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Salvatore
INTERNATIONAL
ECONOMICS
EIGHTH
EDITION

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INTERNATIONAL ECONOMICS

EIGHTH EDITION

CHAPTER 1
Introduction

1.1 Importance of International Economics

When an American purchases a Canon copier or a Sony television set, a BMW automobile or a bottle of Beck's beer, a Michelin tire or a bottle of Courvoisier cognac, a box of Perugina chocolates or a Fendi handbag, J & B scotch or a Burberry's raincoat, he or she is obviously buying a foreign product. These are but a few examples of the numerous products available to American consumers that are obviously made in and imported from other nations. Often we are not aware that the products we use, or parts of them, were in fact produced abroad.

For example, imported cloth is used in American-made suits, most of the parts and components of a Dell PC are actually manufactured abroad (see Case Study 1-1), and it may even be difficult to determine what is an American car (see Case Study 1-2). Many American brand-name shoes are manufactured entirely abroad, the mineral tungsten in our light bulbs is imported, and so are all the coffee we

Case Study 1-1 The Dell PC Is All But American!

Headquartered in Round Rock, Texas, Dell coordinates a global production network in 34 countries in the Americas, Europe, and Asia. For most of the PCs sold in the United States, Dell performs only the final assembly domestically and relies on outside suppliers and contract manufacturers for components, peripherals, printed circuit board (PCB) assemblies, and subassemblies (box builds). The reason is that most parts and components are cheaper to produce in other parts of the world and are thus imported (see Table 1.1). Neither high-value components nor very low-value components (such as power supplies or keyboards) have to be made close to Dell's assembly plants. Only some midlevel components (such as motherboards and other PCB assemblies) which are too expensive to ship by air to meet volatility in demand and too risky to hold in inventory, are produced locally, but even that is not always the case.

TABLE 1.1. *Locations and Companies That Supply Specific Parts and Components for Dell PCs*

Monitors	Europe and Asia (Phillips, Nokia, Samsung, Sony, Acer)
PCBs	Asia, Scotland, and Eastern Europe (SCI, Celestica)
Drives	Asia, mainly Singapore (Seagate, Maxtor, Western Digital)
Printers	Europe (Barcelona)
Box builds	Asia and Eastern Europe (Hon Hai/Foxteq)
Chassis	Asia and Ireland (Hon Hai/Foxteq)

Source: J. Dedrick and K. L. Kraemer (2002): "Dell Computer: Organization of a Global Production Network" and "Globalization of the Personal Computer Industry: Trends and Implications," *Working Papers,* Irvine, CA: Center for Research on Information Technology and Organizations (CRITO), University of California, Irvine, 2002.

As tourists, we need to exchange American dollars for Canadian dollars, Mexican pesos, euros (the new currency of the 12-country European Monetary Union), British pounds, Japanese yen, and so on to pay for hotel rooms, meals, sightseeing trips, and souvenirs. Our news programs and the pages of our daily newspapers are filled with reports of trade controversies between the United States and Europe, demands for protection of our textile and steel industries against imports, fears that Europe will turn more protectionistic as it achieves full economic and monetary integration, complaints that Japan does not allow American products to be sold there as freely as Japanese products are sold in the United States, fears that inadequate macroeconomic policy coordination among the leading industrial countries may lead to the spread of recessionary pressures internationally and to an unstable world economy, and so on.

Similarly, concern is often expressed about the problems arising from legal and illegal migration, international capital movements and the operation of multinational corporations, the risk of complete economic collapse in Argentina and failure

Case Study 1-2 What Is an "American" Car?

Strange as it may seem, the question of what is an American car may be difficult to answer. Should a Honda Accord produced in Ohio be considered American? What about a Chrysler minivan produced in Canada (especially now that Chrysler has become part of Germany's Daimler Chrysler)? Is a Kentucky Toyota or Mazda that uses nearly 50 percent of imported Japanese parts American? Clearly, it is becoming more and more difficult to define what is American, and opinions differ widely.

For some, any vehicle assembled in North America (the United States, Canada, and Mexico) should be considered American because these vehicles use U.S.-made parts. But the United Auto Workers union views cars built in Canada and Mexico as taking away U.S. jobs. Some regard automobiles produced by Japanese-owned plants in the United States as American because they provide jobs for Americans. Others regard production by these Japanese "transplants" as foreign because (1) the jobs they create were taken from the U.S. automakers, (2) they use nearly 40 percent of imported Japanese parts, and (3) they remit profits to Japan. What if Japanese transplants increased their use of American parts to 75 percent or 90 percent? Is the Ford Probe, built for Ford by Mazda in Mazda's Michigan plant, American?

