

Chapter 2

The Economics of International Trade

Introduction

OBJECTIVES

- Understand the three elements of microeconomic theory that serve as the building blocks for trade theory: consumption indifference curves, production possibilities frontiers, and optimized market equilibrium.
- Explore the Ricardian (classical), constant-costs model of comparative advantage and mutually advantageous trade.
- Explore the neoclassical, increasing-costs model of trade and the contribution made by the Heckscher-Ohlin theorem to our understanding of the bases of comparative advantage.
- Examine the Stolper-Samuelson theorem that trade, although beneficial to a country as a whole, may create losses for particular groups within that country, thus giving them a rational basis to prefer protection over trade.
- Understand the new areas of economic research regarding the possible contributions of trade to national economic growth (trade and endogenous growth) and changes in the composition of trade (intra-industry vs. inter-industry trade).

You are living in Des Moines, Iowa. You wake up in a house built with lumber from Canada. You wear clothes fabricated in India or Honduras and shoes from Italy or Brazil. You prepare a breakfast that includes orange juice from Brazil and cereal from Switzerland; you use silverware made in China, South Korea, or Finland; and you sit at a breakfast table manufactured in Thailand or Denmark. You drive to work in an automobile built in Japan or Germany or Sweden and use gasoline that was refined from oil imported from Venezuela, Nigeria, or Saudi Arabia. At lunch you have a salad consisting of tomatoes from Belgium, bell peppers from the Netherlands, lettuce from Mexico, grapes from Chile, olives from Greece, and cheese from France. You have to make a phone call during lunch, and to do so you use a cell phone made in Finland or Sweden. After work you return home and watch the news on a television set made in Mexico; you catch up on your e-mail using a laptop computer assembled in Taiwan of components made in Singapore and China; and you listen to some music by placing a German-made CD into a Japanese-made CD player. Before you retire for the evening, you turn off the lights in your house, which were made in Mexico. You reflect, as you drift off to sleep, on your upcoming visits to Prague and Budapest, with a brief layover in London.¹

International trade affects what we eat, what we wear, what we watch and listen to, how we move about, where we go, and how we earn a living. But how exactly is it possible for consumers in Iowa to obtain tomatoes from Belgium? How do people in Finland know that people in Des Moines wish to buy cell phones? How, in other words, does trade come about? What determines who sells what, and who buys what? And is all this trade a good idea?

We will see in Chapters 4 and 5 that politics determines the answers to these questions to a remarkably large degree. However, the discipline of economics during the past two centuries also has developed a powerful understanding of the sources, mechanics, and effects of international trade. By understanding international trade theory we can identify some of the most important and interesting political issues relating to the world political economy.

Hence, in this chapter we present the main elements of international trade theory. We begin our review with a brief consideration of the building blocks for trade theory that are taken from microeconomics. Using these analytical building blocks, we introduce the two basic models of trade, the Ricardian or classical model, and the more contemporary neoclassical model, emphasizing both what they have in common and where they diverge. Both

State Power and World Markets 21

models, we shall see, reach the same fundamentally important result: trade improves the overall welfare of nations by allowing them to make the best use of their scarce productive resources, and to improve their overall consumption by producing certain things themselves and obtaining other goods and services from other nations. In light of the tremendous gains that trade holds for nations, economists are skeptical of most arguments that are made against international commerce. However, although trade may benefit a nation as a whole, groups within a nation may in some circumstances lose from freer trade and therefore may have a rational reason to resist more open trade. Finally, we shall explore two frontiers of research in international trade theory, one relating trade to national economic growth, and another focusing on the tendency of many countries to trade similar rather than dissimilar goods. Both of these new lines of inquiry, we shall see, have led economists to rethink some elements of their theory of trade, and both point to important new developments in the world trading system.

Analytical Building Blocks

Economists rely on three analytical tools in their exploration of the bases for and benefits of trade: consumption indifference curves, production possibilities frontiers, and an analysis of optimized production-consumption equilibrium in the absence of trade.

Consumption Indifference Curves

Economists assume that individuals derive happiness, or utility, from their consumption of goods. Different combinations of goods, or what economists term “market baskets,” may each provide an individual with the same level of utility. For example, an individual may be exactly as happy consuming a market basket containing five pairs of shoes and two computers as he or she would be consuming a market basket containing six pairs of shoes and one computer. As a result, if presented with a choice between two such baskets, the individual would be *indifferent* as to which of these two market baskets is preferable, for each would provide the same level of utility. A graphical representation of the different combinations of shoes and computers that would

provide the individual with a constant level of satisfaction would be that person's **consumption indifference curve** with respect to shoes and computers.

Economists have employed the concept of an individual's consumption indifference curves in their analyses of trade between countries. They assume that it is possible to aggregate the satisfaction levels that all residents of one country attain from the consumption of different baskets of goods, and therefore that it is possible to create *national* consumption indifference curves. In this book, when we refer to consumption indifference curves, we are referring to the consumption indifference curves for countries taken as a whole.

Examples of hypothetical consumption indifference curves for the United States are presented in Essential Economics 2.1(a). Let us begin with indifference curve U_0 . The different combinations of computers and shoes along that curve—for example, those represented by points A , B , C , and D —provide the country with exactly the same level of aggregate satisfaction.

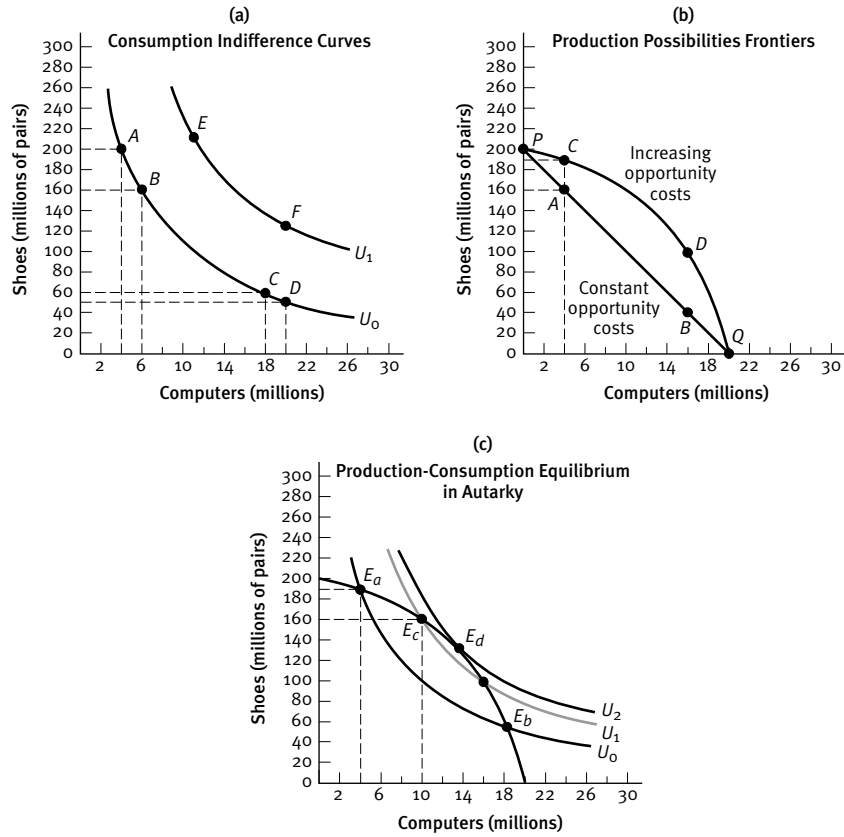
U_0 is convex with respect to the origin, not straight or concave. The premise underlying this characteristic of the indifference curve is that of **declining marginal utility from consumption** of additional increments of any given good. That is, as an individual consumes more and more increments of one good, each increment delivers less and less satisfaction than the preceding increment, and therefore the individual becomes less and less willing to forgo other goods to obtain that next increment. By consequence, if the United States is at point A on U_0 and is asked how many pairs of shoes it is willing to forgo to obtain 2 million more computers, all the while retaining the level of satisfaction it enjoys at point A , its response would be 40 million pairs (this new market basket is represented by point B on U_0). However, if the United States is at point C on U_0 , in response to the same question the answer would be not 40 million pairs, but only 10 million pairs (shown by point D on U_0).

Economists therefore suggest that a curve like U_0 reveals a declining **marginal rate of substitution** of computers for shoes on the part of the United States. The marginal rate of substitution at any point along an indifference curve is the absolute value of the slope of the indifference curve at that point. Because the slope of U_0 declines as we move along the curve from left to right, so does the marginal rate of substitution decline.

One other key observation can be derived from Essential Economics 2.1(a). What happens if the United States is no longer presented with the combinations of shoes and computers depicted by U_0 , but instead can

❖ ESSENTIAL ECONOMICS 2.1

Three Building Blocks for Economic Analysis



Consumption indifference curves (panel a) graphically represent the different combinations of two goods that would provide a nation with a constant level of satisfaction. Production possibilities frontiers (panel b) show the trade-offs that countries make in the production of two different goods. The optimization of both consumption and production in autarky is shown by the point of tangency between the production possibilities frontier and the highest possible consumption indifference curve (panel c).

