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Foreign Trade

This chapter begins in section 17.1 with some facts about China's foreign trade, and then provides in section 17.2 some basic theory to understand trade patterns. Section 17.3 discusses the determination of exchange rates and section 17.4 China's trade policy. Section 17.5 is an evaluation of China's foreign trade policy, beginning in the 1980s, in terms of the possible advantages and limitations of a free-trade policy.

17.1 Some Statistics of China's Foreign Trade

The *China Statistical Yearbook, 1999*, table 17-3, reproduced here as table 17.1, shows that in US dollars, the volume of foreign trade (total imports plus exports) increased from 1.94 billion in 1952, to 4.59 in 1970, 20.64 in 1978, 38.14 in 1980, 115.44 in 1990, and 323.93 in 1998. The volume was very small up to 1978 and has increased very rapidly since then as a result of the open-door policy. In Chinese yuan the volume in 1998 was 2,685.41 billion as converted by the official exchange rate of 8.29 yuan per dollar, with the official exchange rate very close to the market rate that people can use in free markets like Hong Kong. This amounts to 33.8 percent of China's GDP of 7,939.57 billion.

China's exports grew from 16.76 billion yuan in 1978 to 1,523.17 billion in 1998. Its imports grew from 18.74 billion yuan in 1978 to 1,162.24 billion in 1998. As percentage of GDP, the former was 19.2 percent and the latter was 14.6 percent in 1998. China went from an import surplus country in the late 1970s and 1980s to an export surplus country in the 1990s. Since the volume of trade reached 33.8 percent of its GDP, China is an open economy.

To account for the total volume of trade of US\$323.9 billion in 1998, China's main trading partners were Japan (57.9 billion), the United States (54.9 billion), Hong Kong (45.4 billion), Korea (21.3 billion), Taiwan (20.5 billion), Germany (14.3 billion), and Europe (58.7 billion), as reported in the *China Statistical Yearbook, 1999*, table 17-7. As a category of commodity for exports, manufactured goods

Table 17.1 Total Chinese imports and exports

Year	Yuan 100 millions		Total imports	Balance	US\$ 100 millions
	Total imports & exports	Total exports			Total imports & exports
1952	64.6	27.1	37.5	-10.4	19.4
1957	104.5	54.5	50.0	4.5	31.0
1962	80.9	47.1	33.8	13.3	26.6
1965	118.4	63.1	55.3	7.8	42.5
1970	112.9	56.8	56.1	0.7	45.9
1975	290.4	143.0	147.4	-4.4	147.5
1978	355.0	167.6	187.4	-19.8	206.4
1980	570.0	271.2	298.8	-27.6	381.4
1985	2066.7	808.9	1257.8	-448.9	696.0
1986	2580.4	1082.1	1498.3	-416.2	738.5
1987	3084.2	1470.0	1614.2	-144.2	826.5
1988	3821.8	1766.7	2055.1	-288.4	1027.9
1989	4155.9	1956.0	2199.9	-243.9	1116.8
1990	5560.1	2985.8	2574.3	411.5	1154.4
1991	7225.8	3827.1	3398.7	428.4	1356.3
1992	9119.6	4676.3	4443.3	233.0	1655.3
1993	11271.0	5284.8	5986.2	-701.4	1957.0
1994	20381.9	10421.8	9960.1	461.7	2366.2
1995	23499.9	12451.8	11048.1	1403.7	2808.6
1996	24133.8	12576.4	11557.4	1019.0	2898.8
1997	26967.2	15160.7	11806.5	3354.2	3251.6
1998	26854.1	15231.7	11622.4	3609.3	3239.3

accounted for 163.2 billion of the 183.8 billion of total exports in 1998 (*ibid.*, table 17-8). These are manufactured products such as textiles, clothing, shoes, toys, sports goods, and tools that are found in stores in the United States.

17.2 Explanation of Trading Patterns under Free Trade

A basic principle in a market economy is free exchange or free trade. If you exchange two cans of tennis balls for my box of golf balls and the exchange takes place voluntarily, it must mean that both persons benefit. Otherwise one of us would not have traded. The same applies if I give you five dollars instead of one box of golf balls, if you happen to be a merchant, a store owner, or an importer of tennis balls. When both persons benefit and no other person in the economy is worse off, the economy is said to achieve a Pareto improvement, or economic welfare of the economy is

improved. Therefore, trade should not be prohibited. This basic idea of free trade should be kept in mind when we examine China's foreign trade policy. We should always ask on what economic principle the Chinese government is justified in preventing free trade from occurring.

In this chapter we wish to explain why China exports and imports the kinds of goods it does, and why one US dollar is worth 8.3 Chinese yuan in the free market in Hong Kong and other places. We offer explanations of the observed trade pattern and the exchange rate under the assumption that free trade exists. This assumption is not entirely true because there are restrictions to trade and on foreign-exchange transactions. Yet provided that the restrictions are not too severe, the trade pattern and the foreign-exchange rate observed will not be too far from the what the theory based on free trade implies. Applying the theory also enables us to measure the distortion introduced by trade restrictions and to predict what will happen, at least in qualitative terms, when the restrictions are lifted. The following theoretical discussion in this section may require slow and careful reading if the reader wishes to master the subject. It is written much like an economics text. However, if the reader wishes to get a general idea only, the principles are stated in words after some possibly tedious explanations. Grasping the principles will be sufficient for understanding foreign trade in China.

17.2.1 David Ricardo's theory of comparative advantage

When trade is allowed to occur freely, what determines the commodities that a country will export and those that it will import? The Ricardian theory states that a country will export goods which it can produce relatively cheaply and import goods that it can produce relatively expensively. The word "relatively" refers to the price of the export good and the import good at home compared with the relative price in the world market, or in a foreign country. For example, assume that in China shoes are cheap relative to computers, as one computer in China can be traded for 20 pairs of shoes. In the United States shoes are relatively more expensive in the sense that one computer can be traded for only 10 pair of shoes. The relative price of shoes is low in China and it pays for China to export shoes to the United States and import computers. Likewise the relative price of computers is low in the United States and it pays the United States to export computers to China. China is said to have a comparative advantage in the production of shoes and the United States is said to have a comparative advantage in producing computers. In the domestic market without foreign trade, it costs China 20 pairs of shoes to get one computer. If China could sell 20 pairs of shoes to the United States for two computers it would definitely gain from such a trade. Let China trade 15 pairs of shoes for one computer with the United States, both countries gain. This discussion does not involve the exchange rate between the Chinese yuan and the US dollar. We can imagine trading to take place by barter without having to consider the exchange rate at this point.

Comparative advantage is measured by relative price, which equals the slope of the production possibility curve or production transformation curve in a market economy. In the United States in the above example it means that giving up one computer would release resources to be used to produce 10 more pairs of shoes. We

can use a diagram with its x and y axis measuring respectively the quantity of shoes and computers which a country can produce. The combinations of the quantities of these two goods that the country can produce form a production transformation curve. The slope of this curve is negative because to increase the output of shoes measured along the x axis, the quantity of computers measured along the y axis has to decrease. As long as the slopes of the production possibility curves of two countries at the current levels of production are different, it will be advantageous for both countries to trade at a ratio between the two rates indicated by the slopes of their production possibility curves. We have just answered the question concerning what commodities to trade by using the concept of comparative advantage, or the relative slopes of the production possibility curves of two countries.