It is difficult to decide exactly what is an American car—even after the American Automobile Labeling Act of 1992, which requires all automobiles sold in the United States to indicate what percentage of the car's parts are domestic or foreign. One could even ask if this question is relevant at all in a world growing more and more interdependent and globalized. In order to be competitive, automakers must purchase parts and components wherever they are cheaper and better made, and they must sell automobiles throughout the world to achieve economies of mass production. Ford designs its automobiles in seven locations (two in the United States, and one each in the United Kingdom, Germany, Italy, Japan, and Australia), has production facilities in 30 locations (3 in North America, 3 in South America, 7 in Asia, and 17 in Europe), and employs more workers outside than within the United States. In fact, the automotive market, as many other markets, is rapidly moving toward a handful of truly global, independent companies in each industry.

Sources: "Honda's Nationality Proves Troublesome for Free-Trade Pact," *The New York Times,* October 9, 1992, p. 1; "Want a U.S. Car? Read the Label," *The New York Times,* September 18, 1994, Section 3, p. 6; "Made in America? Not Exactly: Transplants Use Japanese Car Parts," *The Wall Street Journal,* September 1, 1995, p. A3B; "Ford Hopes Its New Focus Will Be a Global Bestseller," *The Wall Street Journal,* October 8, 1998, p. B10; "Auto Sales," *The Wall Street Journal,* January 4, 2002, p. A3; and "Hot Dogs, Apple Pie and Toyota," *The New York Times,* February 17, 2002, p. 1.

of the world and the possibility of recurring famine in Africa, the leakages of high-technology secrets and exports of nuclear material, and the danger of financial crises and international financial instability.

All of these topics and many more are either directly or indirectly the subject matter of international economics. Some knowledge of international economics is thus necessary to understand what goes on in the world of today and to be informed consumers, citizens,

for numerous jobs in multinational corporations, international banking, government agencies such as the Department of Commerce, and international organizations such as the United Nations, the World Bank, and the International Monetary Fund.

1.2 International Trade and the Nation's Standard of Living

The United States, stretching across a continent and rich in a variety of human and natural resources, can produce, relatively efficiently, most of the products it needs. Contrast this with the situation of small industrial countries, such as Switzerland or Austria, that have a few very specialized resources, and produce and export a much smaller range of products, and import all the rest. Even large industrial countries such as Japan, Germany, France, England, Italy, and Canada rely crucially on international trade. For developing nations, exports provide employment opportunities and earnings to pay for the many products that they cannot now produce at home and for the advanced technology that they need.

A rough measure of the economic relationship among nations, or their **interdependence**, is given by the ratio of their imports and exports of goods and services to their gross domestic product (GDP). The GDP refers to the total value of all goods and services produced in the nation. Figure 1.1 shows that imports and exports as a percentage of GDP are much larger for smaller industrial and developing countries than they are for the United States. Thus, international trade is even more important to most other nations than it is to the United States.

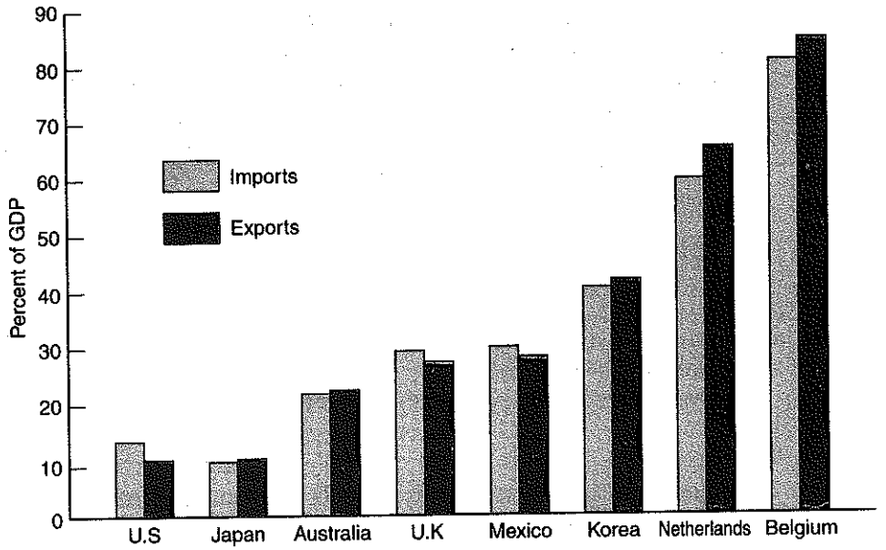

FIGURE 1.1. Imports and Exports as a Percentage of GDP in Various Countries in 2001. International trade (imports and exports) is even more important to most other smaller industrial and developing countries than it is to the United States.