Core Principle

Consumption indifference curves, production possibilities frontiers, and production-consumption equilibrium in autarky all show a country's production and consumption options in the absence of international trade.

24 State Power and World Markets

choose among a new set of market baskets, each of which contains more computers, more pairs of shoes, or more of both? Such market baskets are represented by the curve labeled U_1 . Since points on U_1 , such as E and F, represent combinations of goods that mark an increase, as compared with points on U_0 , in American consumption of shoes or computers or both, the United States must be enjoying a higher level of satisfaction along each point of U_1 than it is at any point along U_0 .

Hence, and this concept will be crucially important in our later discussion of the effects of trade, anything that permits the United States to increase its consumption of at least one good must be improving overall American satisfaction and must therefore be producing a movement by the United States to a *higher indifference curve*. Trade, as we will see later in this chapter, is precisely such a mechanism; it provides a way for countries to improve their overall levels of consumption and thereby to move to higher indifference curves, signifying higher levels of overall societal satisfaction.

Production Possibilities Frontiers

The second analytical device we need to acquire for our discussion of trade theory is the concept of a ***production possibilities frontier***. A production possibilities frontier represents the different combinations of goods that a country can produce during some period of time (in our illustrative discussion below, one year), given the full exploitation of the productive resources available in the country during that period of time. Two basic types of production possibilities frontier are presented in Essential Economics 2.1(b): the first is built on the premise of *constant opportunity costs*, and the second is built on the premise of *increasing opportunity costs*.

Production Possibilities Frontiers with Constant Opportunity Costs

Let us begin with the production possibilities frontier in Essential Economics 2.1(b) closest to the origin. Notice that this frontier has a negative slope, and that it is a straight line. The first characteristic of the frontier—that its slope is negative—indicates that ***opportunity costs*** are present in production. As can be observed of the inner frontier in Essential Economics 2.1(b), if the United States puts all its productive resources into shoe manufacturing, it can reach point *P* on that frontier and produce 200 million pairs of shoes in one year. If it decides to produce not just shoes but also computers,

it would need to take some of its resources out of shoe manufacturing and reallocate them to the production of computers. For example, if the United States elects to build 4 million computers, that is, to go from point P to point A on the inner frontier, it needs to reduce its production of shoes by 40 million pairs. In this example, then, the cost of building one computer in the United States is the opportunity to produce ten pairs of shoes. In the language of economics, the opportunity cost of producing one computer is the production forgone of ten pairs of shoes. This notion of opportunity costs is absolutely central to our upcoming discussion of the bases for and dynamics of trade.

As we have noted, the inner production possibilities frontier in Essential Economics 2.1(b) is drawn as a straight line. This second characteristic of the frontier indicates that the opportunity cost of producing computers in terms of shoes forgone remains *constant* (as we have drawn the frontier, constant at ten pairs of shoes forgone for each computer built) no matter how many additional increments of computers the United States chooses to build. By virtue of the assumption of constant opportunity costs, if the United States wants to go from point B to point Q on the frontier, that is, from 16 million to 20 million computers produced, then it needs to forgo the production of 40 million pairs of shoes, the same amount it must forgo when moving from point A to point B on the frontier.

Production Possibilities Frontiers with Increasing Opportunity Costs

We will be using a production possibilities frontier that is based on constant opportunity costs later in this chapter when we discuss the first major economic theory of trade. However, in more recent years economists have built their models of trade, which we will also discuss later, on the basis of the assumption that production possibilities frontiers should represent *increasing* opportunity costs. In other words, they assume that successive, equal increases in the production of one good will require forgoing the production of larger and larger increments of the other good. The rationale for this switch to an assumption of increasing opportunity costs is that it is usually more reasonable to assume that, although the first redeployment of an increment of productive resources from one use to another might produce very large results, eventually, as more and more increments of resources are so redeployed, decreasing *returns to scale* for the resource increments are likely to come into effect.

To see how decreasing returns might arise, and how decreasing returns

26 State Power and World Markets

create increasing opportunity costs, let us assume the following about a country:

- It has land on which it can grow either grapes or wheat;
- Some of the land is better suited for grapes than for wheat, whereas some of the land is better suited for wheat than for grapes; and
- At first, the country is using all available land to produce grapes.

If this country were to decide to grow some wheat, it would need to select plots of land to take out of grape production, and then use those plots to plant wheat. In order to maximize the production of wheat and to minimize the reduction in the production of grapes, the country would select the plots of land that are the least suited for grapes and the most suited for wheat. In doing so, it would find at first that forgoing a relatively small amount of grapes results in the production of large amounts of wheat. But what if the country wanted to produce more and more wheat? Eventually, it would have to use plots of land that were progressively less suited for wheat and more suited for grapes. As a result, the amount of additional wheat harvested per plot of additional land so allocated would decline. In the face of such decreasing returns in wheat production with respect to land, an effort by the country to produce successive equal increments of wheat would require forgoing the production of ever larger volumes of grapes—that is, there would be *increasing* opportunity costs for wheat in terms of grapes forgone.

The outer frontier in Essential Economics 2.1 (b) is an example of a production possibilities frontier for computers and shoes that is characterized by such increasing opportunity costs. Note that movement from point *P* to point *C* on the outer frontier, that is, increasing U.S. computer production from 0 to 4 million computers, requires a reduction in U.S. shoe production by 10 million pairs. However, because we are assuming decreasing returns as America shifts resources from shoes to computers, if we instead start at point *D* and increase computer production by the same amount, 4 million computers, to reach point *Q*, we must accept a vastly greater drop in shoe production, about 100 million pairs.

More generally, and in contrast to the inner production possibilities frontier in Essential Economics 2.1(b), the outer frontier reflects increasing opportunity costs for computers in terms of shoes forgone, and what economists term an increasing **marginal rate of product transformation** between computers and shoes. The marginal rate of product transformation at any point along a production possibilities frontier is the absolute value of the

slope of the curve at that point. Insofar as the outer frontier in Essential Economics 2.1(b) depicts a requirement that more and more shoes must be forgone in order to build each additional fixed increment of computers, the slope of the outer curve is increasing, indicating an increasing marginal rate of product transformation between shoes and computers.

Optimized Production and Consumption in Autarky

Essential Economics 2.1(c), in which consumption indifference curves and production possibilities frontiers are superimposed on one another, provides a final key analytical building block for our understanding of the sources and benefits of trade. This panel presents economists' conception of the manner in which a country achieves its highest level of satisfaction in the context of *autarky*, that is, in the absence of trade. This analysis of optimization in autarky, we will see in the following discussion, allows us to appreciate how a country can enjoy greater satisfaction if it moves from autarky to participation in the international trading system, and therefore why countries choose to participate in world trade.

We begin with another hypothetical production possibilities frontier, which we assume is characterized by increasing opportunity costs (i.e., its slope is increasing as we move from left to right). As with the curves in Essentialized Economics 2.1(b), this frontier depicts the different combinations of computers and shoes that the United States can produce in one year with its current resources. Because we are assuming that absolutely no trade is taking place, the production possibilities frontier also sets the limits on what the United States can consume: Americans are able to consume only the combinations of the two goods that are on or inside the frontier. Assuming that all goods that are produced are consumed, the effective range of choice for the United States in terms of optimum consumption is the locus of points that constitutes the production possibilities frontier.

In these circumstances, the United States produces the combination of shoes and computers that provides the maximum level of satisfaction possible.

Consider the country's reasoning if it finds itself at point E_a . How much would it have to give up in terms of shoe production forgone in order to consume 10 million rather than 4 million computers—that is, what is the drop in shoe production that is associated with a move from E_a to E_c ? The answer, if we move along the production possibilities frontier, is about 30 million

28 State Power and World Markets

pairs of shoes. Yet how many pairs of shoes would the United States be *willing* to forgo to obtain those extra 6 million computers while being no worse off in terms of its level of satisfaction? The answer, as we move down along the consumption indifference curve U_0 , is about 90 million pairs. By shifting resources from shoes to computers and moving from E_a to E_c , the United States could have all the satisfaction it enjoys at E_a , plus the satisfaction of the 60 million pairs of shoes that it would be *willing* to forgo, but would not have to forgo, in order to obtain the 6 million extra computers. Recalling our discussion about consumption indifference curves in Essential Economics 2.1(a), it is clear that, by moving from E_a to E_c , the United States is enjoying a higher level of satisfaction and therefore must have shifted to a higher indifference curve—specifically, curve U_1 .

Clearly, then, the combination represented by point E_a , at which the United States is producing and consuming 4 million computers and 190 million pairs of shoes, is not an optimum outcome. At point E_a , the United States would be willing to forgo consuming many more shoes in exchange for computers than it would actually have to forgo producing in order to make those computers. More theoretically, at E_a , the country's marginal rate of substitution exceeds its marginal rate of product transformation; equivalently, at E_a , the slope of the country's consumption indifference curve is greater than the slope of its production possibilities frontier. Likewise, if the United States found itself at point E_b , it would find it in its interest to shift resources out of computers and into shoes. At point E_b , the slope of the production possibilities frontier is greater than the slope of the consumption indifference curve, which means its marginal rate of product transformation exceeds its marginal rate of substitution.