17.2.2 The Heckscher–Ohlin theory of trade

A natural second question is what determines the slopes of the production transformation curves of different countries. The answer can be found in possible differences in technology and in the amounts of inputs available. By definition the technology of a country is partly summarized by its production transformation curve. In the theory of Heckscher (1919) and Ohlin (1933), technology as defined below is assumed to be identical in different countries, so that differences in transformation curves are attributed to differences in the quantities of basic resources available. Furthermore, in contrast with the Cobb–Douglas production function, the production function employed assumes that each production process, or each productive “activity” in the language of Koopmans (1951), requires fixed amounts of different inputs for the production of one unit of output. To illustrate, assume that there are two production processes or activities, one for producing shoes and the other for producing computers. In general, there could be two or more production processes for producing shoes or computers, but we simplify our discussion in this illustration. Process 1 requires 2 units of labor and 0.5 units of capital to produce 1 unit of shoes. Process 2 requires 5 units of labor and 5 units of capital to produce 1 unit of computers. The technology is summarized by the coefficients in table 17.2, which are the input requirements per unit of output in each of the two “activities” or production processes.

Let there be 100 units of labor and 50 units of capital available in an economy. Let x_1 and x_2 denote the outputs of shoes and computers, respectively. To produce the output quantities (x_1, x_2) , $2x_1 + 5x_2$ units of labor and $0.5x_1 + 5x_2$ units of capital are required, according to the input coefficients of table 17.2. Since these input require-

Table 17.2 Illustrative input coefficients for two production processes

<i>Input</i>	<i>Process 1: Shoe production</i>	<i>Process 2: Computer production</i>	<i>Quantity of input available</i>
Labor	2	5	100
Capital	0.5	5	50

ments cannot exceed the inputs available, we have the following two inequality restrictions on the outputs:

$$2x_1 + 5x_2 \leq 100 \quad (17.1)$$

$$0.5x_1 + 5x_2 \leq 50 \quad (17.2)$$

Consider a diagram with x_1 and x_2 measured along the horizontal and vertical axes respectively. Geometrically, the output combinations (x_1, x_2) that satisfy the inequality constraint (17.1) are points on or below a certain line, to be denoted by B . The output combinations (x_1, x_2) that satisfy the inequality constraint (17.2) are the points on or below a certain line, to be denoted by A . Readers wishing to follow this example in depth need to use paper and pencil to draw the relevant lines B and A and follow the discussion using the diagram. Such inequalities are used in a linear programming problem where the objective is to maximize a linear function of the variables, although no such objective function is specified here. The economy's production transformation curve is given by two line segments. The first segment is taken from the left portion of line A before it intersects with line B . The second segment is taken from the right portion of line B after it intersects with line A . For the points (x_1, x_2) on the first segment, all 50 units of capital are used up and there are units of labor unused (since these points are below the restriction B specified by the inequality (17.1)). For the points on the second segment, all 100 units of labor are used up and there are units of capital unused (since these points are below the restriction A specified by the inequality 17.2). Thus, we have derived the production transformation curve for an economy from its technology, as summarized by the input coefficients of each production process and its supply of inputs (see question 3 below).

Assume that the same technology is available in countries A and B . However, let country A have only 50 units of capital but more than 200 units of labor. Its production transformation curve will be simply line A specified in the last paragraph because the constraint (17.1) is not binding. Let country B have only 100 units of labor but more than 100 units of capital. Its production transformation curve will be simply line B referred to in the last paragraph because the constraint (17.2) is not binding. Thus, we have derived the linear production transformation curves A and B for the two countries A and B from the technology of table 17.2 by assuming different supplies of the two inputs for the two countries. Country A is assumed to have plenty of labor and country B plenty of capital. According to table 17.2, the production of shoes requires relatively more labor and less capital compared with the production of computers. In the production of shoes the ratio of labor requirement to capital requirement is $2/0.5$, or 4. In the production of computers the ratio is $5/5$, or 1. In other words, the production of shoes is relatively labor-intensive while the production of computers is relatively capital-intensive. Since country A has more labor than country B (200 units as compared with 100 units) and country B has more capital than country A (100 units as compared with 50 units), country A will specialize in the production of the labor-intensive commodity (shoes) and country B will specialize in the production of the capital-intensive commodity (computers). Such a specialization was discussed in terms of comparative advantage earlier in this section, but in terms of the Heckscher-Ohlin theory we are able to trace the source of the specialization to the relative supplies of inputs or factors of production.

This example illustrates a basic Heckscher–Ohlin theorem in international trade. A country with plenty of labor (or capital) will tend to specialize in producing labor-intensive (or capital-intensive) commodities and will export these commodities in exchange for the capital-intensive (or labor-intensive) commodities. This theorem holds true when the production transformation curves of the countries concerned are nonlinear. To illustrate, let us modify the above example by assuming country *A* to have 180 units of labor and 50 units of capital and country *B* to have 100 units of labor and 80 units of capital. The production transformation curve of each country will consist of two line segments, but the main part of country *A*'s is given by line *A* and country *B*'s by line *B*. Country *A* will still produce shoes for export and country *B* will still produce computers for export. The demonstration of this result is left as an exercise (see question 1 below).

By completing this exercise, the reader will find that the theory of Ricardo is useful in determining the quantities of exports and imports of each country and the relative prices of the commodities traded. What the Heckscher–Ohlin theory adds to the Ricardian theory of comparative advantage is the relation between the production transformation curve, which defines comparative advantage, and the relative supplies of the factors. By the Ricardian theory we say that country *A* exports shoes because it has a comparative advantage in producing shoes as revealed by a comparison of the slope of its production transformation curve with the slope of the production transformation curve of country *B*. By the Heckscher–Ohlin theory we say that country *A* exports shoes because the production of shoes is labor-intensive and country *A* has plenty of labor compared with country *B*. Although the above illustrative example is artificial for the purpose of explaining a theory, the theory is relevant for the explanation of the kinds of exports from China. China exports shoes, clothing, sports equipment, toys, and other goods that require inexpensive labor, which is plentiful in China. It needs to import computers, automobiles, and other capital-intensive products in exchange. China will soon export computers. Why?

Using the production transformation curve we can point out that if country *A* exports “shoes” (which stands for any labor-intensive product in this artificial example), it means that in country *A* the marginal rate of substitution of shoes for computers (which stands for any capital-intensive product) is large compared with country *B*, or the price of shoes relative to computers is low (if a competitive market is allowed to function) compared with country *B* or the world market. After country *A* exports shoes and imports computers, the price of shoes relative to computers will increase in country *A* because its domestic supply of shoes decreases and the supply of computers increases. The relative price of shoes to computers will continue to increase until it equals the relative price in the world market and there is no further gain by an additional export of shoes, if we can make the unrealistic assumption of zero transportation and distribution costs for imports and exports. In the meantime, after the opening of the world market and the increases in the demand for domestic shoes and in the price of shoes in country *A*, the demand for labor also increases, since labor is used intensively in the production of shoes. Similarly, the import of computers lowers the demand for domestically produced computers as well as the price of computers. The demand for capital also decreases, since capital is used intensively in the production of computers. With the increase in demand for labor and the decrease in demand for capital, the price of labor will go up and the price of

capital goods will go down. An exposition of the effects of international trade on the prices of resources or inputs based on the Heckscher–Ohlin theory can be found in Kenen (1984, ch. 4).

