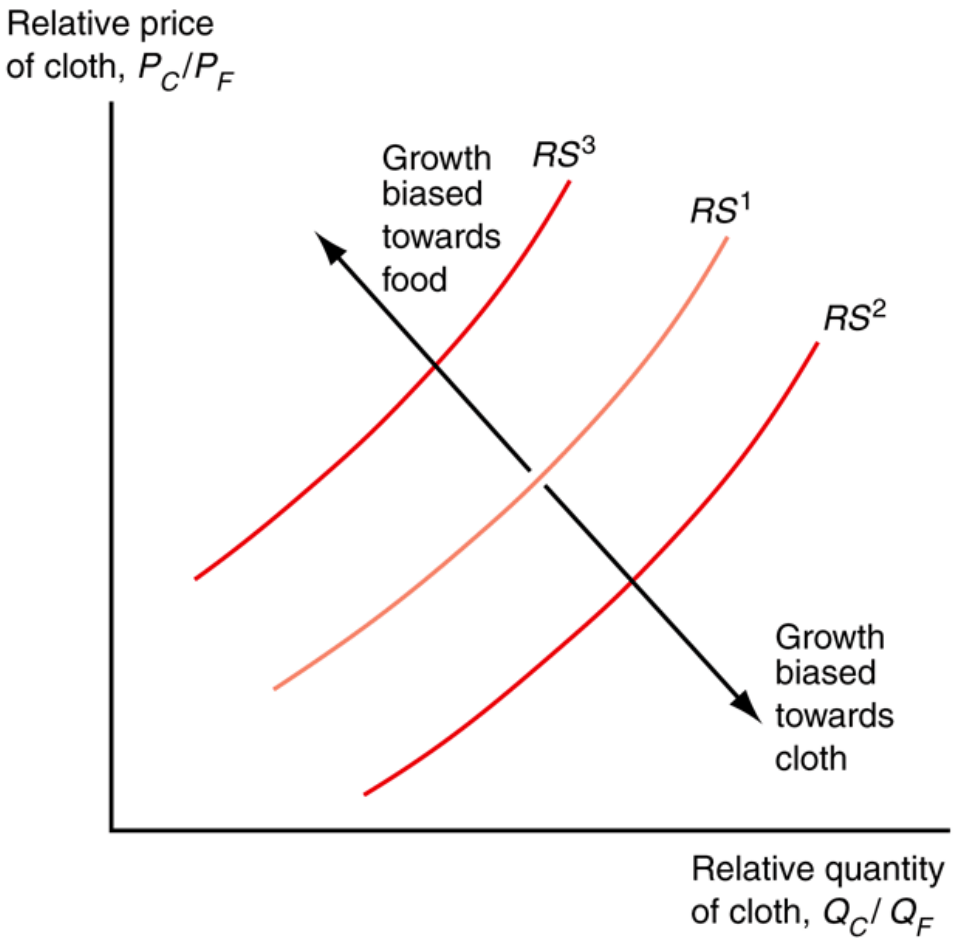


Fig. 6-6: Biased Growth (cont.)

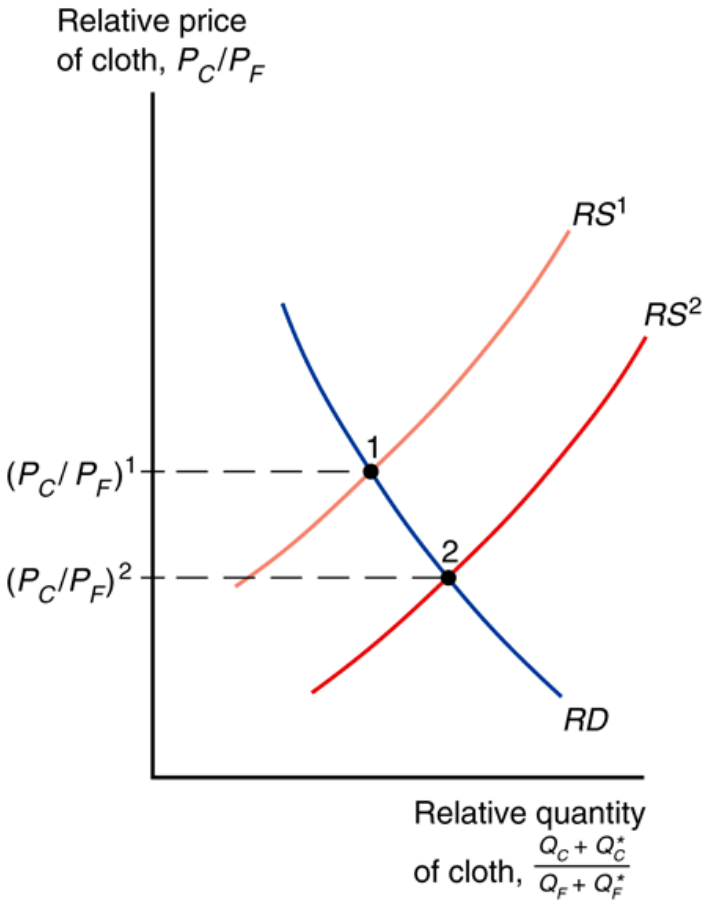


(c) Effects of biased growth on relative supply

The Effects of Economic Growth (cont.)