Where, then, does the country maximize its happiness in light of its production possibilities frontier? Maximum satisfaction is found at point E_d , which is associated with the indifference curve U_2 . At that point, the marginal rate of substitution of computers for shoes is exactly equal to the marginal rate of product transformation between the two goods. That is, at point E_d , given its preferences for the two goods and its ability to make them, the United States cannot improve its satisfaction further by changing its production or consumption choices. This situation can change, however, if we introduce the opportunity for the United States to engage in international trade.

Why Do Nations Engage in Trade?

The Ricardian Model: Two Countries, Two Goods, and Constant Opportunity Costs

Using these basic building blocks, economists have demonstrated that countries can gain from trade and thereby have an incentive to engage in such transactions across their borders.

To make this issue concrete, consider the following questions:

- From 1996 to 2000, the United States bought about \$400 million per year in coffee and coffee products from Brazil. Coffee, however, was not the largest product category of Brazilian exports to the United States during this period; the highest it ranked was second, in 1997. On average, the biggest category of Brazilian export products going to the United States during 1996–2000 was footwear, which averaged \$1.1 billion per year during that period.² Now, it might be obvious why the United States buys coffee from Brazil: it cannot be grown readily in the U.S. climate and it can be in Brazil. But how, in light of the fact that the United States is an industrial powerhouse, could the United States possibly benefit from importing from Brazil something as simple to make as shoes?
- The biggest single category of U.S. exports to Brazil between 1996 and 2000 was telecommunications equipment: it averaged about \$1.2 billion per year during this period. Yet the biggest overall area of U.S. exports to Brazil during the late 1990s, at an average level of \$1.8 billion per year, was information technology—that is, computers, computer parts, and parts for other office equipment. What is remarkable about these U.S. information-technology hardware exports to Brazil during the late 1990s is that it followed a 20-year period during which Brazil had been seeking and had made some progress in nurturing a domestic Brazilian computer industry.³ Given this apparent Brazilian national interest in promoting an indigenous computer industry, why didn't Brazil simply prohibit computer imports and thereby create a market for local computer producers? How, in other words, does Brazil gain from buying U.S. computers rather than building them at home?

➤ TIMELINE 2.1

The Development of International Trade Theory

1776	Adam Smith argues his free-market critique of mercantilism	
1817	David Ricardo develops Ricardian (classical) model	
1879	Alfred Marshall proposes offer curves and trade	
1919	Eli Heckscher	} develop what comes to be known as the Heckscher-Ohlin theorem
1930	Bertil Ohlin	
1930	Gottfried Haberler explores increasing opportunity costs and trade	} The foundations of the neoclassical model
1932	A. P. Lerner explores increasing opportunity costs and trade	
1933	Wassily Leontief explores increasing opportunity costs and trade	
1939	Paul Samuelson advocates the gains from trade	
1941	Wolfgang Stolper and Paul Samuelson propound the Stolper-Samuelson theorem	
1975	H. G. Grubel and P. L. Lloyd examine intra-industry trade	
1981	Paul Krugman and Elhanan Helpman theorize on increasing economies of scale and trade	
1986	Paul Romer develops endogenous growth theory	

To understand why the United States and Brazil exchange shoes for computers today, we can usefully employ the logic of *comparative advantage*. The benefits of freer trade were highlighted by Adam Smith in his foundational 1776 work, *The Wealth of Nations*, and the logic of comparative advantage as the underpinning for this view was presented by David Ricardo in 1817.⁴

Let us, for the following discussion, stipulate these assumptions:

- There are only two countries, Brazil and the United States;
- Brazil and the United States produce only two goods, computers and shoes;
- There are no transportation costs for goods shipped between Brazil and the United States;

✦ ESSENTIAL ECONOMICS 2.2

Hypothetical Output Levels, United States and Brazil

	OUTPUT PER WORKER PER YEAR		OPPORTUNITY COST	
	<i>Computers</i>	<i>Pairs of shoes</i>	<i>1 computer</i>	<i>1 pair of shoes</i>
United States	50	200	4 pairs shoes	.25 computer
Brazil	5	175	35 pairs shoes	.03 computer

Core Principle

An absolute advantage in manufacturing does not necessarily imply a comparative advantage.

- Only one input, labor, is required for the production of either computers or shoes;
- There are constant opportunity costs between the two goods in each country, or, in graphical terms, the production possibilities frontiers for both countries for computers and shoes, while possessing different slopes, are straight lines;
- The United States and Brazil each have one million labor-years of total labor supply; and
- Any one worker in the United States and Brazil is able to produce in one year the number of computers or pairs of shoes depicted in the first two columns of Essential Economics 2.2.

Any one worker in the United States, in this scenario, can produce more computers than can any one worker in Brazil (50 in America as opposed to 5 in Brazil), and any American worker can also produce more pairs of shoes than can a Brazilian worker (200 as opposed to 175 pairs). The United States, in other words, has an *absolute advantage* over Brazil in both computers and shoes. In these circumstances, it might appear to be highly unlikely that the United States could gain anything from trade with Brazil.

The key to appreciating the potential basis for mutually profitable trade between these two countries lies in the differences in opportunity costs each faces with respect to shoes and computers. As we discussed earlier, if the United States wants to produce more shoes, it can do so only by moving workers out of computer manufacturing. Over the course of one year, for

32 State Power and World Markets

each worker it shifts from computers to shoes, 50 fewer computers are built and 200 pairs of shoes are produced. For each additional pair of shoes produced, then, the United States must forgo the production of $1/4$ of a computer (50 computers whose production is forgone \div 200 pairs of shoes thereby produced = $1/4$ computer forgone per additional pair of shoes produced). Hence, the opportunity cost of each additional pair of shoes produced in the United States is the production forgone of $1/4$ of a computer. If the United States prefers to have more computers and thus shifts workers from shoe making to computer manufacturing, then, for each worker so shifted, computer production goes up by 50 units over the year while shoe production goes down by 200 pairs. Therefore, the opportunity cost of 1 additional computer is the production forgone of 4 pairs of shoes (200 pairs of shoes whose production is forgone \div 50 additional computers thereby produced = 4 pairs of shoes forgone per additional computer produced).

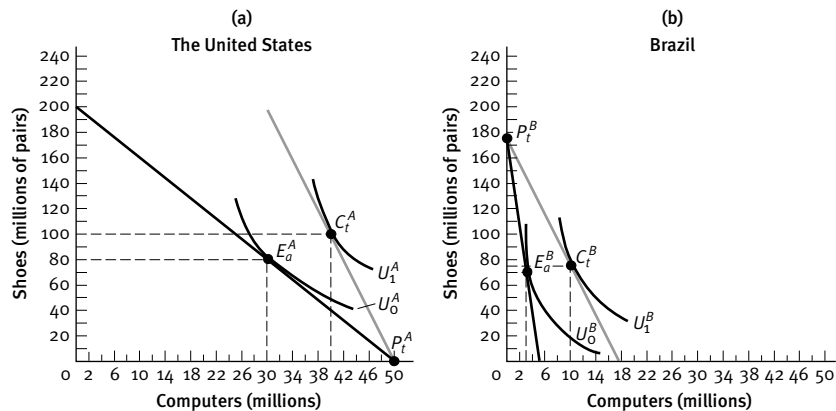
By the same token, in Brazil, each worker shifted from computers to shoes causes production of the former to go down by 5 computers while allowing production of the latter to go up by 175 pairs; the opportunity cost of 1 additional pair of shoes made in Brazil is the production forgone of about .03 computer. Each Brazilian worker shifted from shoe production to computer manufacturing causes the former to go down by 175 pairs while allowing the latter to go up by 5 computers; the opportunity cost of 1 additional computer produced in Brazil is the production forgone of 35 pairs of shoes. These opportunity costs for the United States and Brazil are shown in the third and fourth columns of Essential Economics 2.2.

Now comes the critical point. If we ask where it is relatively cheaper to build additional computers in terms of pairs of shoes forgone, we see in the third column of Essential Economics 2.2 that the answer is in the United States, where only 4 pairs of shoes must be forgone to build each additional computer, as opposed to the 35 pairs that must be forgone in Brazil. The United States, then, has a comparative advantage over Brazil in the making of computers. By the same token, if we ask where it is relatively cheaper to manufacture additional pairs of shoes in terms of computers forgone, we see in the fourth column of Essential Economics 2.2 that the answer is in Brazil, for there only .03 computers must be forgone to produce each additional pair of shoes, whereas in the United States, .25 computers must be forgone. Brazil, therefore, has a comparative advantage over the United States in the production of shoes.

