Chapter 5
The Standard Trade Model

■ Chapter Organization

■ Key Themes

Previous chapters have emphasized certain specific sources of comparative advantage which give rise to international trade, including differences in the productivity of labor or in the relative endowments of factors of production. This chapter presents a general model which admits previous models as special cases. This "standard trade model" can be viewed as the workhorse of international trade theory and can be used to address a wide range of issues. Some of these issues, such as the welfare and distributional effects of economic growth, transfers between nations, and tariffs and subsidies on traded goods are considered in this chapter.

The standard trade model is based upon four relationships. First, an economy will produce at the point where the production possibilities curve is tangent to the relative price line *VV* (called the isovalue line). In Figure 5-1 the production point is Q_1. Second, indifference curves (*II*) describe the tastes of an economy and the consumption point for that economy is found at the tangency of the budget line and the highest indifference curve. This is point D_1 in the figure. Together, these two relationships yield the general equilibrium trade diagram for a small economy (one which takes as given the terms of trade) where the consumption point and production point are the tangencies of the isovalue line with the highest indifference curve and the production possibility frontier, respectively. Note that at point D_1 food consumption occurs at higher levels than food production. By contrast, cloth consumption is at lower levels than cloth production. At the price shown, this economy is a net importer of food and a net exporter of cloth.

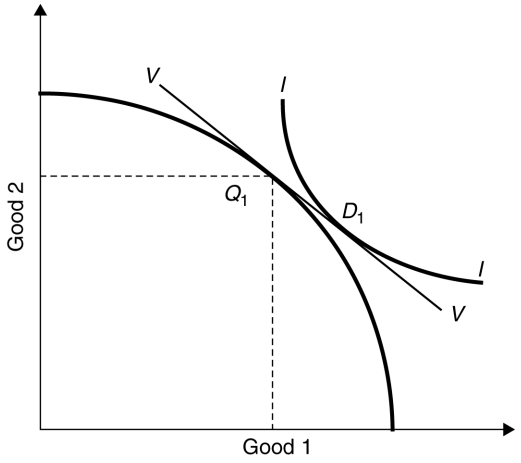

Figure 5-1

The third relationship is that an improvement in the terms of trade (an increase in the price of exports relative to the price of imports) increases welfare in the economy. The fourth relationship takes us from a small country analysis to a two country analysis by introducing a structure of world relative demand and supply curves which determine relative prices. As shown in Figure 5-2, the higher is p_c/p_f, the larger the world supply of cloth relative to food (see the *RS* curve) and the lower the world demand for cloth relative to food (see the *RD* curve).

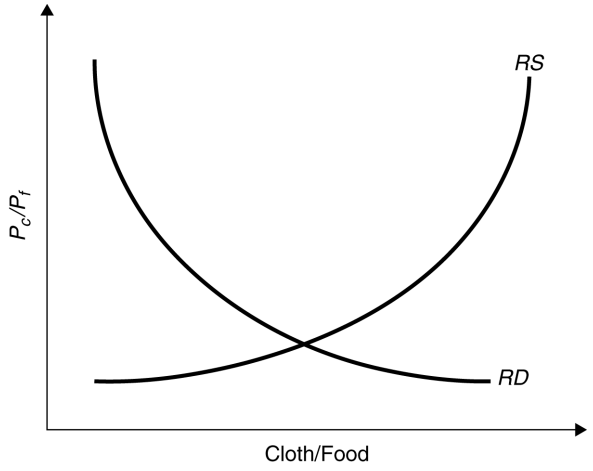

Figure 5-2

One application of the standard trade model deals with the popular arguments in the media that growth in Japan or Korea hurts the United States. The analysis presented in this chapter demonstrates that the *bias of growth* is more important for determining welfare effects than is the country in which growth occurs. The existence of biased growth causes a shift of the *TT* curve of Figure 5-1 and of the *RS* curve of Figure 5-2. The Relative Supply and Relative Demand curves provide a clear illustration of the effect of biased growth on the terms of trade. The new terms of trade line (determined by the point of intersection of the new *RS* curve and the existing *RD* curve) can be used with the general equilibrium analysis to find the welfare effects of growth. A general principle which emerges is that a country which experiences export-biased growth will have a deterioration in its terms of trade while a country which experiences import-biased growth has an improvement in its terms of trade. A case study points out that growth in the rest of the world has made other countries more like the United States. This import-biased growth has worsened the terms of trade for the United States. The theoretical possibility that a country's growth can lead it to a lower level of welfare is called immiserizing growth.