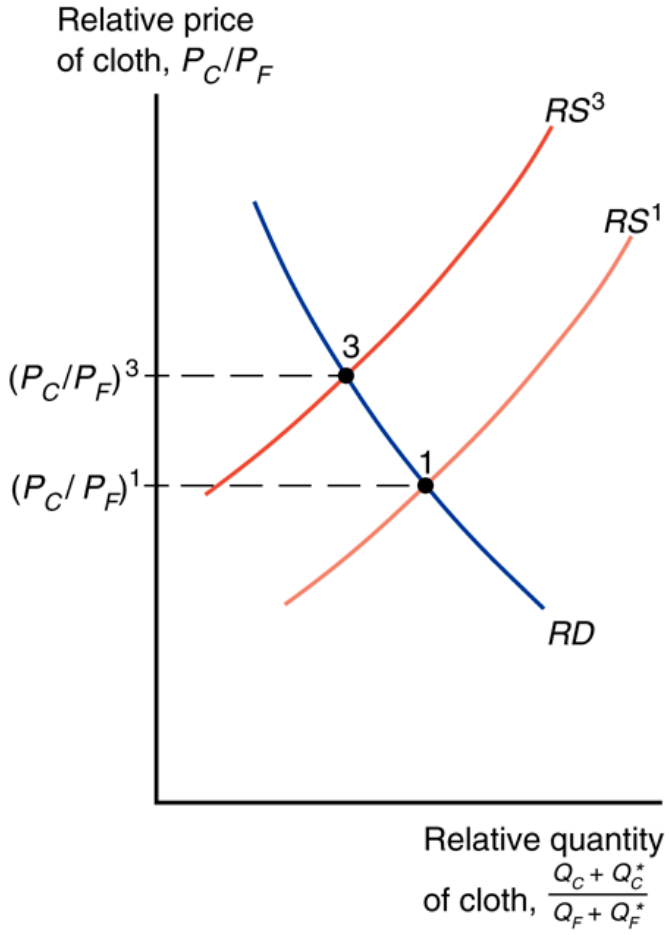
- Biased growth and the resulting change in relative supply causes a change in the terms of trade.
  - Biased growth in the cloth industry (in either the home or foreign country) will lower the price of cloth relative to the price of food and lower the terms of trade for cloth exporters.
  - Biased growth in the food industry (in either the home or foreign country) will raise the price of cloth relative to the price of food and raise the terms of trade for cloth exporters.
  - Suppose that the home country exports cloth and imports food.

Fig. 6-7a: Growth and World Relative Supply



(a) Cloth-biased growth

Fig. 6-7b: Growth and World Relative Supply



(b) Food-biased growth

The Effects of Economic Growth (cont.)

- **Export-biased growth** is growth that expands a country's production possibilities disproportionately in that country's export sector.
  - Biased growth in the food industry in the foreign country is export-biased growth for the foreign country.
- **Import-biased growth** is growth that expands a country's production possibilities disproportionately in that country's import sector.
  - Biased growth in cloth production in the foreign country is import-biased growth for the foreign country.

The Effects of Economic Growth (cont.)

- Export-biased growth reduces a country's terms of trade, reducing its welfare and increasing the welfare of foreign countries.
- Import-biased growth increases a country's terms of trade, increasing its welfare and decreasing the welfare of foreign countries.

Has Growth in Asia Reduced the Welfare of High-Income Countries?

- The standard trade model predicts that *import*-biased growth in China reduces the U.S. terms of trade and the standard of living in the U.S.
  - Import-biased growth for China would occur in sectors that compete with U.S. exports.
- But this prediction is not supported by data: there should be negative changes in the terms of trade for the U.S. and other high-income countries.
  - In fact, changes in the terms of trade for high-income countries have been positive and negative for developing Asian countries.