We can now employ the analytical tools developed in the preceding section to appreciate how the logic of comparative advantage produces opportu-

✦ ESSENTIAL ECONOMICS 2.3

The Ricardian Model of Trade



Core Principle

Trade between two countries allows each of them to specialize and increases each country's level of overall satisfaction.

nities for mutually beneficial trade between countries. Consider the two graphs in Essential Economics 2.3: the solid straight lines in panels (a) and (b) represent the production possibilities frontiers for the United States and Brazil, respectively. At the moment we are assuming constant opportunity costs between computers and shoes in each country, so the production possibilities frontier for each country is drawn as a straight line. Furthermore, the slopes of the two countries' production possibilities frontiers differ from one another, reflecting the different opportunity costs each country experiences in production of the two goods.

We begin with the situations in the United States and Brazil under the assumption of autarky. In autarky, as we discussed earlier, the only consumption opportunities available to each country are those defined by their respective production possibilities frontiers. Let us assume that, in autarky, demand conditions in Brazil and the United States are such that each allocates 600,000 labor years to computers and 400,000 labor years to shoes. In these circumstances, market equilibrium in the United States is at point E_a^A in Essential Economics 2.3(a), at which the United States is producing and

34 State Power and World Markets

consuming 30 million computers and 80 million pairs of shoes and is enjoying a level of satisfaction that is represented by consumption indifference curve U_0^A . Brazil's market equilibrium in autarky is at point E_a^B in Essential Economics 2.3(b), at which it is producing and consuming 3 million computers and 70 million pairs of shoes and is enjoying a level of satisfaction that is represented by consumption indifference curve U_0^B .

What happens now if trade becomes possible between the United States and Brazil? If trade becomes possible, then the United States specializes on the basis of its comparative advantage: it stops making shoes and increases its production of computers from 30 million to 50 million units. This is noted in Essential Economics 2.3(a) by the movement downward along the U.S. production possibilities frontier from E_a^A to P_t^A . Brazil also specializes on the basis of its comparative advantage, ceasing the production of computers and, using the labor so released, increasing its shoe production from 70 million pairs to 175 million pairs. This is captured in Essential Economics 2.3(b) by the movement of Brazil upward along its production possibilities frontier from E_a^B to P_t^B .

Now that the United States is producing many more computers and Brazil is producing many more pairs of shoes, each might seek to obtain the good it no longer produces locally by offering to enter into an exchange. The key requirement is that both countries agree on the terms of trade—that is, the rate at which U.S. computers will be exchanged for Brazilian shoes. Given the domestic opportunity costs between computers and shoes in the two countries, we know that certain offers will not be accepted:

- If Brazil offers fewer than 4 pairs of Brazilian shoes for each U.S. computer received, then the United States will decline to trade: it would be cheaper for the United States to make its own shoes again by reallocating labor from computers back to shoes, and thereby obtain 4 pairs of American-made shoes for each computer forgone.
- If the United States indicates that it will provide a computer to Brazil only if it received more than 35 pairs of shoes in return, then Brazil will decline the chance to trade: it would be cheaper for Brazil to acquire computers by shifting labor out of shoes and back into computers, since it can obtain each locally produced computer by forgoing only 35 pairs of shoes.

Thus, for each partner voluntarily to accept the opportunity to specialize and to trade, the terms of trade between the two countries need to fall some-

PRIMARY DOCUMENT 2.1

David Ricardo and International Trade

Under a system of perfectly free commerce, each country naturally devotes its capital and labour to such employments as are most beneficial to each. This pursuit of individual advantage is admirably connected with the universal good of the whole. By stimulating industry, by rewarding ingenuity, and by using most efficaciously the peculiar powers bestowed by nature, it distributes labour most effectively and most economically: while, by increasing the general mass of productions, it diffuses general benefit, and binds together by one common tie of interest and intercourse, the universal society of nations throughout the civilized world. It is this principle which determines that wine shall be made in France and Portugal, that corn shall be grown in America and Poland, and that hardware and other goods shall be manufactured in England.

Source: David Ricardo, *On the Principles of Political Economy and Taxation*, Chapter 7, InteleX Past Masters series, available at pastmasters2000.nlx.com/display.cfm?clientID=1332338&depth=2&infobase=pmbritphil.info&softpage=GetClient42&view=browse.

Core Principle

David Ricardo believed that trade, when combined with specialization on the basis of comparative advantage, can provide benefits to all participants, and that it does so through the allocation of labor to its most productive uses and thus through the production and consumption of a greater amount of goods globally than would be possible in the absence of trade. Ricardo also suggests in this passage that freer trade yields other benefits, including the fostering of technological innovations and the forging of common interests among nations.

where between 1 U.S. computer for 4 pairs of Brazilian shoes and 1 U.S. computer for 35 pairs of Brazilian shoes. For the purposes of analysis, let us assume that the demand for computers and shoes in both the United States and Brazil is such that they negotiate terms of trade setting 1 computer equivalent to 10 pairs of shoes (this is noted by the dashed lines in Essential Economics 2.3(a) and 2.3(b)), and they agree to exchange 10 million U.S.-made computers for 100 million Brazilian-made pairs of shoes.

Americans' consumption therefore grows from 30 million computers in autarky to 40 million computers with trade, and from 80 million pairs of

36 State Power and World Markets

shoes without trade to 100 million pairs of shoes with it. Graphically, we see in Essential Economics 2.3(a) that U.S. consumption moves off the U.S. production possibilities frontier: specifically, it moves from E_a^A to C_t^A . Given that the United States is consuming more of both computers and shoes after it has specialized and engaged in trade than it had in autarky, it must be enjoying greater satisfaction than it had during autarky, and this is represented by its attainment of a higher consumption indifference curve, U_1^A rather than U_0^A . Similarly, Brazil's consumption of computers grows from 3 million to 10 million, and its consumption of shoes rises from 70 million to 75 million pairs. Graphically, we see in Essential Economics 2.3(b) that Brazil's consumption point also moves off its production possibilities frontier, going from E_a^B to C_t^B . Given that Brazil with trade is now consuming more of both computers and shoes, it must be enjoying greater satisfaction than it had in autarky, and this is represented in Essential Economics 2.3(b) by Brazil's movement from consumption indifference curve U_0^B to U_1^B . Thus, the combination of specialization and trade allows both countries to improve their welfare.

David Ricardo's model of comparative advantage and trade is of profound historical and contemporary importance, and the power and persuasiveness of his thinking can be appreciated even in the very brief extract from his presentation of that model that is presented in Primary Document 2.1. The model's brilliance and endurance over time have resulted from its capacity to demonstrate that countries that choose specialization and trade can escape the seemingly tyrannical limits imposed on their consumption levels by their individual production possibilities frontiers. In other words, countries can use specialization and trade to achieve greater consumption and thus greater satisfaction than was possible in autarky.

Yet Ricardo's model, as powerful as it is, leaves two key problems unresolved:

- If specialization on the basis of comparative advantage is the path to enhanced national welfare, why do we not observe countries fully specializing in the good(s) in which they have a comparative advantage?
- What causes one country to have a comparative advantage in one good, and another country to have a comparative advantage in another good? Why, for example, does the United States have a comparative advantage in computers and Brazil have a comparative advantage in shoes?

The Neoclassical Model of Trade: Two Countries, Two Goods, and Increasing Opportunity Costs

In addressing the first of these unanswered questions, we may recall that, in our discussion so far of the Ricardian model, we have assumed that the United States, as it shifts labor from shoes to computers, can produce each additional computer at the opportunity cost of 4 pairs of shoes, and that this opportunity cost remains the same no matter how many more computers the United States produces. Neoclassical economic theory (in contrast to the “classical” approach articulated by such economists as Ricardo) argues persuasively that constant opportunity costs between goods are not likely to hold as a country progressively specializes in one or another good. Instead, as we noted earlier in this chapter, such specialization is likely to encounter increasing opportunity costs. To make this case, the neoclassical approach begins with two key adjustments to the Ricardian model’s assumptions about the production of either computers or shoes:

- Rather than being produced with only one factor of production, shoes and computers are produced with at least *two* factors of production: in the discussion that follows, we will assume that these two factors are labor and capital (machinery and buildings).⁵
- Technical knowledge allows both computers and shoes to be made with different amounts of labor and capital. However, compared to shoes, the most efficient ways of making computers all use relatively more capital than labor, whereas, compared to computers, the most efficient ways of making shoes all use relatively more labor than capital.

With these modified assumptions, the neoclassical model would expect that, although at first the United States may be able to build one more computer by shifting the labor and capital previously used to make four pairs of shoes, eventually it would need to forgo progressively larger numbers of shoes to make each additional computer. This is because, in comparison to the optimal mixture of capital and labor to make a computer, the reduction in shoe production releases too much labor and too little capital. The computer industry would respond by turning to relatively more labor-intensive manufacturing processes, but, given that computers are optimally made using capital-intensive techniques, the productivity of the computer industry as a whole would at some point begin to decline. As a result, to keep building

38 State Power and World Markets

additional increments of a given number of computers, shoe production would have to drop by progressively larger and larger amounts. Returning to our example, rather than being able to produce one more computer by shifting the labor and capital that had been used to make four pairs of shoes, it would become necessary at some point to shift the labor that otherwise would yield five pairs of shoes, and then seven pairs, and so on.