To make the above artificial example relevant for China, we think of the labor-intensive commodity “shoes” as clothing, sports equipment, toys that the Chinese export, and think of the capital-intensive commodity “computers” in the example as high-technology products such as computers and automobiles that the Chinese would import. The theory says that if free trade is allowed the prices of capital-intensive products relative to labor-intensive products will decrease. Furthermore the price of labor itself will increase compared with the price of capital. In the process of economic development with free trade, the wage rate of a developing economy such as China goes up because China is able to sell labor-intensive products like clothing, toys, etc. to a world market that commands high prices. This is almost like having the Chinese laborers producing shoes to be sold in the United States at the prices of the United States. The Chinese laborers still cannot command the same wage as a US worker making shoes because there is a high transportation and distribution cost (including profits for the Chinese exporters, the American importers, and the American distributors) to make the price received by the Chinese shoe producers much lower than (perhaps equal to only 10 to 15 percent of) the price of shoes that American consumers pay. Yet the ability to export shoes to the United States still raises the wage of Chinese workers in a shoe factory.

It might be suggested that the Heckscher–Ohlin theory as presented here has limited applicability because of its assumption that the same technology is available to each country. We know that developing economies lack some advanced technology which is available in more developed economies. To allow for this under the framework of the Heckscher–Ohlin theory, we can define a new technology as the possession of some special resources required to apply the technology. For example, if China does not have certain advanced technology to produce high-quality computers or automobiles, we can treat this as China having no or a limited supply of certain engineers who can supervise the production of these products. To illustrate this point in the framework of the Heckscher–Ohlin theory, let country *A* have the technology given by table 17.2. Let country *C* have a better process for producing shoes, one that requires only 1 unit of labor and 0.5 units of capital. The technology of country *C* can be summarized by the input coefficients of two processes, the first (called process 3) having coefficients 1 and 0.5 for labor and capital respectively, and the second having coefficients 5 and 5 as in table 17.2. One may say that country *C* has a different technology from that of country *A*. However, on closer examination it might turn out that the reason process 3 uses less labor than process 1 in the production of shoes is that it employs a special machine that is not available to country *A*. This particular machine, let us say, cannot simply be imported because it has to be developed locally together with the training of the labor to use it. There are two ways to model the technologies of countries *A* and *C*. One is to use two different tables of input coefficients, as suggested above. The alternative is to use the same table for both countries, as given in table 17.2. This table consists of input coefficients for three processes, each employing up to three inputs. The technology of table 17.2 is assumed to be available to both countries *A* and *C*, but country *A* has no supply of the third input.

The use of a special input in the last paragraph to get around the difference in technology between two countries might appear to be artificial. To make the specification of technology more appealing, let us change the third factor from a "machine" to scientific and technical personnel who are capable of developing or using the technology in country *A*. Instead of saying that country *A* lacks the technology incorporated in process 3, which requires 1 and 0.5 units of labor and capital respectively to produce one unit of shoes, one can say that country *A* has all the technology given by table 17.3 but lacks scientific and technical personnel (which replaces "machine" as the third input). Proponents of the Heckscher–Ohlin theory would claim that most of the modern technology used in production in the developed countries is public knowledge available to all countries in the world. Any country can use it, provided that technical and managerial personnel are available. One can claim that the same, or almost the same, technology is available to every country, but some countries have larger supplies of technical and managerial personnel than others. This is a valid point that can be translated to a statement that human capital is the crucial factor in determining a country's production capability. I have some reservation on its general validity, because social and economic organization determine how well-trained Princeton Ph.D.s, Harvard MBAs, and experienced and innovative entrepreneurs from Hong Kong can get such technology to work in China, a subject discussed at the end of chapter 16.

The choice to explain a difference in technology as a difference in the supply of technical personnel is also open when we discuss foreign investment, the second topic of this chapter. Foreign investment can be viewed as import of capital goods, import of technology, import of technical and managerial personnel, or a combination of these, all of which can help to improve the production transformation curve of the importing country. International trade of final products also improves the transformation curve facing a trading country, if the output combinations incorporate imports and exports.

17.3 The Determination of Foreign-exchange Rates

In section 17.2 we explained why and how a country gains from international trade. We have also explained how the country's production transformation curve is determined by technology (a set of available productive processes or productive "activities") and the supply of inputs, and how the production transformation curve can be extended through trade. We have not dealt with the financial aspect of trade. The

Table 17.3 Illustrative input coefficients for three production processes

<i>Input</i>	<i>Process 1: Shoe production</i>	<i>Process 2: Computer production</i>	<i>Process 3: Shoe production</i>
Labor	2	5	1
Capital	0.5	5	0.5
Technical personnel	0	0	1

theories of section 17.2 apply even when there is no paper money in each country and trade takes place through barter. These theories, like the theories of demand and supply in a competitive economy as expounded in any standard economics text, deal with the quantities of different commodities traded or consumed and their relative prices, but not their absolute prices in money terms.

To understand how exchange rates between currencies in different countries are determined by market forces, consider the factors affecting the demand for and supply of these currencies. To begin with, consider the trading of two goods, shoes and computers, between two countries, *A* and *B*. Given the production transformation curves of these two countries and their demand conditions, how are production and trading of the two commodities by the two countries determined by the analysis set forth in section 17.2? For example, in the situation depicted by the technology of table 17.2, country *A* produces 100 units of shoes and exports 50 units to country *B*; country *B* produces 20 units of computers and exports 10 units to country *A*. The relative price of shoes to computers is 0.20 in both countries. Let country *A*'s monetary unit be the yuan and country *B*'s be the dollar. Let the prices of shoes and computers in country *A* be 20 and 100 yuan, respectively. Let the prices of shoes and computers in country *B* be 4 and 20 dollars, respectively. Common sense tells us that in this situation one dollar must be worth five yuan, or the exchange rate of the yuan is 0.2 dollars.

The commonsense conclusion can be justified in the following way. If the exchange rate were otherwise, there would be an excess demand for one currency to alter the exchange rate to the above level. For example, assume that the exchange rate of the yuan is 0.3 dollars. Traders can exchange 100 yuan for 30 dollars to buy 1.5 units of computers in country *B*, and sell them in country *A* for 150 yuan for a profit. Such traders will be selling yuan to buy dollars in order to buy computers in country *B*. This increases the demand for dollars relative to the demand for yuan. As a result, the price of the dollar relative to the yuan will increase, or the exchange rate of yuan in dollars will be lowered. The exchange rate will cease to change when one yuan can buy exactly as much in country *A* as it can in country *B* after it is converted to dollars.