Even though the United States relies to a relatively small extent on international trade, a great deal of its high standard of living depends on it. First of all, there are many commodities—coffee, bananas, cocoa, tea, scotch, cognac—that the country does not produce at all. In addition, the United States has no deposits of such minerals as tin, tungsten, and chromium, which are important to certain industrial processes, and it has only dwindling reserves of petroleum, copper, and many other minerals. Much more important *quantitatively* for the nation's standard of living are the many products that could be produced domestically but only at a higher cost than abroad. We will see later that these account for most of the *benefits or gains from trade.*

Nevertheless, the United States could probably withdraw from world trade and still survive without too drastic a decline in its standard of living. The same cannot be said of such nations as Japan, Germany, England, or Italy—not to speak of Switzerland or Austria. Even Russia and China, which for political and military reasons have valued self-sufficiency very highly in the past, have now come to acknowledge their need to import high-technology products, foreign capital, and even grains, soybeans, and other agricultural commodities, and at the same time be able to export large quantities of their goods and services in order to pay for all the imports they need.

In general, the economic interdependence among nations has been increasing over the years, as measured by the more rapid growth of world trade than world production (see Figure 1.2). This has certainly been the case for the United States during the past four decades (see Case Study 1-3). The only exception to world trade rising, and rising faster than world GDP, was in 2001, when world GDP rose slightly but world

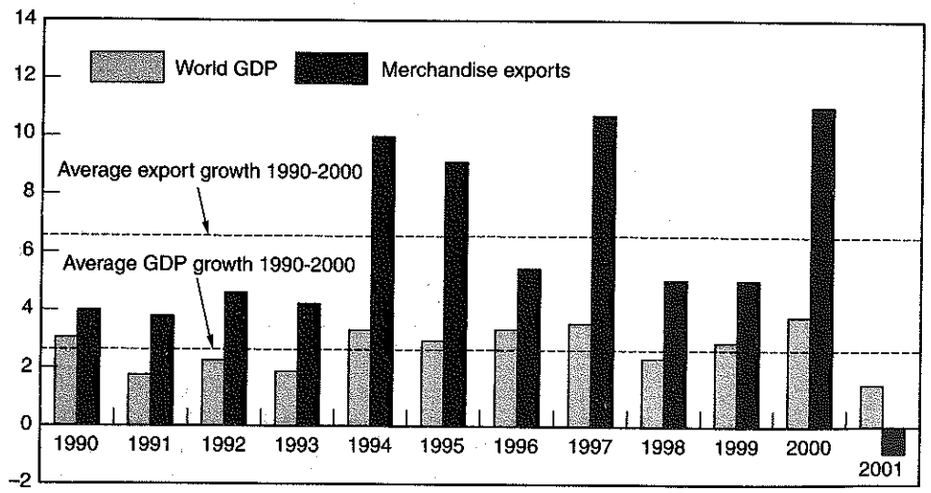

FIGURE 1.2. Growth of World Production and Trade, 1990–2001 (annual percentage changes). International trade grew much faster than world production from 1990 to 2001, except in 2001, when production grew slightly but trade declined.

Case Study 1-3 Rising Importance of International Trade to the United States

After remaining at between 4 and 5 percent during most of the 1960s, imports and exports as percentages of gross domestic product (GDP) rose sharply in the United States during the 1970s. Figure 1.3 shows that imports as a percentage of U.S. GDP increased from about 5 percent during the late 1960s to nearly 11 percent of GDP in 1980 and were 13.5 percent in 2001. Exports increased from about 5 percent in the late 1960s to more than 10 percent in 1980 and were 10.3 percent of GDP in 2001. Thus, international trade has become more important to the United States (i.e., the United States has become more interdependent with the world economy) during the past four decades. Figure 1.3 also shows that the share of imports in GDP exceeded the share of exports since 1976 and that the excess widened sharply during the first half of the 1980s and then again from 1997 to 2000. This led to huge U.S. trade deficits and persistent demands for protection of domestic markets and jobs against foreign competition by American industry and labor during the 1980s.