The second issue addressed in the context of the standard trade model is the effects of international transfers. The salient point here is the direction, if any, in which the relative demand curve shifts in response to the redistribution of income from a transfer. A transfer worsens the donor's terms of trade if the donor has a higher marginal propensity to consume its export good than the recipient. The presence of nontraded goods tends to reinforce the transfer related deterioration of terms of trade for the donor country.

The third area to which the standard trade model is applied are the effects of tariffs and export subsidies on welfare and terms of trade. The analysis proceeds by recognizing that tariffs or subsidies shift both the relative supply and relative demand curves. A tariff on imports improves the terms of trade, expressed in external prices, while a subsidy on exports worsens terms of trade. The size of this effect depends upon the size of the country in the world. Graphical analyses which illustrate these points are provided through the study guide problems. You should spend some time working through these problems and the end of chapter problems in the text. Tariffs and subsidies also impose distortionary costs upon the economy. Thus, if a country is large enough, there may be an optimum, nonzero tariff. Export subsidies, however, only impose costs upon an economy. Intranationally, tariffs aid import-competing sectors and hurt export sectors while subsidies have the opposite effect. An appendix presents offer curve diagrams and explains this mode of analysis.

■ Key Terms

Define the following key terms:

1. Terms of Trade _____

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2. Import-Biased Growth _____

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3. Import Tariff _____

4. Export Subsidy _____

5. Metzler Paradox _____

6. Immiserizing Growth _____

■ Review Questions

1. Assume that a country produces two goods, wine (W) and cheese (C). Equilibrium output is at the point where the initial isovalue line (v_1v_1) is tangent to the production possibilities frontier. The relative price p_c/p_w at this point is equal to 4.

   a. Suppose the relative price of cheese increases to 6. Graph the new isovalue line (v_2v_2) in the figure below.

   b. Describe the new equilibrium output mix.

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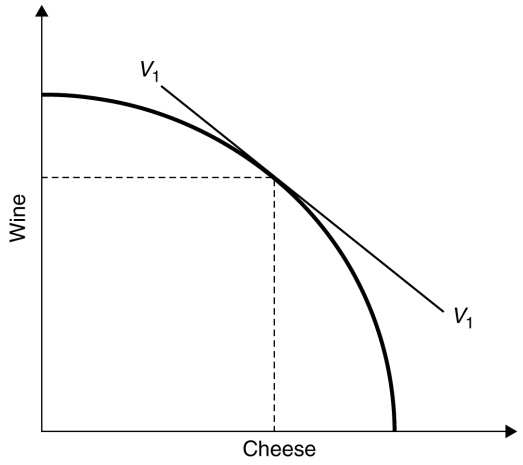
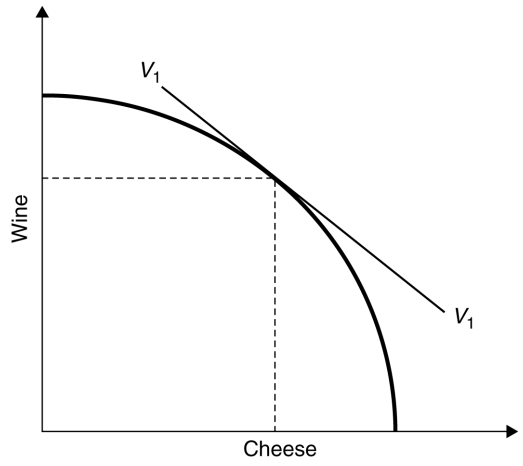
c. Suppose the relative price of cheese decreases to 2. What happens to the isovalue line? Describe the new equilibrium output mix.



d. What is the relationship between the supply of cheese relative to wine and the relative price of cheese to wine?

2. Continuing with the example in question 1, assume that the relative price of cheese to wine is 4 and that the economy exports wine and imports cheese.

a. Given these consumption preferences, describe the point at which the isovalue line is tangent to the highest indifference curve. Draw isoquants on the figure below to illustrate this tangency.