This analysis suggests that the exchange rate of yuan in terms of dollars is that rate, if used to convert one yuan to dollars, which will provide just enough dollars to buy the same amount of goods in country *B* as one yuan can buy in country *A*. This explanation of the exchange rate is known as the purchasing power parity (PPP) theory. According to this theory, the exchange rate between two currencies should equal the ratio of the prices in the two countries. Each currency should be capable of buying the same bundle of commodities domestically as it can buy in a foreign country after conversion to the latter's currency. We will show below that this theory is at best a first approximation to a satisfactory explanation of actually observed exchange rates. It makes many unrealistic assumptions including zero transportation and distribution costs for exporters and importers, zero tariffs and no restrictions on trade, etc. which we will discuss.

If the exchange rate depends on the ratio of monetary or absolute prices in the two countries concerned and if, as a first approximation, absolute prices in each country depend on its money supply, then, as a first approximation, the exchange rate is affected by the relative money supplies in the two countries. Recall that when we

study a competitive market economy, we use the demand and supply conditions to determine the relative prices of different commodities, but not their absolute prices in money terms. In section 7.2 we point out that as a first approximation, the absolute prices are determined by the supply of money in relation to the total output of an economy. As a first approximation, if the supply of money in country *A* increases by 20 percent, its absolute prices will increase by 20 percent and its foreign-exchange rate will be reduced by 20 percent. This analysis is independent of the analysis of the production transformation curves that determine comparative advantage and trading patterns between countries. A finer theory than a first approximation will be concerned with the interactions between monetary forces and the production and trading of commodities. For example, money supply can affect the rate of interest, which in turn affects investment, and thus the production of producer goods relative to consumer goods. We will not be concerned with such refinements here.

Even without such refinements, the purchasing power parity PPP theory of exchange rates should be modified or extended in several ways. First, the absolute prices in the two countries that determine the exchange rate should refer to the prices of only internationally traded goods and not to goods and services that cannot be exported. Prices of goods and services that are consumed only at home should not be included in the PPP calculation. For example, the price of labor services may be very low in China when converted to US dollars at the prevailing exchange rate, but China may not be able to export these services directly to the United States. It can export labor services indirectly by using them to produce labor-intensive products for exports. Such exports would tend to raise the wage rate in China if the wage rate were determined by the forces of demand and supply in the market.

Second, besides the trading of goods and services, other factors affect the demand for and supply of currencies of different countries. Besides the export of goods, one important source of supply of foreign currencies is the inflow of foreign capital. Foreign investment is one source of capital inflow. If corporations in the United States want to invest in China, they have to sell US dollars for Chinese RMB to pay for the cost of the investments in China. This will increase the supply of US dollars in China and, other things being equal, raise the exchange rate of RMB in terms of dollars. In the future, if the investments turn out to be successful, the investing corporations will receive Chinese RMB, which they can trade for dollars. The supply of RMB will increase, thus lowering the exchange rate of RMB in terms of dollars. Foreign aid is another source of supply of a foreign currency. It tends to reduce the exchange rate of the currency of the country extending aid.

There are other sources of capital inflow than foreign investment. For example, foreign currencies will flow into a country to earn a high return if the interest rate in that country is high. Such flows will decrease the exchange rates of the foreign currencies. Thus, because of banking regulations favorable to depositors, Switzerland receives large quantities of foreign currencies for deposit in banks. This tends to raise the exchange rate of the Swiss franc and to lower the interest rate paid by Swiss banks.

Third, the purchasing power parity theory, after the above two modifications are incorporated, can be applied to explain the exchange rates of many countries by considering the trading and capital flows between any one country and the rest of the world. The exchange rate of any country depends on the absolute prices of interna-

tionally traded goods in that country compared with world market prices, in whatever international currency. It also depends on the inflow of foreign capital compared with the outflow of its own capital abroad.

Fourth, because of the existence of transportation and distribution costs, which we have assumed to be zero in the above analysis, the purchasing power of one currency, measured in domestically produced goods, may be somewhat different from that measured in foreign goods. As a modification to the analysis of the last section on trade flows, when transportation costs exist, trade will take place to a lesser extent than predicted by the theory and relative prices between commodities may not be completely equalized in different countries. The effect of transportation and distribution costs on the PPP theory for the determination of exchange rates is that the actual rates may deviate to a fairly large extent from the rate determined by the PPP theory. In section 5.6 we convert Chinese GNP into GNP in US dollars based on PPP calculation as performed by the World Bank, by using a conversion rate of about 2 yuan per dollar in 1998 when the free-market exchange rate was about 8.3 per dollar. Although the bundle of commodities included in calculating the above conversion rate include more than just internationally traded goods (the relative prices of which determine the market exchange rate) the difference between 2 and 8.3 suggests that the PPP exchange rate determined by only internationally traded goods should be below 8.3 even if it is above 2. In section 4.4 I mentioned some reasons for the Chinese yuan to be valued at lower than the rate based on economic fundamentals including PPP, and suggest that in the long run, say before 2006, the Chinese currency will appreciate in the direction of its PPP rate.

Fifth, the theories of trade and exchange rate determination set forth above are based on free trade and free capital flows among countries. In reality, many trade restrictions exist, such as import quotas and tariffs. Furthermore, the governments of many countries, including China, set their exchange rates and do not allow the rates to be determined entirely by the forces of demand and supply. The analysis of the last section can assist the reader in evaluating the economic consequences of trade restrictions. The analysis of this section sets bounds to the exchange rate that a government can enforce and reveals the economic effects of enforcing an exchange rate which deviates from a market-determined rate.

As the tools of demand and supply are useful in explaining market prices and in studying the effects of government price regulation, the theory of exchange rate determination in this section is useful in explaining exchange rates in free markets and in studying the effects of government control of exchange rates. When the value of the home currency is set above the market rate as determined by the forces of demand and supply set forth above, people will try to sell home currency to buy more foreign currencies than the supply of foreign currency offered in the market. Further controls to limit the purchase of foreign currencies would be required. For example, in China before 1994, RMB could not be freely used to purchase US dollars because its official exchange was set too high. Through several successive steps of devaluating the overvalued RMB, from 2 RMB for one US dollar in 1979 to 8.3 RMB for one US dollar in 1994, the official rate finally reached the market rate. It can freely be traded at this 8.3 rate as any tourist could do in Hong Kong. The rates of buying and selling RMB in exchange for one US dollar are almost identical in Hong Kong, showing the small profit margin for the traders under competition.

It took the Chinese government some twenty years to reform its foreign trade and foreign-exchange system to become one that is qualified for membership of WTO. In the early 1980s, Chinese economic officials did not appreciate the rationale for free trade and the role of a market-determined exchange rate. They had the notion that because of the shortage of foreign goods – and foreign goods could be purchased only by using a hard currency like the US dollars – the government should control the supply and demand for dollars. This is the same as assuming that if steel is a scarce and valuable resource for industrial production, its demand and supply should be controlled by the government in the form of quotas allocated to state enterprises which use it and to suppliers which produce it. The corresponding users of foreign exchange are enterprises which require imports for production. The corresponding suppliers are the export companies controlled by the government. The official price of American dollars, or the official exchange rate, is set low in order to allow its users to have easy access to it, just like the low price of steel set under central planning. A student of economics cannot understand such logic. If foreign exchange or steel is scarce its price should be high enough to allocate its use to the most needy users. By “high enough” we mean that the price will equate demand and supply. To continue the logic of the Chinese economic planners, the price of foreign exchange was set low and there was a shortage in the sense that people could not buy dollars at the official rate because there were not enough available at that low rate.