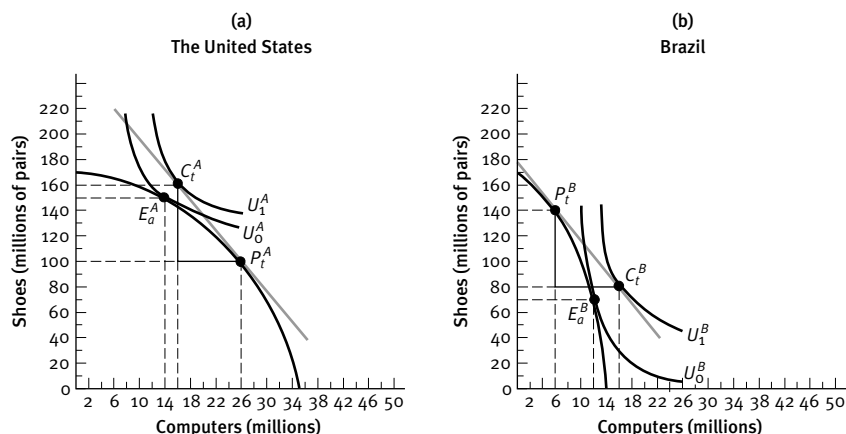
The result, according to neoclassical economic theory, is that the opportunity cost of computers in terms of forgone pairs of shoes increases as the United States makes more and more computers and fewer and fewer shoes. By the same logic, the opportunity cost of pairs of shoes in terms of forgone computers increases as Brazil makes more and more shoes and fewer and fewer computers. Eventually, as the United States and Brazil undertake specialization and trade, additional U.S. computer production becomes so expensive in terms of forgone shoes, and extra Brazilian shoe production becomes so costly in terms of forgone computers, that the opportunity costs between computers and shoes become equal across the two nations. At that point, which in all likelihood would occur prior to full specialization, neither of the two countries would have an incentive to specialize further. Hence, in the neoclassical model of increasing opportunity costs, the dual process of specialization on the basis of comparative advantage plus trade is mutually beneficial to the nations involved, but it is not likely to lead to full specialization by either partner in the good in which it has a comparative advantage.

We can observe the implications of increasing opportunity costs for trade in Essential Economics 2.4. As can be observed in the two graphs in the figure, increasing opportunity costs characterize the production possibilities frontiers for both the United States and Brazil: both are concave with respect to the origin. In autarky, as shown in Essential Economics 2.4(a), the United States is at the production-consumption equilibrium point E_a^A , at which it produces and consumes 14 million computers and 150 million pairs of shoes and enjoys a satisfaction level represented by the consumption indifference curve U_0^A . Brazil, as we can see in Essential Economics 2.4(b), finds itself in autarky at E_a^B , at which it produces and consumes 12 million computers and 70 million pairs of shoes and enjoys a level of satisfaction that is associated with the consumption indifference curve U_0^B .

With the possibility of trade, the United States begins to shift productive resources out of shoes and into computers, the good for which it has a comparative advantage, while Brazil begins to shift productive resources out of computers and into shoes, the good for which it has a comparative advantage. However, as we observed in connection to the outer frontier in Essen-

ESSENTIAL ECONOMICS 2.4

The Neoclassical Model of Trade



Core Principle

Increasing opportunity costs for trade cause specialization to end where opportunity costs and market clearance converge. Even partial specialization, when combined with trade, produces a consumption outcome for both countries that is superior to what is optimally possible in autarky.

tial Economics 2.1(b), we see in the panels of Essential Economics 2.4 that, as the United States produces more and more computers, its opportunity cost for one more computer in terms of pairs of shoes forgone increases, and as Brazil produces more and more shoes, its opportunity cost for one more pair of shoes in terms of computers forgone also rises. As a result, opportunity costs between shoes and computers come to be similar in each country.

The point at which specialization ends in both countries reflects both this tendency toward a convergence in opportunity costs and the clearing of the markets in both countries for computers and shoes (both domestically produced and demanded from the trading partner). Let us assume that markets clear at the hypothetical exchange ratio, both domestically and internationally, of 1 computer for 6 pairs of shoes. This exchange ratio is depicted by the faintly-drawn lines in the two panels in Essential Economics 2.4. With these

mutually agreed-upon terms of trade, the United States moves its production from E_a^A to P_t^A in Essential Economics 2.4(a), reducing its domestic production of shoes from 150 million to 100 million pairs and, with the productive resources thus released, increasing its computer output from 14 million to 26 million units. It then exports 10 million computers to Brazil in exchange for 60 million pairs of shoes; rather than consuming at E_a^A , the United States is now consuming at C_t^A .

If we compare C_t^A to E_a^A in Essential Economics 2.4(a), we find that even partial specialization, when combined with trade, produces a consumption outcome for the United States that is superior to what is optimally possible in autarky. Prior to trade, the United States is able to consume 14 million computers and 150 million pairs of shoes; with partial specialization and trade, it is able to consume 16 million computers and 160 million pairs of shoes. With partial specialization and trade, the United States, with no increase in resources, increases its consumption of both computers and shoes, and this is reflected in its movement from consumption indifference curve U_0^A to the higher curve U_1^A .

Brazil also faces in these circumstances the opportunity for an improvement in its consumption and overall satisfaction. If trade becomes possible, Brazil moves along its production possibilities frontier from E_a^B to P_t^B in Essential Economics 2.4(b): it produces 6 million computers rather than 12 million, and with the freed-up resources it increases shoe production from 70 million to 140 million pairs. As noted in the preceding paragraph, it then sends 60 million of those pairs to the United States in exchange for 10 million computers. This brings Brazil to the consumption point C_t^B , at 16 million computers and 80 million pairs of shoes. Brazil, then, also increases its consumption of both computers and shoes as a result of partial specialization and trade. This increased satisfaction is reflected in Brazil's movement from U_0^B to the higher indifference curve U_1^B in Essential Economics 2.4(b). Hence, even in the face of increasing costs, Brazil, like the United States, reaches a higher indifference curve by abandoning autarky and embracing specialization and trade.

Accounting for Differences in Comparative Advantage: Relative Factor Abundance and the Heckscher-Ohlin Theorem

In response, then, to the first of the questions that emerged from our exploration of the Ricardian model of trade—why we do not witness full special-

* ESSENTIAL ECONOMICS 2.5

Similarities and Differences between the Ricardian and Neoclassical Models of Trade

	RICARDIAN MODEL	NEOCLASSICAL MODEL
<i>Similarities in assumptions</i>		
Number of countries	2	2
Number of goods	2	2
Technology	Similar across countries	Similar across countries
Transportation costs	0	0
<i>Differences in assumptions</i>		
Factors of production	1 (labor)	2 or more (land, labor, capital)
Opportunity costs	Constant	Increasing
<i>Differences in results of trade</i>		
Specialization in production	Complete	Partial
Improved consumption	Yes	Yes

Core Principle

The Ricardian and neoclassical models of trade differ in their views of opportunity costs and specialization. The neoclassical model answers the Ricardian model's question about full specialization by highlighting the importance of increasing opportunity costs.

ization in the presence of international trade—neoclassical theory argues the following: countries can mutually benefit if they undertake specialization and trade because in the absence of trade they differ with regard to opportunity costs between goods, but specialization and trade eventually eliminate these differences and thus eliminate the incentive to trade or to specialize further. The key similarities and differences between the Ricardian and neoclassical models of trade are summarized in Essential Economics 2.5.

But what about the second question? Why is it that the United States has a comparative advantage in computers rather than shoes, whereas Brazil has a comparative advantage in shoes rather than computers? The Swedish economists Eli Heckscher in 1919 and Bertil Ohlin in 1930 provided a helpful response to this question by investigating the implications of adding to the neoclassical model the following assumptions:

42 State Power and World Markets

- Compared to the availability of capital and labor in one country, another country will have relatively more or less capital than labor (for example, the United States is a capital-abundant country, whereas Brazil is a labor-abundant country).
- Preferences or tastes for one commodity over another are similar across countries. Differences in the relative amounts of two goods that are produced and consumed in two countries prior to specialization and trade are therefore a reflection not of relative demand for those two goods but of differences in the relative costs of producing them in the two countries.

Working with these assumptions and those listed earlier under the neo-classical theory, Heckscher and Ohlin developed a crucially important line of analysis about trade. What has come to be known as the **Heckscher-Ohlin theorem** of the bases of trade suggests that a country will have a comparative advantage in, and thus will tend to export, those goods whose production requires the intensive use of the factor of production that it has in relative abundance.

In the Heckscher-Ohlin framework, because the United States, compared to Brazil, is abundant in capital rather than labor, the cost of capital, relative to wages, is likely to be lower in the United States than in Brazil. Given the earlier assumption that economically efficient production techniques are capital-intensive for computers and labor-intensive for shoes, the United States can produce computers at a lower cost and therefore at a lower price relative to shoes than can Brazil, and Brazil can produce shoes at a lower cost and price in comparison to computers than can the United States. This is equivalent to saying that the opportunity cost for producing an additional computer in terms of shoes forgone is lower in the United States than in Brazil.