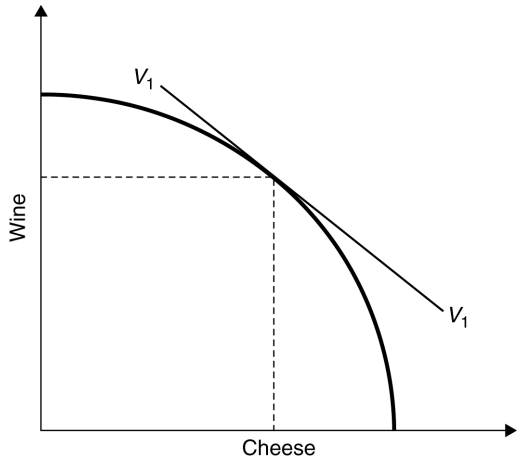
b. Assume the relative price of cheese rises to 6. What is the effect on production and consumption?

c. What are the welfare effects of this relative price change?

d. Discuss the income and substitution effects associated with this relative price change.

e. Assume that the relative price of cheese falls to 2. Discuss the effect on production, consumption, the terms of trade, and the welfare of the economy.

3. Continuing with the same economy, suppose instead that the economy exports cheese and imports wine.



a. Use the tangency of the isovalue line, the production possibility frontier, and the highest indifference curve to show the production and consumption points of this economy.

b. What are the effects on production of a decline in the relative price of cheese?

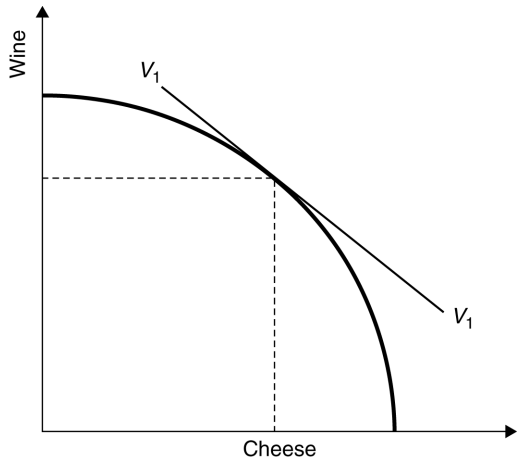
c. What are the effects on consumption of this decline in relative prices? Is this country better off or worse off?

d. Discuss the relationship between a country's terms of trade and its welfare.

4. Consider an economy which produces two goods, wine and cheese, whereby wine production is land-intensive and cheese production is labor-intensive.

a. Suppose the government decides to turn all public parks into land used in production, thereby increasing the supply of land available to producers. Show how this will affect the production possibilities of the economy. Discuss.

b. What is the theoretical basis for your answer to part (a)?



c. Suppose the relative price of cheese is unchanged following biased growth. Compare the new production mix with the original production mix.

d. If the government wants the output of cheese to remain constant, despite the biased growth, what must happen to the relative price of cheese? What types of policies could achieve this goal?

5. The Home economy produces labor-intensive sneakers and land-intensive beets. Suppose that demographic changes are strongly biased in favor of the export good, sneakers.

a. If this were a small country so that the relative price of sneakers was unchanged by this growth, what would be the effect of growth on the Home production mix?

b. If this were a medium to large country, what would be the effect on the world relative supply of sneakers to beets?

c. How does this growth affect Home terms of trade? Home welfare?

d. Suppose that biased growth had favored beet production instead. Discuss the impact on world relative supply, the terms of trade for the Home country, and the Home welfare.

6. Assume that the Home country is an importer of wine and an exporter of cheese. The domestic government imposes a 25 percent tariff on wine imports.

   a. How does the tariff affect the Home relative price of wine vis-a-vis the relative price of wine on world markets?

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   _____.

   b. How does the tariff affect the world relative demand and supply for wine?

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   c. What is the impact of the tariff on Home's terms of trade?

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   d. Discuss the assumptions that are critical for your answer to part (c).

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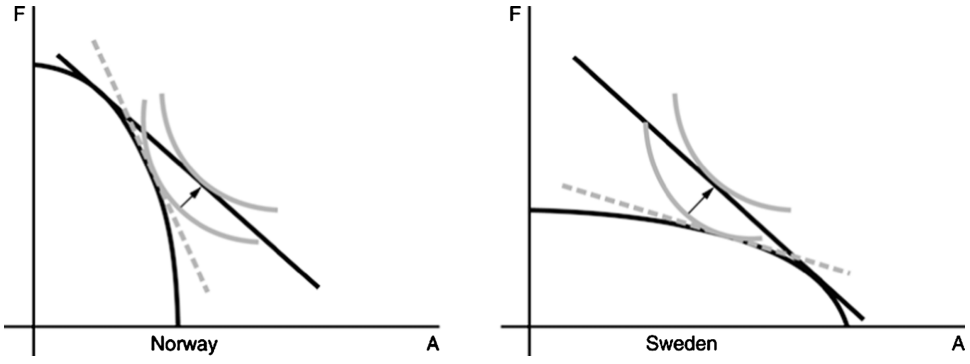
■ Answers to Odd-Numbered Textbook Problems

1.