Table 6-1: Average Annual Percent Changes in Terms of Trade for the United States and China

TABLE 6-1 Average Annual Percent Changes in Terms of Trade for the United States and China

	Change by Decade			Overall Change
	1980–89	1990–99	2000–08	1980–2008
U.S.	1.6%	0.4%	−1.0%	0.1%
China	−1.4%	0.2%	−3.3%	−1.3%

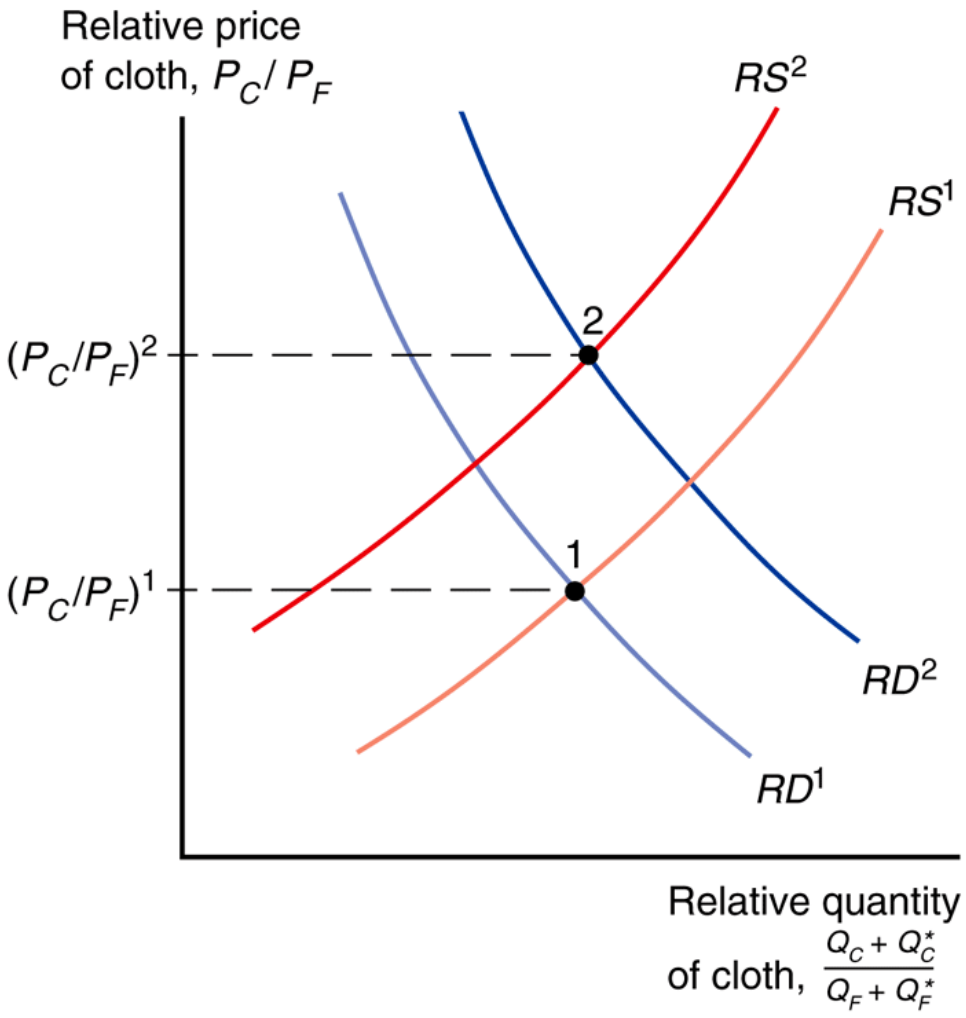
Import Tariffs and Export Subsidies: Simultaneous Shifts in RS and RD

- **Import tariffs** are taxes levied on imports.
- **Export subsidies** are payments given to domestic producers that export.
- Both policies influence the terms of trade and therefore national welfare.
- Import tariffs and export subsidies drive a wedge between prices in world markets and prices in domestic markets.

Relative Price and Supply Effects of a Tariff

- If the home country imposes a tariff on food imports, the price of food relative to the price of cloth rises for domestic consumers.
  - Likewise, the price of cloth relative to the price of food falls for domestic consumers.
  - Domestic producers will receive a lower relative price of cloth, and therefore will be more willing to switch to food production: relative supply of cloth will decrease.
  - Domestic consumers will pay a lower relative price for cloth, and therefore will be more willing to switch to cloth consumption: relative demand for cloth will increase.