The Heckscher-Ohlin line of inquiry thus suggests that differences across countries in their endowments of the factors of production, plus differences in the mixtures of factors of production with which different goods are optimally made, can explain why Brazil has a comparative advantage in shoes and the United States has a comparative advantage in computers. Given that the United States and Brazil face different relative prices of computers and shoes (and therefore different opportunity costs of one in terms of the other) as a result of the differences in their factor endowments and the factor intensities associated with the two products, the United States best improves its prospects for increasing its overall consumption of both computers and

shoes by specializing in computers and exchanging some for Brazilian shoes, whereas Brazil best improves its consumption opportunities by specializing in shoes and exporting some to the United States in exchange for computers.⁶

Why Protectionism? The Problem of the Domestic Distribution of the Gains from Trade

In our discussion so far, we have found that both the Ricardian and the neo-classical theories of trade yield the same basic argument about why nations engage in trade: nations are better off trading than remaining in autarky. Trade and specialization on the basis of comparative advantage are clear examples of the power of human ingenuity and rationality, for the increases in welfare in the two trading states result not from increases in capital or labor in the two countries, but rather from the more efficient use by each of its existing capital and labor resources and the construction of a new human institution: voluntary exchange across national boundaries.

Given these core findings, economists have generally supported freer trade among nations and have been highly skeptical of arguments favoring restrictions on trade, generally referred to as protection. Indeed, given the big gains that nations may attain from trade, it is hard to understand how anyone could rationally question the wisdom of efforts by nations to facilitate international commerce, or how someone could rationally support national policies that impair such exchange.

However, as we will see in this section, modern trade theory has identified and explored at least one dynamic associated with specialization and trade that could lead some groups within a country to have a perfectly rational basis for opposing freer trade, even though the country as a whole would benefit from more open trade.

To appreciate how economists have come to the view that there might in fact be a rational basis for some groups within a country to prefer protection over liberalization of trade, we proceed in three steps: first, we specify the main types and effects of protection; second, we review arguments for protectionism that economists find highly unpersuasive; and third, we present the argument for protection that, from the viewpoint of economic theory, may be persuasive or even compelling.

Types of Protection and Their Impact on National Welfare

Instruments of Trade Protection

Governments have three basic classes of protectionist measures at their disposal: tariffs, quotas, and non-tariff barriers.

TARIFFS

A **tariff** is a tax imposed by government on imported goods or services. Tariffs can be of two types. *Specific tariffs* impose a tax of a fixed amount on each unit of an item being imported. For example, the United States might charge \$5 for each and every pair of shoes imported into its territory, regardless of the import prices of different types of shoes. *Ad valorem* tariffs, by contrast, are based on the value of the items being imported. So, for example, the United States could impose a 25 percent tariff on each and every imported pair of shoes.

QUOTAS

As an alternative to a tariff, a government might impose a **quota** or a quantitative limit on the amount of a good or service that may be imported during a period of time. For example, at a given price for shoes in the United States, imports might total ten million pairs in a given year, but the United States might impose a quota of five million pairs on the importation of shoes per year, thus creating a shortage of five million pairs of shoes compared to what would have been supplied had the quota not been imposed.

NONTARIFF BARRIERS

A third option available to a government is to put into place policies that have the effect of increasing the cost of importing goods into the country; such policies are called **nontariff barriers**. For example, the United States might put into place a law that requires the U.S. military to purchase boots and other footwear only from U.S. sources, or the U.S. government could require health and safety certifications for imported shoes that are more onerous than such requirements for domestically produced shoes, or it could require burdensome and expensive paperwork for importers who seek to bring shoes through customs.

The Effects of Protection on National Welfare

Tariffs, quotas, and nontariff barriers raise the domestic prices of imported goods and thus reduce the price advantages in the domestic market that might otherwise be enjoyed by suppliers from countries with a comparative advantage in the good against which protection is being imposed. As a result, protection makes it less profitable for foreign producers to shift resources into the production of the protected good even though they have a comparative advantage in that good. At the same time, protection reduces the incentive for local producers to shift resources out of the production of goods for which their country does not have a comparative advantage and into goods for which the country does have a comparative advantage.

So, for example, if by virtue of imposing some form of extreme protection the U.S. government were to cause the relative prices of shoes and computers to be equal in both the United States and Brazil, U.S. consumers would no longer demand Brazilian shoes. As a result, the price of shoes in Brazil relative to computers would not go up, and Brazilian manufacturers would have no incentive to shift resources out of computers and into shoes. At the same time, with no additional supply of shoes from Brazil, or no Brazilian demand for U.S. computers, American producers would have no interest in shifting resources from shoes to computers. The imposition by the United States of extreme protection against shoe imports would, therefore, unwind the entire sequence of steps we have explored whereby the United States and Brazil specialize in the goods for which each has a comparative advantage and then engage in mutually attractive exchange. Both countries, as a result of protection, would lose the substantial increases in satisfaction that can be attained by specialization and exchange, even in the face of increasing opportunity costs.

Arguments for Protection Strongly Resisted by Economists

Economists, looking at the sort of welfare gains that are forgone when protection is imposed against imports, are unreceptive to most arguments in favor of protection. Two arguments are particularly unappealing to economists.

The “Unfair” Cheap Foreign Labor Argument

One argument in favor of protection that is often put forward in the United States and in Europe is that protection is legitimate and necessary because

46 State Power and World Markets

foreign countries compete on the basis of very cheap labor. Economists respond to this argument by emphasizing that absolute differences in labor costs by themselves do not create differences in comparative advantage across countries. Workers in a poor country may be paid 15 cents an hour while workers in the United States are paid \$15 an hour. However, if, as a result of having little in the way of shoe machinery, each worker in the poor country can produce only 1 pair of shoes per hour while an American worker using efficient machinery can produce 100 pairs an hour, then, from the viewpoint of labor cost per pair of shoes, shoe production would be as costly in the poor country (15 cents per pair) as in the United States (again, 15 cents per pair). It is not differences in the cost of any single factor of production, economists emphasize, but differences in the cross-national relative abundance and thus the cross-national *relative costs* of factors of production that drive comparative advantage.

The Infant-Industry Argument

Producers and workers in an industry that might be opened to trade or that is already under pressure from less-expensive imports sometimes bring forward the argument that, if their industry were given temporary protection, it would in fact become (or would again become) as competitive as foreign suppliers. Just as a cruel and unfair world imperils children, who therefore need the protection of their parents when they are young or they might not survive, so too, these producers and workers suggest, can trade prevent their “infant” industry from reaching its true potential as a world competitor. Similarly, just as children need less assistance from their parents as they grow up, so too, these claimants for protection suggest, would their industry eventually outgrow that temporary protection from foreign competition.

Economists emphasize that one key flaw with this *infant-industry argument* is that a government is likely to be unable to decide which among the many industries putting forward requests for protection on the basis of infant-industry claims are in fact worthy of protection. In addition, once an industry is afforded protection on infant-industry grounds, that industry has few incentives to become more competitive (after all, it has a protected market). As a result, the government may soon find itself confronting an uncompetitive industry and a hard choice between allowing that industry to remain in place, at the opportunity cost of the welfare gains that trade would afford, and permitting trade but forcing a larger and perhaps more painful realloca-

tion of national resources across sectors than would have been necessary had it not afforded protection to the infant industry in the first place.

The Stolper-Samuelson Theorem and a Rational Preference for Protection

From the viewpoint of modern trade theory, cheap-labor and infant-industry arguments for protection are usually ill founded. However, from the viewpoint of that theory, at least one possible set of circumstances could provide some groups within a country with a rational basis for opposing freer trade. The line of analysis that identified and explained that set of consequences was put forward by economists Wolfgang Stolper and Paul Samuelson (the latter a Nobel laureate) in 1941, and the important result of their analysis is known in economics as the ***Stolper-Samuelson theorem***.

This theorem explores the effects of the opening of a country to trade on the returns and hence the incomes of factor owners (for example, workers, capital owners, or landowners) as their countries specialize on the basis of comparative advantage as envisioned in the Heckscher-Ohlin framework—that is, as the country specializes in those goods whose most efficient production employs intensively the factor of production that is in abundance in that country. The Stolper-Samuelson theorem suggests that such specialization can cause the owners of the relatively abundant factor to experience a gain in their returns and real incomes, but can cause the owners of the relatively scarce factor to sustain a drop in their returns and real incomes. This dichotomy will result from changes in the demand for factors of production as specialization proceeds on the basis of comparative advantage.

For example, in our case involving the United States and Brazil, when trade commences, U.S. computer manufacturers will encounter an increase in demand for their product, and to meet that increased demand they will want to expand production. To do so they will need some additional labor and a lot of additional capital equipment, for computers are a capital-intensive product. In our earlier discussion, we identified the source from which both sets of additional inputs would come: the shoe industry. But we did not reflect on why capital will move from the shoe industry to the computer industry. The answer is that computer manufacturers, in dire need of capital, will be willing to pay higher prices for it, and it is the prospect of receiving such higher returns that induces some of the owners of capital

48 State Power and World Markets

equipment in the shoe industry to provide it to the computer makers. Only the payment of that higher price by shoe manufacturers will prevent other capital owners from also abandoning the shoe industry.