Note how welfare in both countries increases as the two countries move from production patterns governed by domestic prices (dashed line) to production patterns governed by world prices (straight line).

3. An increase in the terms of trade increases welfare when the production possibility frontier (PPF) is right-angled. The production point is the corner of the PPF. The consumption point is the tangency of the relative price line and the highest indifference curve. An improvement in the terms of trade rotates the relative price line about its intercept with the PPF rectangle (since there is no substitution of immobile factors, the production point stays fixed). The economy can then reach a higher indifference curve. Intuitively, although there is no supply response, the economy receives more for the exports it supplies and pays less for the imports it purchases.

5. The terms of trade of Japan, a manufactures (M) exporter and a raw materials (R) importer, is the world relative price of manufactures in terms of raw materials (P_M/P_R). The terms of trade change can be determined by the shifts in the world relative supply and demand (manufactures relative to raw materials) curves. Note that in the following answers, world relative supply (*RS*) and relative demand (*RD*) are always M relative to R. We consider all countries to be large, such that changes affect the world relative price.

   a. Oil supply disruption from the Middle East decreases the supply of raw materials, which increases the world relative supply. The world relative supply curve shifts out, decreasing the world relative price of manufactured goods and deteriorating Japan's terms of trade.
   b. Korea's increased automobile production increases the supply of manufactures, which increases the world *RS*. The world relative supply curve shifts out, decreasing the world relative price of manufactured goods and deteriorating Japan's terms of trade.
   c. U.S. development of a substitute for fossil fuel decreases the demand for raw materials. This increases world *RD* and the world relative demand curve shifts out, increasing the world relative price of manufactured goods and improving Japan's terms of trade. This occurs even if no fusion reactors are installed in Japan since world demand for raw materials falls.
   d. A harvest failure in Russia decreases the supply of raw materials, which increases the world *RS*. The world relative supply curve shifts out. Also, Russia's demand for manufactures decreases, which reduces world demand so that the world relative demand curve shifts in. These forces decrease the world relative price of manufactured goods and deteriorate Japan's terms of trade.
   e. A reduction in Japan's tariff on raw materials will raise its internal relative price of manufactures. This price change will increase Japan's *RS* and decrease Japan's *RD*, which increases the world *RS* and decreases the world *RD* (that is, world *RS* shifts out and world *RD* shifts in). The world relative price of manufactures declines and Japan's terms of trade deteriorate.

7. These results acknowledge the biased growth which occurs when there is an increase in one factor of production. An increase in the capital stock of either country favors production of Good X while an increase in the labor supply favors production of Good Y. Also, recognize the Heckscher-Ohlin result that an economy will export that good which uses intensively the factor which that economy has in relative abundance. Country A exports Good X to Country B and imports Good Y from Country B. The possibility of immiserizing growth makes the welfare effects of a terms of trade improvement due to export-biased growth ambiguous. Import-biased growth unambiguously improves welfare for the growing country.

   a. A's terms of trade worsen, A's welfare may increase or, less likely, decrease, and B's welfare increases.
   b. A's terms of trade improve, A's welfare increases, and B's welfare decreases.
   c. B's terms of trade improve, B's welfare increases, and A's welfare decreases.
   d. B's terms of trade worsen, B's welfare may increase or, less likely, decrease, and A's welfare increases.

9. India opening should be good for the United States if it reduces the relative price of goods that China sends to the United States and hence increases the relative price of goods that the United States exports. Obviously, any sector in the United States hurt by trade with China would be hurt again by India, but on net, the United States wins. Note, here we are making different assumptions about what India produces and what is tradable than we are in question 6. Here we are assuming India exports products the United States currently imports and China currently exports. China will lose by having the relative price of its export good driven down by the increased production in India.

11. When a country subsidizes its exports, the world relative supply and relative demand schedules shift such that the terms of trade for the country worsen. A countervailing import tariff in a second country exacerbates this effect, moving the terms of trade even further against the first country. The first country is worse off both because of the deterioration of the terms of trade and the distortions introduced by the new internal relative prices. The second country definitely gains from the first country's export subsidy, and may gain further from its own tariff. If the second country retaliated with an export subsidy then this would offset the initial improvement in the terms of trade; the "retaliatory" export subsidy definitely helps the first country and hurts the second.