Fig. 6-8: Effects of a Food Tariff on the Terms of Trade



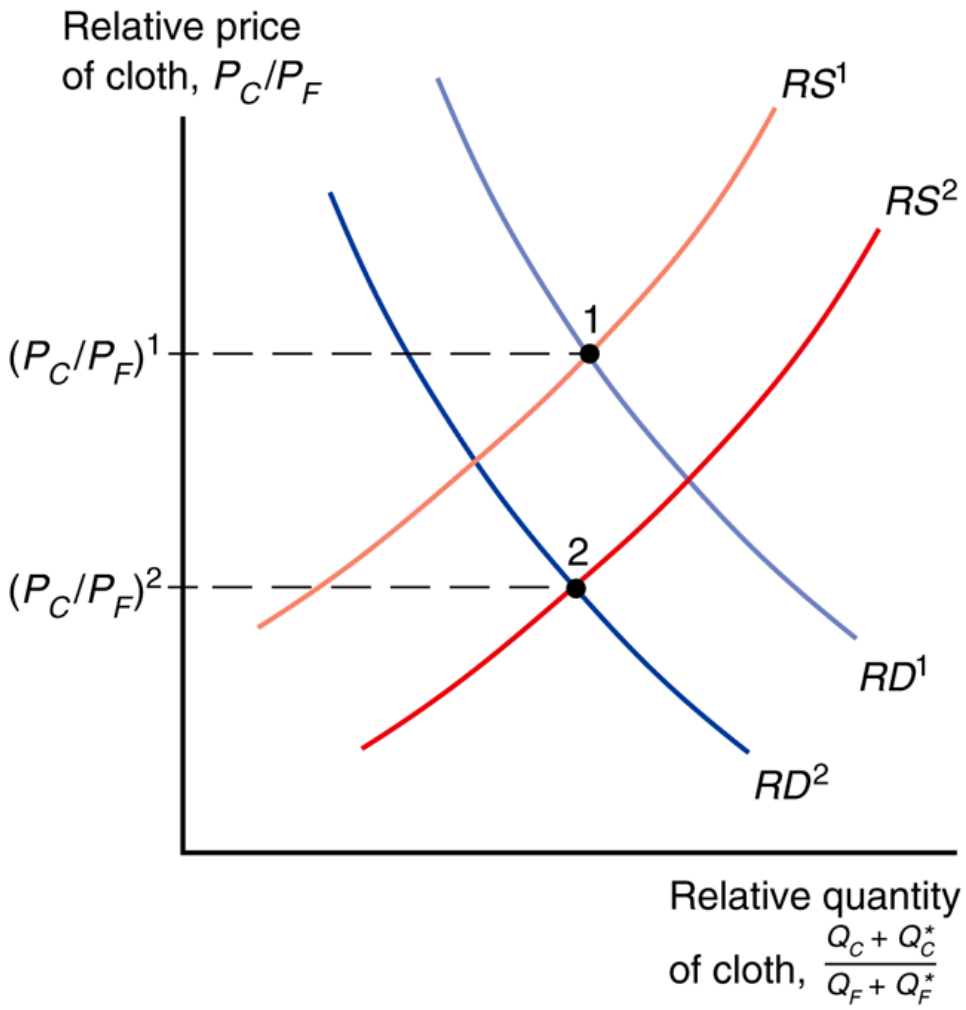
Relative Price and Supply Effects of a Tariff (cont.)

- When the home country imposes an import tariff, the terms of trade increase and the welfare of the country may increase.
- The magnitude of this effect depends on the size of the home country relative to the world economy.
  - If the country is a small part of the world economy, its tariff (or subsidy) policies will not have much effect on world relative supply and demand, and thus on the terms of trade.
  - But for large countries, a tariff may maximize national welfare at the expense of foreign countries.

Effects of an Export Subsidy

- If the home country imposes a subsidy on cloth exports, the price of cloth relative to the price of food rises for domestic consumers.
  - Domestic producers will receive a higher relative price of cloth when they export, and therefore will be more willing to switch to cloth production: relative supply of cloth will increase.
  - Domestic consumers must pay a higher relative price of cloth to producers, and therefore will be more willing to switch to food consumption: relative demand for cloth will decrease.

Fig. 6-9: Effects of a Cloth Subsidy on the Terms of Trade



Effects of an Export Subsidy (cont.)

- When the home country imposes an export subsidy, the terms of trade decrease and the welfare of the country decreases to the benefit of the foreign country.

Implications of Terms of Trade Effects: Who Gains and Who Loses?

- The standard trade model predicts that
  - an import tariff by the home country can increase domestic welfare at the expense of the foreign country.
  - an export subsidy by the home country reduces domestic welfare to the benefit of the foreign country.

Implications of Terms of Trade Effects: Who Gains and Who Loses? (cont.)

- Export subsidies on a good *decrease the relative world price* of that good by increasing relative supply of that good and decreasing relative demand of that good.
- Import tariffs on a good *decrease the relative world price* of that good (and increase the relative world price of other goods) by increasing the relative supply of that good and decreasing the relative demand of that good.