Hence, higher demand for computers will lead to higher demand for capital equipment, and, in the face of that higher demand for capital, capital owners in both the computer and the shoe industries will enjoy a higher return and thus an increase in their incomes. Prices of computers in the United States would also go up as computer demand escalated in the face of the new export market in Brazil, but the Stolper-Samuelson model suggests that the percentage increase in the return to capital would be greater than the percentage increase in the price of computers. Therefore, capital owners would enjoy not just an increase in the returns to their factor of production, but also an increase in their *real income* (that is, an increase in their income after taking into account price changes) even if they purchased only computers. Thus, owners of the relatively abundant factor of production gain from an opening of trade.

Owners of the relatively scarce factor—in the present discussion, labor—face a different situation when specialization and trade go forward. As we have just seen, the computer industry will expand its production by drawing both capital and labor from the shoe industry. Let us also recall that, by assumption, compared to each pair of shoes, each computer is made using a great deal of capital and not much labor. Therefore, compared to the optimal combination of capital and labor needed to make computers, too much labor is being released relative to the amount of capital that is becoming available as shoe production contracts. As a result, more workers are available than are required for employment in the computer industry and the now-reduced shoe industry, *given the current production methods using capital and labor in the two industries*. Workers laid off from shoe factories who were unable to get jobs in the expanding (but capital-intensive) computer industry would respond to their situation by offering to accept lower wages if offered a position in either industry, and, in the face of decreasing costs for labor, both industries would hire these less costly workers and maintain overall output by moving to more labor-intensive manufacturing processes. Hence, in the face of specialization and trade, owners of the relatively scarce resource in the United States (labor) would experience a decline in their returns (that is, their wages), and, according to the Stolper-Samuelson theorem, this decline in wages would not be offset by the percentage decline in the prices of shoes as the latter became more plentiful through imports from Brazil. Workers would, in sum, experience a decline in their real incomes.

In sum, although specialization and exchange with Brazil would make the

United States as a whole better off, the Stolper-Samuelson theorem provides a basis for finding that a particular group within the United States—U.S. workers—would be worse off as a result of such a move to specialization and commerce. Hence, although the United States as a national community might have a rational incentive to pursue trade liberalization, U.S. workers would have a rational basis for resisting such a liberalization of exchange. Similarly, although the Stolper-Samuelson theorem would help us understand why workers in Brazil, as the owners of the relatively abundant factor of production in that country, would unambiguously gain from trade and thus rationally would have an incentive to press for trade with the United States, the theorem would also lead us to expect that Brazilian capital owners would rationally oppose such trade.

The main response by modern trade theory to the implication of the Stolper-Samuelson theorem (that some groups within a country may have a rational preference for protection) is that the gains from exchange are so great that those who win from trade liberalization could offer compensatory payments to those who lose, and both groups would still be better off with trade than with autarky. Will that occur, and if so, what will be the form of compensation? Will the country instead respond to demands for protection by imposing restraints on trade to some degree, even if this reduces the nation's overall gains from trade? Or will the country pursue liberalization without compensating domestic losers? These questions concern the politics and political institutions of the country considering liberalization, the subjects of Chapters 4 and 5.

Recent Developments in International Trade Theory

Ricardo's insight into comparative advantage and mutually advantageous trade, the neoclassical identification of increasing costs as a constraint on specialization, the Heckscher-Ohlin understanding of the sources of comparative advantage, and the Stolper-Samuelson theorem regarding possible problems with the distribution of the gains from trade remain at the heart of the analysis by modern economists of the sources and consequences of trade. In recent years, economists have sought to engage and, to some degree, amend the neoclassical model in order to press ahead on two important research frontiers regarding trade: trade's relationship to economic growth, and the importance of intra-industry rather than inter-industry exchanges across nations.⁷

The Benefits from Trade: From Greater Consumption to Higher Economic Growth

Our exploration of economic theory has shown how trade can yield new opportunities for countries to achieve higher levels of consumption. In recent years, economists have also turned their attention to the way in which trade might also help nations enjoy faster long-term rates of economic growth.

The capacity for international trade to improve the aggregate growth rate of a country during the period in which integration is occurring has long been recognized by employment of the model of trade outlined in this chapter.⁸ The fundamental insight of this model is that, as a country opens itself to world markets, it specializes in the production of a narrower range of goods, the precise choice of which depends on the country's endowment of productive factors, local and world tastes for and prices of goods, and the state of world technology (which is assumed to be available to all nations for any given good). This narrowing of a country's product range may in turn create opportunities for the enjoyment of increasing returns to scale over some range of the production runs of these goods. For example, by making more shoes, Brazil may enjoy economies of scale resulting from larger runs of particular types of shoe. This enjoyment of economies of scale permits an increase in the country's aggregate growth rate. However, according to the increasing-costs model of trade described earlier, declining economies of scale would eventually curtail the capacity of this specialization to boost the rate of economic growth for the country as a whole.⁹

Yet recent economic analysis highlights opportunities for trade to increase the long-term economic growth rates of countries well beyond that anticipated by the standard model of trade described in this chapter. What is often termed "endogenous growth theory" identifies the ways in which economic growth and especially intense inter-firm competition in the context of a growing economy may motivate entrepreneurs to seek out technological innovations. Technological innovations, in turn, produce increases in the productivity of labor and capital, which, in turn, boost the rate of national growth.¹⁰ Openness to trade, the new theory suggests and a number of empirical tests appear to confirm, can enhance the long-term growth trajectory of nations, because trade expands market opportunities for home producers as well as instigates greater competition for them, and thereby it both encourages and compels these firms to seek out and to invest in new technology. Moreover, trade creates new opportunities for local firms to gain access to new, superior technologies from abroad. Through these and other mecha-

nisms, economists find, trade has a good chance of increasing the productivity of the factors of production and thereby enhances national growth rates.¹¹

Economists caution, however, that although trade between advanced industrialized countries—that is, between countries that are similarly well endowed with capital and technological capabilities—is likely to act as described above, it is at least possible that developing countries that are lacking in such resources may not find that trade with industrialized countries will impart to their developing economies the same pressures and opportunities to innovate. Thus, it is not certain that trade with industrialized countries, by prompting the search for and facilitating the acquisition of new technology, will necessarily place developing countries on higher long-term growth trajectories than would be possible in the absence of trade.¹² For example, while emphasizing that they do not suggest that developing countries would necessarily be better off by closing their economies to the world, economists central to endogenous growth theory have noted that if the products in which developing countries are prompted to specialize as a result of trade are not associated with substantial opportunities for technical improvements, then trade might not contribute very much to the rate of technological advance in those countries and thus it might not deliver the positive dynamics identified in endogenous growth theory.¹³

The Content of International Commerce: From Inter-Industry to Intra-industry Trade

The neoclassical increasing-costs model of trade that we presented in this chapter is concerned with explaining why two countries would gain from the trade of two commodities that are constituents of very different industries (in our examples, shoes and computers). For some time, however, economists have recognized and have sought to understand why much of the international commerce we actually see in the world consists not of such *inter-industry trade*, but of *intra-industry trade*.

Intra-industry trade consists of the exchange between countries of goods in the same industry.¹⁴ For example, the biggest single category of U.S. exports to and imports from Mexico in 1998 consisted of electrical machinery, equipment, and related parts. This category of goods constituted about 24 percent of the total dollar value of U.S. exports to Mexico that year, and it also constituted 27 percent of the total dollar value of U.S. imports from Mexico. More generally, in the late 1990s, intra-industry trade accounted for

about 57 percent of all U.S. trade, 60 percent of all trade by European countries, and 20 percent of all trade by Japan.¹⁵

This large volume of intra-industry trade has prompted economists to reflect upon a number of features of the neoclassical model of trade. For example, in our discussion of that model, it was assumed that goods are *homogeneous* across producers both within and among countries: for example, the shoes made in the United States are all exactly the same as those made in Brazil. Economists have noted that, from the viewpoint of consumers, goods are in fact often *differentiated*: for example, automobiles are differentiated in the eyes of consumers in terms of being speedy or being fuel-efficient. Hence, one reason we might observe intra-industry trade, economists have suggested, is that while some consumers in a country may prefer one variety of a given good, others may prefer another variety of the same good, and whereas one country might have a comparative advantage in the one variety, another country might have a comparative advantage in the other.

But how might this difference in comparative advantage come into being? Here again, economists have reconsidered elements of the neoclassical model of trade. As we have seen, that model assumes increasing opportunity costs as a country shifts from the production of one good to the production of another. One reason for such increasing costs was emphasized in our discussion regarding U.S. specialization in computers: as the United States increases computer production by drawing resources from the shoe industry, it must make use of progressively larger amounts of the “wrong” factor for computer manufacturing—that is, labor. A second reason might also explain increasing opportunity costs between shoes and computers: *decreasing returns to scale*. As firms in the computer industry grow bigger and bigger, each proportional increment of labor and capital used in production may result in fewer and fewer additional computers being built. A variety of circumstances may cause decreasing returns to scale. Managers, for example, may experience “bureaucratic diseconomies of scale”—that is, they may become progressively less able to coordinate production at their firms as those firms become larger and larger.