In order to limit the consumption of imported goods by Chinese consumers, a system of “foreign-exchange certificates” was introduced. There were two kinds of Chinese currency, one ordinary and a second foreign-exchange certificate. Foreigners could obtain foreign-exchange certificates at the official exchange rate by trading dollars. Since the official exchange rate was unfavorable for the dollar (or below the rate set by the market if it existed) foreigners were given some benefits in return in being able to use the certificate to purchase imported goods which Chinese consumers could not buy using ordinary Chinese currency. Because of its higher utility than ordinary Chinese currency, one yuan of foreign-exchange certificates was traded in illegal markets (by resourceful foreign visitors) for more than one ordinary yuan, but in many local stores local currency used by foreigners was not accepted. Store keepers had an incentive to insist on getting foreign-exchange certificates which were worth more. The whole system led to confusion: arguments between foreigners trying to use ordinary yuan and taxi-drivers, storekeepers, and Chinese merchants; bargaining in illegal trading of foreign-exchange certificates for the ordinary yuan, etc. It did not take a very sophisticated economist to know that the foreign-exchange certificate should be abolished and that China should set its exchange rate equal to the market rate to eliminate the shortage of foreign exchange. If the government wished to promote the development of certain industries, it could give enterprises in such industries fixed subsidies for a finite duration to enable them to develop. The enterprises could decide how best to use the subsidies, including the purchase of foreign imports at a market-determined exchange rate. This would eliminate the waste of using the scarce foreign exchange under the Chinese system of undervaluation of the dollar and restriction of its use to favored users.

In 1984, when I first met Premier Zhao Ziyang to discuss at length economic education and economic reform in China, I suggested to him to abandon the use of the foreign-exchange certificate. This suggestion was made at a time when such an

idea was contrary to the accepted wisdom of the top Chinese economic officials described in the last paragraph. (I chose not to make such a drastic suggestion in front of other government officials present at our meeting, but in the form of a letter delivered to the Premier after our meeting the afternoon of July 5, 1984.) Two years later in the summer of 1986, after at least two more meetings with the Premier and several intensive meetings with top officials of the State Commission on Restructuring the Economic System, of which the Premier served as chairman, I was very pleased to read in a newspaper an official announcement that the use of the foreign-exchange certificate was to be terminated in September of that year. This did not happen on schedule, but actually about two years later. The setting of the official exchange rate to equal the market rate occurred in steps in a period of about 8 years from 1986 to 1994.

In the meantime there were foreign-exchange swap centers in Shanghai where importers could swap local currency for foreign exchange supplied by exporters at a rate determined by that swap market, and more favorable to a holder of US dollars than the official rate. Here again, China was practicing a two-tier price system in terms of exchange rates. One could get dollars more cheaply at the official rate but only in limited quantity and subject to official approval, in the same way that a state enterprise at the time could obtain materials at lower than market prices but only in limited quantity. At the same time, foreign traders could buy and sell foreign exchange at a market rate in a swap center. Marginal calculations by importers and exporters using the market price of foreign currency could thus be carried out to preserve economic efficiency in the use of scarce foreign exchange as an economic resource.

17.4 China's Foreign Trade Policy

Perhaps the most significant aspect of China's foreign trade policy in the 1980s was the drastic reversal from self-sufficiency to trade expansion. The ratio of the total value of foreign trade to national income increased from a low of 0.058 in 1970 to a high of 0.182 in 1981. According to Zhang (1982: 621), as of 1980 China had established trade relations with more than 170 countries and regions and had signed bilateral government trade agreements or protocols with more than 80 of them. One can only interpret the change as resulting from the realization among Chinese leaders of the gain to be achieved from international trade.

China was largely a planned economy. Foreign trade was directed by central planning. When construction projects were included in a five-year plan, some required the imports of foreign capital goods and materials. Certain consumption goods in the plan had to be imported, including food grain when the domestic supply was insufficient. All these projected imports required the use of foreign exchanges, which had to be earned by the planned exports of domestically produced goods. Thus, exports, imports, and the supply of and demand for foreign exchange had to be incorporated in any central economic planning. Foreign trade plans were parts of China's economic plans. In the State Council, the Ministry of Foreign Trade directed the affairs of foreign trade. It incorporated the Bureau of Import-Export Control and the General Administration of Customs, and was assisted by the General

Administration of Travel and Tourism and the State Administration of Exchange Control (later part of the People's Bank).

In June 1979 the People's Congress adopted a policy for the modernization of China, which included a policy of foreign trade expansion. The ratio of the total value of foreign trade to national income increased immediately, from 0.118 in 1978 to 0.135 in 1979, 0.154 in 1980, and 0.182 in 1981. Following the shift in policy from an emphasis on developing heavy industry to an emphasis on developing light industry and agriculture, the composition of imports changed. The imports of machinery and raw materials for heavy industry were reduced, and imports of food grains, cooking oils, materials for agricultural use, and raw materials for textiles and light industry increased. As reported in the article on foreign trade by Zhang (1982: 622), in 1980 imports of grains, animal fats and vegetable oils, cotton, synthetic fibers, chemical fertilizers, industrial chemicals, and wood pulp were 51 percent higher than in 1979. Their combined share in the total value of imports rose to 52.8 percent in 1980 from 41.7 percent in 1979. Imports of steel, nonferrous metals, machinery, and instruments decreased by 3.5 percent from 1979 and together accounted for 47.2 percent of the total value of imports, as compared with 58.3 percent in 1979.

As for the composition of exports, in 1980 the proportion of exports of heavy industrial products went up, while that of agricultural and sideline products, textiles, and light industrial products declined. Agricultural and sideline products decreased from 23.1 percent to 18.7 percent, while industrial and mineral products increased from 44.0 percent to 51.8 percent. In particular, the value of exported machine tools increased from 65.56 million RMB in 1979 to 77.88 million in 1980, and the export of tools and instruments increased from 112.19 million RMB to 147.30 million. Although China increased the value of its exports of machinery and transport equipment by 44.6 percent between 1979 and 1980, its imports of machinery and transport equipment still far exceeded its exports in 1981, being 9.798 billion RMB as compared with 1.815 billion (*Statistical Yearbook of China, 1981*, p. 390). The quantities of major exported commodities from 1950 to 1980 are given on pages 372-84 of the *Statistical Yearbook of China, 1981*; the quantities of major imported commodities are given on pages 385-9.