Yet recent economic analyses have suggested that often we see not decreasing but *increasing returns to scale* within a firm, at least up to a point. In other words, the larger the number of computers already being built by a firm, the cheaper it is to build the next increment of computers, at least up to some very large number of computers produced. The consequence of increasing returns to scale might be an inversion of the production possibilities frontier facing a country: over some significant range of production possibili-

ties, the curve might be convex rather than concave! If this is correct, then as the firms in a country specialize in a particular variety of a good, they will enjoy an ever-greater comparative advantage in that particular variety. Although it might be chance that determines which countries specialize in which varieties of goods, once they begin to specialize, increasing returns to scale may prompt them to devote ever-greater resources to those varieties in which they started to specialize in the first place.

Finally, we noted earlier that the Stolper-Samuelson theorem provides a basis for expecting some elements of society to lose from trade and thus to have a rational basis for seeking to prevent or to undo efforts by countries to pursue trade liberalization. This line of reasoning may be correct with respect to the effects of inter-industry trade on domestic income distribution. However, economists have suggested that *intra*-industry specialization does not require the sort of large redeployments of resources across industries that may be associated with inter-industry trade.

In the neoclassical model of inter-industry trade, workers in a capital-abundant country experience a decline in their real wages as the country moves from the production of labor-intensive to capital-intensive goods. However, if intra-industry trade prompts the movement of labor within that country from one segment of a given industry into another segment of the very same industry, then wages are likely to be adversely affected to a much smaller degree, and, given that intra-industry trade augments the variety of goods available within the country, workers might actually experience a net improvement in their overall welfare through such trade.¹⁶ Intra-industry trade then, is less costly in terms of domestic adjustment, less disruptive in terms of inducing shifts in national income distributions, and less likely to prompt demands for or movements toward protection as a country opens itself to the world trading system. These characteristics of intra-industry trade may in turn have prompted governments to liberalize trade since World War II in a manner that has fostered and perhaps even accelerated the development of intra-industry trade.¹⁷

Conclusion

In this chapter we have offered a thumbnail sketch of how economic theory helps us understand why states engage in international trade. Trade occurs between countries because it can be mutually advantageous. Two states can

54 State Power and World Markets

both benefit if each specializes on the basis of comparative advantage and engages in mutually voluntary trade. A country's comparative advantage is likely to reflect its endowment of such resources as labor, capital, and land.

Although a nation as a whole stands to gain from international trade, some segments of society within a nation may lose. In particular, owners of the relatively scarce factor of production may experience a reduction in their incomes. Society as a whole may choose to compensate those who lose from an opening of the country to trade. However, economic theory cannot tell us whether that will happen, how it will happen, the degree to which it will happen, whether the nation will instead choose economic closure, or whether society will choose openness without compensation of those left behind. Those questions require analysis of political institutions and dynamics both within and across nations, which we will turn to in Chapters 4 and 5.

Notes

¹This paragraph is inspired by the famous economist John Maynard Keynes's reflections on life in 1914 for "an inhabitant in London" at the height and, as it turned out, the end of the first "Golden Era" of global economic integration. See Primary Document 7.1 on page 206 for those reflections.

²U.S. Department of Commerce, International Trade Administration, "U.S. Trade by Commodity with Brazil," available at www.ita.doc.gov/td/industry/otea/usfth/top80cty/brazil.cp. Brazilian aircraft exports to the United States grew in importance at the end of the 1990s: these totaled about \$1.2 billion in 1999 and \$1.5 billion in 2000, surpassing footwear exports in each of those years.

³On efforts by Brazil to foster the emergence of an indigenous computer-hardware industry, with only limited success, see Peter B. Evans, *Embedded Autonomy: States and Industrial Transformation* (Princeton: Princeton University Press, 1995).

⁴For a superb analysis of Ricardo's model of trade and the overall historical development of international trade theory, see Douglas Irwin, *Against the Tide: An Intellectual History of Free Trade* (Princeton: Princeton University Press, 1996); and John S. Chipman, "International Trade," in John Eatwell, Murray Milgate, and Peter Newman, eds., *The New Palgrave: A Dictionary of Economics* (London: Macmillan, 1991), esp. pp. 937–52.

⁵There might be additional factors of production that are economically meaningful for some goods, such as land with respect to agricultural goods.

⁶However, if tastes in the United States were such that its consumers had a much stronger preference for computers over shoes than did Brazilians, then it might be the case that, in light of increasing costs, local demand-driven high production of computers in the United States could cause the opportunity costs between (and therefore the relative prices of) computers and shoes to be equal to those in Brazil, thus undermining the basis for specialization by either or trade between them. It is for this reason that the Heckscher-Ohlin theorem assumes that tastes

between countries are not so dissimilar as to bring about a demand-led equalization of opportunity costs.

⁷A third characteristic of international trade is garnering increasing attention—namely, the large incidence of intra-firm exchanges as a component of total world trade. According to an analysis by the United Nations Conference on Trade and Development (UNCTAD), for example, exports by firms to their own affiliates in other countries totaled about \$2.3 trillion in 1998, which is about 34 percent of the total of \$6.7 trillion in world exports recorded that year. See UNCTAD, *World Investment Report 1999* (Geneva: UNCTAD, 1999), Table 5, p. 10.

⁸Very useful overviews of the theoretical and empirical studies relating economic openness to national economic growth are provided by Sebastian Edwards, “Openness, Trade Liberalization, and Growth in Developing Countries,” *Journal of Economic Literature* 31 (September 1993), pp. 1358–93; and Sebastian Edwards, “Openness, Productivity, and Growth: What Do We Really Know?” *Economic Journal* 108 (March 1998), pp. 383–98.

⁹For a helpful graphical treatment of how, according to the basic increasing-costs model of trade, an outward movement of the production possibilities frontier results from the achievement of economies of scale after specialization and trade, see Richard E. Caves, Jeffrey A. Frankel, and Ronald W. Jones, *World Trade and Payments: An Introduction* (Reading, MA: Addison-Wesley, 1999), pp. 36–39.

¹⁰In this model, the sources of technological change and thus future economic growth are internal, or *endogenous*, to current economic processes, thus yielding the term “endogenous growth theory.”

¹¹A key early statement of endogenous growth theory was put forward by Paul M. Romer, “Increasing Returns and Long-Run Growth,” *Journal of Political Economy* 94 (October 1986), pp. 1002–37. Romer presents an important intellectual history of the development of the endogenous growth research program in “The Origins of Endogenous Growth,” *Journal of Economic Perspectives* 8 (winter 1994), pp. 3–22. A useful juxtaposition of the main elements of endogenous growth theory with that of the traditional model of growth, formulated by Robert Solow, is presented by David M. Gould and Roy J. Ruffin, “What Determines Economic Growth,” *Economic Review of the Federal Reserve Bank of Dallas* (2nd quarter 1993), pp. 25–40. For empirical studies that link international economic openness to investments in innovations and thus medium-term greater economic growth, see Edwards, “Openness, Productivity, and Growth,” and Robert Z. Lawrence and David E. Weinstein, “Trade and Growth: Import-Led or Export-Led? Evidence from Japan and Korea,” National Bureau of Economic Research Working Paper 7264 (July 1999), available at www.nber.org/papers/w7264.

¹²As a result, Luis Rivera-Batiz and Paul Romer, for example, emphasize that their work on the manner in which trade prompts technical advances and thus growth is restricted to the circumstance in which both countries have advanced research-and-development capabilities. See Luis A. Rivera-Batiz and Paul M. Romer, “Economic Integration and Endogenous Growth,” *Quarterly Journal of Economics* 106 (May 1991), esp. pp. 532 and 550.

¹³Gene M. Grossman and Elhanan Helpman, “Endogenous Innovation in the Theory of Growth,” *Journal of Economic Perspectives* 8 (winter 1994), pp. 440–41.

¹⁴For a key early work on this subject, see H. G. Grubel and P. L. Lloyd, *Intra-industry Trade: The Theory and Measurement of International Trade in Differentiated Products* (New York: Wiley, 1975).

56 State Power and World Markets

¹⁵Roy Ruffin, "The Nature and Significance of Intra-Industry Trade," *Economic and Financial Review of the Federal Reserve Bank of Dallas* (4th quarter, 1999), pp. 7–8.

¹⁶See Paul R. Krugman, "Intraindustry Specialization and the Gains from Trade," *Journal of Political Economy* 89 (October 1981), pp. 959–73.

¹⁷For interesting discussions of the political implications of intra-industry trade, see Howard P. Marvel and Edward John Ray, "Intraindustry Trade: Sources and Effects on Protection," *Journal of Political Economy* 95 (December 1987), pp. 1278–91; Charles Lipson, "The Transformation of Trade: The Sources and Effects of Regime Change," in Stephen D. Krasner, ed., *International Regimes* (Ithaca: Cornell University Press, 1983), pp. 258–62; and Beth V. Yarbrough and Robert M. Yarbrough, *The World Economy: Trade and Finance* (Fort Worth: The Dryden Press, 1994).