Before and at the beginning of economic reform, China's foreign trade policy had three main characteristics. First, imports were controlled by the government so that essential consumer goods and capital goods from abroad could be acquired in the process of modernization. Second, to obtain the foreign exchange to pay for the necessary imports, the Chinese government tried to direct and encourage the expansion of exports. New government units were set up in the early 1980s for the purpose of increasing exports. Besides directing selected centrally run enterprises to expand their exports, the government encouraged provincially run and collective enterprises to obtain export licenses to compete in the world market. Third, to ensure that the foreign exchange obtained from exports was used to pay for essential imports, the government controlled foreign exchange by setting the exchange rate and monopolizing and regulating the trading of foreign exchange. Foreign exchanges were not allowed to be traded freely in the marketplace. To obtain foreign exchange for a purpose approved by the government, an importer, an enterprise, or a tourist had to apply to the Administration of Exchange Control, which is a part of the People's Bank. Furthermore, a system of multiple exchange rates was practiced. To encour-

age certain exporters, the government paid them more RMB per US dollar earned than according to the standard official exchange.

Concerning import policy in the early 1980s, Zhang (1982: 623) wrote:

During the period of economic readjustment, imports of agricultural and industrial materials needed for maintaining economic stability and developing the textile and light industries must be timely and orderly. Imports of technology and equipment needed for upgrading existing industries, for expanding energy production, communications and transportation facilities and for advancing science, education and culture must be organized in a planned way . . . In drawing up foreign trade plans, we must take into consideration our actual export capabilities . . . From the short-term as well as the long-term point of view, import controls will be necessary . . .

We shall not import those items that can be produced domestically in sufficient quantity and with satisfactory quality. Items that we can make at home but are still importing now will eventually be supplied mainly by domestic production. In this way, we can save our limited foreign exchange for the most essential items and make the composition of our imports more reasonable.

To promote exports, the Chinese government took the following actions after 1979 (Yen 1982). First, exports were decentralized. While commodities of the first categories (defined in section 2.5), including coal, oil, food grain, steel, and others, were still exported by enterprises under the direct control of the Ministry of Foreign Trade, commodities of the second category could be exported by enterprises under other ministries, subject to the approval of the State Council. Other commodities could be exported by trading companies established under the jurisdiction of provincial governments. Export licenses were issued by provincial bureaux of foreign trade authorized by the Ministry of Foreign Trade, rather than directly by the ministry, as had been the case.

Second, trading companies were formed in cooperation with manufacturing enterprises as well as industrial enterprises specializing in the production of export products. These enterprises were responsible for their own profits and losses. Many provinces and cities set up areas specializing in the production of agricultural and related products for export.

Third, special treatment was given to exporting companies and enterprises to encourage them to export, including allowing them to retain part of the foreign exchange they earn and extending to them special loans in RMB or in foreign exchange for short-term financing or long-term capital expansion. After 1981 a more favorable exchange rate was granted to exporters in exchanging the foreign currency earned for RMB. For example, in 1981, while the official exchange rate was 1 US dollar for 1.6 RMB, the more favorable rate was 1 to 2.8 RMB.

Fourth, several coastal provinces, including Guangdong and Fujian, established export-processing zones. Foreign investors were encouraged to set up factories in these zones, independently or jointly with Chinese enterprises, to process imported or locally produced materials for export. No import duties were levied on materials processed for exports. A main purpose was to absorb Chinese labor while using the capital and technical knowledge of the foreign investors. The use of export-processing zones to promote exports proved successful in Taiwan, which established the Kaohsiung Export-processing Zone in December 1966 (see Li 1976: 352-8). Also,

joint ventures with foreign investors outside the export-processing zones were established. These developments were relevant not only to China's foreign trade but also to foreign investment in China, a topic to be treated in chapter 18.

17.5 Chinese Foreign Trade Problems in the Early 1980s

While China's foreign trade has expanded greatly since 1979, it had several problems which were the subject of debate in the Chinese literature: I take as an example the articles on pages 1-2 of the August 22, 1983, issue of the *World Economic Herald*, a weekly journal in Chinese published in Shanghai and edited jointly by the Chinese World Economic Association and the Institute of World Economics of the Shanghai Academy of Social Science.

The first problem was how to decide what to import and what to export. In China, where imports and exports were subject to government direction to a large extent, by what means could the government decide what and how much to import and to export? In the preceding section we quoted from an article by Zhang Peiji (1982) of the Ministry of Foreign Trade indicating that imports were a part of the overall planning of production and investment. Foreign consumer and producer goods were needed to satisfy the needs of consumption and capital accumulation. The principles of planning were discussed in section 2.2, and we have nothing to add here.

A difficult question concerns the choice of the kinds and the quantities of exports to pay for the imports. Chinese government officials had some awareness of the principle of comparative advantage, as evidenced by their choice of labor-intensive products for export, such as handicraft products. Further study is required to establish whether officials violated this principle by increasing the export of certain machinery and machine tools produced by skilled labor and technicians in China. One guideline that they sometimes used in choosing a commodity for export was the ratio of the cost of the product in RMB to the net revenue from the product in a foreign currency, typically US dollars. If this "RMB cost per dollar" is 2.2, for example, it takes 2.2 yuan to earn a dollar of foreign exchange. If the exchange rate is 2.0, for example, this product is considered a poor candidate for export because it takes more RMB to exchange one dollar by exporting than by currency exchanging. Of course, whether the official exchange rate should serve as the cut-off point for the use of this ratio depended on whether the rate truly reflected the purchasing power of one dollar relative to that of one yuan RMB. If the purchasing power (in terms of internationally traded goods) of one dollar was in fact 3 times that of one RMB, while the official exchange rate was only 2, it would be worthwhile to export a commodity at a ratio of 2.2 for the "RMB cost per dollar." However, the most serious problem with using this ratio arose from the fact that the relative cost figures often did not reflect the relative trade-off possibilities or the marginal rates of substitution in production because of government regulation of prices. Prices of certain agricultural products, the cost of labor, and the cost of using land were set too low. This affected the numerator in the above ratio. In practice, the ratio was used merely as a guide and not as the sole determinant of a commodity for export, but no better criteria were available.

The second problem was that many exporting enterprises continued to expand

their exports even when they were operating at a loss. They often competed with other Chinese exporting firms by lowering their prices or giving special commissions or kickbacks to foreign agents for handling their products, resulting in high ratios of RMB cost per dollar earned, or in actual losses in their operations. While the Chinese government set official export prices and guidelines for commission rates to foreign agents, the provincial exporting companies sometimes charged lower prices and gave higher commission rates as well as other kickbacks. The losses incurred in exports amounted to selling products below cost to benefit foreign consumers.

The third problem was how to determine an appropriate exchange rate or set of exchange rates. The official exchange rate of RMB in terms of US dollars declined after 1980, or the exchange rate of one US dollar in terms of RMB went up. The latter rate was approximately 1.5 in 1980, 1.7 in 1981, 1.9 in 1982, and 1.97 in 1983, eventually rising to 8.3 in 1996–2000. Thus, from 1980 on, the RMB was steadily devalued relative to the US dollar. Ordinarily, the devaluation of a country's currency has the effect of increasing its exports and decreasing its imports, because it makes that country's products cheaper to foreigners and makes foreign goods more expensive to its own citizens. If the elasticity of demand in the world market for that country's exports is larger than one, as is ordinarily the case because there are close substitutes for these products in the world market, increasing the quantity of exports (at a lower price in foreign exchange) will lead to a larger total revenue in foreign exchange. Whatever the elasticity of demand in the domestic market for imports is, increasing the domestic prices of imports due to devaluation (given constant prices of these products in the world market) will lead to a reduction in the total quantities purchased at home and thus in the total expenditures for imports in foreign exchange. Therefore, a devaluation of a country's currency will tend to increase a trade surplus or to reduce a trade deficit.

In the case of China, the steady devaluation between 1980 and 1983 was in terms of US dollars, while the US dollar was itself appreciating in terms of some other major currencies. The Chinese RMB was not necessarily devalued in terms of these currencies. Be that as it may, it is interesting to note that China ran a trade deficit (with the dollar value of its imports higher than that of its exports) of US\$1.14 billion in 1978, \$2.01 billion in 1979, \$1.28 billion in 1980, a trade surplus of \$1.41 billion in 1981, \$4.7 billion in 1982 (*Chinese Statistical Abstract, 1983*, p. 74), and a likely trade deficit in 1983. The devaluation of the RMB in 1981 and 1982 contributed to the trade surpluses in these two years. The Chinese government probably devalued the RMB to correct the trade deficits from 1978 to 1980. (Not only the official exchange rate of the Chinese currency was devalued. Since 1981 some exporters have been able to get 2.8 yuan for 1 US dollar under the dual exchange rate system, which further encourages exports.) Trade surpluses and deficits are the signs used by the government to adjust the official exchange rate of its currency. However, even when foreign trade is nearly balanced and the official exchange rate remains unchanged, with government control of imports and regulation of exports, there is no guarantee that at the official exchange rate one Chinese RMB has the same purchasing power in the world market as in China. For example, in 1983 800 RMB when exchanged for \$400 was sufficient to buy a good color television in the world market, but not sufficient to buy one in China. After overvaluing the RMB in terms of US dollars, the Chinese government avoided a trade deficit by restricting imports.

In so doing, it prevented Chinese consumers from enjoying foreign consumer goods and Chinese producers from using foreign producer goods by trading their own products according to the principle of comparative advantage.

Readers of the last section understand how these problems are solved by market economies practicing free trade. First, the government has no difficulty in deciding what to import and what to export. As long as the marginal rate of substitution in production or the relative prices of two commodities at home are different from the relative prices in the world market (after transportation costs are absorbed), there is economic gain from trade and traders will automatically engage in trade to equalize the price ratios. Trade will stop when there will be no further gain. Government planning will require certain state enterprises to import foreign producer goods. However, to allow the state enterprises to purchase these goods cheaply by supplying them with undervalued foreign currencies, the government encourages inefficiency of these enterprises.

Second, in a market economy one need not be concerned with financially independent enterprises engaged in export expansion when the operations are unprofitable. They automatically stop producing for export if such operations become unprofitable. The reason Chinese enterprises allegedly continued to export their products at a loss must be that there were economic incentives for them to do so. These incentives might include the foreign exchange that the enterprises were allowed to retain and the special loans extended to exporting enterprises. If an exporting enterprise could obtain foreign exchange cheaply at the official exchange rate, the gain might more than offset the loss of an export operation. All special favorable treatments to exporters encouraged the expansion of exports even when the operations might be unprofitable. Furthermore, competition among Chinese exporters in the world market is not necessarily a bad thing if they produce in competitive conditions. American computer manufacturers compete with one another in the world market, as do Japanese automobile manufacturers. Competition in the world market ensures that domestic enterprises operate efficiently and that inefficient manufacturers cannot enter the world market, or even survive in the domestic market when world trade is free. More on this point near the end of this chapter, where I discuss China's entry into the World Trade Organization.

Third, as we have pointed out, the exchange rate is automatically determined in the market by the demand for and the supply of the currency in question, like the price of any commodity. We have witnessed how the exchange rate of a freely traded currency such as the Hong Kong dollar before 1984 is determined daily or even hourly by the forces of demand and supply. Living in a free-trade area, the people of Hong Kong enjoy all the consumer goods produced in different parts of the world and pay for them by exporting products and performing services according to the principle of comparative advantage. Almost no government control of imports and exports is involved. There is no shortage of foreign exchange, and the Hong Kong government does not have to control the supply of foreign exchange. In fact, levying taxes at low rates was sufficient for the government of Hong Kong to earn substantial foreign exchanges for remittance to the British government before 1997. More funds, including foreign exchange, can be obtained by taxing a rich economy at low rates than by controlling a small amount of foreign exchanges earned by an unproductive economy.

This summary of how the problems of foreign trade are solved by market economies practicing free trade is intended to highlight the difficulties facing the Chinese or any economic planners who control imports, regulate exports, set official exchange rates differing from market rates, and set the prices of labor, land, capital, materials, and consumer goods to suit special planning purposes. Just as an understanding of the functioning of a market economy increases one's appreciation of the working of a centrally planned economy (the subject of chapter 2), an understanding of the functioning of international trade as set forth in section 17.2 increases one's appreciation of the three problems of foreign trade facing the Chinese government. The problems associated with administrative decisions on economic affairs, compared with decisions by market forces, are as real in the sphere of international trade as in domestic production and trade. Once resources are not priced by the competitive forces of demand and supply, it is difficult for any planner to make economically correct decisions concerning what to produce, how much to produce, and what and how much to export and import, not to speak of the need to provide proper incentives to the economic agents to carry out their tasks. In the 1990s the Chinese government came to appreciate the usefulness of market forces in the regulation of the economy. It instituted reforms to decentralize production for the domestic as well as the foreign market. As of 1984 it did not decontrol the prices of labor, land, many important products and materials, and the price of US dollars (namely, the exchange rate). Accordingly, rational economic calculations could not be successfully carried out by enterprises engaged in production for domestic consumption, capital accumulation, and exports. This was the main hindrance to the achievement of economic efficiency in China up to the early 1990s.

One argument often advanced to justify import restrictions is the protection of infant domestic industries. The theory of comparative advantage discussed in the last section is based on a given technology. Comparative advantage changes as technology changes, through the import of either new technology or some scarce factors required to use the technology known to the world. In the process of economic development and technological change, a country's comparative advantage changes. For example, Japan did not have a comparative advantage in producing automobiles in the 1960s but it did have such an advantage in the 1970s. While infant industries are being developed, one might argue, they should be protected from foreign competition by tariffs or other restrictions on competing imports. This argument was advanced in Taiwan in the 1960s to protect a domestic automobile manufacturer from foreign competition. The manufacturing cost of producing an automobile was about two and a half times the world price. Such protection lasted for 15 years, and the production cost of this manufacturer was still about twice the world price. In the meantime, consumers in Taiwan incurred a great loss by paying more than twice the world price for their automobiles. The resources that they used up to pay for these expensive automobiles could have been used to purchase more than twice as many automobiles from abroad. In other words, the economy of Taiwan was using a very inefficient way of producing or acquiring its automobiles. By allowing free trade, it could have acquired twice as many automobiles, or it could have paid only half as much for the automobiles it actually acquired. Up to the 1990s, mainland China still protected its automobile industry by imposing high tariffs on imports of automobiles. In many developed

countries, import restrictions have been imposed to protect not infant industries, but declining industries that no longer produce at a comparative advantage. Such restrictions may be good for the owners and workers of those industries, but they are bad in general for the consumers of the countries concerned. See Baldwin (1969) for a criticism of the infant-industry argument.

In mainland China, importation of many other consumer products such as cameras, television sets, stereos, and video equipment was also restricted. Consumers lost out by not being able to buy these products. Protection of domestic infant industries is not the only argument justifying this policy. The government may decide which products the consumers should consume and which are luxury items consumers should not consume. Furthermore, the purchase of foreign consumer goods uses up valuable foreign exchanges, which should be saved for more important consumer items and for capital accumulation. The last argument is not easy to justify if the principle of comparative advantage is understood. If a consumer decides to buy a foreign-made color television (assuming it can be imported freely) for \$380, he has to give up the consumption of \$380 worth of other resources to acquire it. Under free trade, the latter resources could be traded in the world market for \$380 US and there should be no problem of the shortage of foreign exchanges. One might imagine that the resources the consumer gives up consist of two domestic black-and-white television sets that could not be exchanged for \$380 in the world market. In that case, assuming the exchange rate of RMB to be market-determined, the conclusion must be that the two domestic television sets are overpriced at home and China should not produce them. Under free trade and market-determined exchange rates, there should be no shortage of US dollars in China. Any (internationally traded) good in China selling for 1 RMB must be worth approximately its US dollar equivalent in the world market. Trade is determined by comparative advantages. The exchange rates will adjust so that the relative supply of and demand for US dollars and Chinese RMB will be equal.

The main reason for failure to develop infant industries by import restriction is the resulting reduction of competition. Without foreign competition, the protected domestic producers have no incentive to improve their products or change their technology. In the meantime, the consumers are forced to buy inferior products at higher prices than necessary. To develop an infant industry, if such an industry can be identified, a better method than import restriction is to provide the enterprises of that industry with subsidies of fixed and declining amounts during a specified period of, say, 5 years. This alternative method has several advantages over imposing import restrictions. First, consumers would not be deprived of the better and cheaper foreign products. Second, domestic producers would have incentives to improve because of foreign competition. The availability of good-quality foreign products in the home market would also have a demonstration effect stimulating domestic manufacturers to produce better products. One reason the opening of China in the late 1970s has been beneficial to China's economic development is that it enables Chinese planners and managers to see what goes on in the outside world. Third, through the subsidies, the government knows exactly the cost involved in helping to develop the industry concerned. By imposing import restrictions, the government does not know this cost and therefore may not care about the economic loss involved; only the consumers suffer. Knowing the cost involved and having to pay for it from its own

budget would enable the government to choose a sound policy for developing infant industry and would help to prevent an inefficient industry from being protected for an extended period.

However, it is still difficult for the government to identify a promising industry to develop. A well-trained staff is required to identify such industries and to devise appropriate means of continually upgrading their technologies. The development of new industries and the upgrading of existing industries are related to the subject of foreign investment, to be discussed in the next chapter. One important principle in carrying out these tasks is that the central government should not set up and run monopolies in these industries. The central government can promote the development of an industry by various means, including providing subsidies and technical assistance in the form of training programs to its managerial, technical, and production staff. It can even set up new enterprises in the industry, but to prevent enterprises at the provincial and local levels and those established under collective ownership from competing would be harmful to the development of the industry. Most important of all, in the process of industrial development, prices should be unregulated, so that accurate cost and benefit calculations can be performed by state-owned and collectively owned enterprises and by consumers and workers to ensure economic efficiency.

Foreign trade has enabled the low-cost and high-quality labor in China to produce goods to be sold at higher prices in the world market, thus increasing the compensation to Chinese labor. It has also enabled the import of technology and high-quality capital goods for use in production in China, as well as the import of high-quality consumer goods. The availability of high-quality capital goods improves productive efficiency. The availability of high-quality consumer goods not only increases consumer welfare directly; it also acts as an important competitive force in the Chinese consumer market and stimulates improvement of the quality of domestically manufactured products. In the latter part of the 1990s the Chinese leadership recognized the need to introduce foreign competition to speed up reform of state enterprises which had been protected and subsidized. It also recognized the danger of opening China for foreign competition too rapidly, as there would be adjustment costs including unemployment, need for reallocation, and possibly political instability. Therefore, the opening up will be accomplished in steps, as we have described in section 4.5, on the conditions which China offered in joining the WTO. The effects of China's accession to the WTO on its trading pattern and on the incomes of other countries are discussed in Ianchovichina and Martin (2001).

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1. Assume that the technology given in table 17.2 applies to both countries *A* and *B*, but the quantities of labor and capital available in country *A* are respectively 180 and 50 units, and in country *B* are respectively 100 and 80 units. Draw the production possibility curves for countries *A* and *B* when there is no trade. If the utility function is $u = x_1x_2$ (x_1 denoting the quantity of shoes consumed, x_2 the quantity of computers), mark the equilibrium outputs for countries *A* and *B* in the diagram. Let the prices of shoes and computers have a ratio of 1 to 12 in the world market. Show the new production possibilities and the equilibrium points for countries *A* and *B* that incorporate the possibility of trade. Hint: To find equilibrium points substitute an appropriate linear function of x_2 for x_1 in the utility function and maximize it with respect to x_1 .
2. What is the meaning of comparative advantage? Using the answer to question 1, what does country *A* have a comparative advantage in producing and what does country *B* have a comparative advantage in producing? Explain. What is the range for the ratio of the price of shoes to the price of computers that will enable both countries to gain from trade?
3. Modify the technology given in table 17.2 by assuming that in addition to the (unskilled) labor and capital inputs specified, processes 1 and 2 require respectively 1 and 5 units of skilled labor. Assume that there are 60 units of skilled labor available. Write down the inequality required and draw the new production transformation curve. Assuming the quantity of skilled labor to be 40 units instead, draw the new production transformation curve.
4. What are the main differences between the Cobb-Douglas production function and the input coefficient matrix as exemplified in table 17.2 as an alternative method to specify the technology of a country? How is a production transformation curve derived from a Cobb-Douglas production function?
5. What are the reasons the Chinese currency could appreciate in the future?
6. What is the annual rate of change of the ratio of the volume of foreign trade to GDP in China in the last five years? What is the annual rate of change of the ratio of foreign investment to GDP in the last five years?
7. What were the important characteristics of China's trade policy in the early 1980s? What was wrong with the policy?

- 8 What is the infant-industry argument against free trade? Is the argument valid in your opinion? Explain.
- 9 What are the main restrictions on foreign trade in China that joining the WTO will liberalize in steps?
- 10 What was the Chinese government's rationale in setting an official exchange rate in the early 1980s that overvalued the domestic currency? What was the economic problem resulting from such an overvaluation? How did the Chinese government try to resolve the problem?