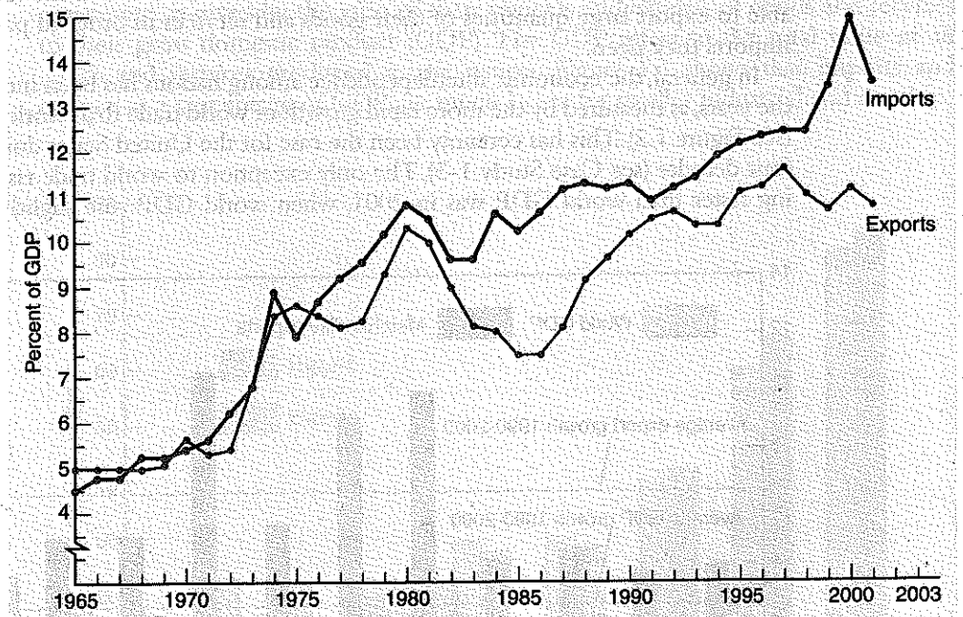

FIGURE 1.3. Imports and Exports as a Percentage of U.S. GDP, 1965–2001. The share of imports and exports in U.S. GDP has increased sharply since the early 1970s. Thus, international trade has become increasingly important to the United States. During the first half of the 1980s, and again from 1997 to 2000, U.S. imports greatly exceeded U.S. exports, resulting in huge trade deficits for the United States.

Source: International Monetary Fund, *International Financial Statistics Yearbook* (Washington, D.C., Various Issues).

trade actually declined by 1 percent (the first such a decline since 1982–1983). To a large extent this was due to the economic recession in the United States in 2001 and the fear of terrorism following the September 11, 2001, attack on the World Trade Center in New York City. In all likelihood, world trade will resume its growth in the future and continue to serve as a strong stimulus to world growth. (The appendix to this chapter provides data on the commodity and geographic concentration of international trade, as well as on the world's leading exporters and importers of goods and services; Case Study 13-1 gives the major commodity exports and imports of the United States, and Case Study 13-2 its major trade partners.)

But there are many other crucial ways in which nations are interdependent, so that economic events and policies in one nation significantly affect other nations (and vice versa). For example, if the United States stimulates its economy, part of the increased demand for goods and services by its citizens spills into imports, which stimulate the economies of other nations that export those commodities. On the other hand, an increase in interest rates in the United States will attract funds (capital) from abroad. As we will see in Part Four of the text, this inflow of funds to the United States, by itself, tends to increase the international value of the dollar, which in turn stimulates U.S. imports and discourages U.S. exports. This then leads to a trade deficit, which dampens economic activity in the United States and stimulates economic activity abroad.

Finally, trade negotiations that reduce trade barriers across nations may lead to an increase in the exports of high-technology goods (such as computers) and thus to an increase in employment and wages in those industries in the United States, but it may also lead to an increase in imports of shoes and textiles, thereby reducing employment and wages in those sectors. Thus, we see how closely linked, or interdependent, nations are in today's world and how government policies aimed at solving purely domestic problems can have significant international repercussions.

1.3 The Subject Matter of International Economics

International economics deals with the economic and financial interdependence among nations. It analyzes the flow of goods, services, payments, and monies between a nation and the rest of the world, the policies directed at regulating these flows, and their effect on the nation's welfare. This economic and financial interdependence is affected by, and in turn influences, the political, social, cultural, and military relations among nations.

Specifically, international economics deals with international trade theory, international trade policy, the balance of payments and foreign exchange markets, and open-economy macroeconomics. **International trade theory** analyzes the basis and the gains from trade. **International trade policy** examines the reasons for and the effects of trade restrictions and **new protectionism.** The **balance of payments** measures a nation's total receipts from and the total payments to the rest of the world, while **foreign exchange markets** are the institutional framework for the exchange of one national currency for others. Finally, open-economy macro-

disequilibria (deficits and surpluses). More importantly, it analyzes the relationship between the internal and the external sectors of the economy of a nation, and how they are interrelated or interdependent with the rest of the world economy under different international monetary systems.

International trade theory and policies are the **microeconomic** aspects of international economics because they deal with *individual* nations treated as single units and with the (relative) price of *individual* commodities. On the other hand, since the balance of payments deals with *total* receipts and payments, as well as with adjustment and other economic policies that affect the level of *national* income and the *general* price of the nation as a whole, they represent the **macroeconomic** aspects of international economics. These are often referred to as **open-economy macroeconomics** or **international finance**.

International economic relations differ from interregional economic relations (i.e., the economic relations among different parts of the same nation), thus requiring somewhat different tools of analysis and justifying international economics as a distinct branch of economics. That is, nations usually impose some restrictions on the flow of goods, services, and factors across their borders, but not internally. In addition, international flows are to some extent hampered by differences in language, customs, and laws. Furthermore, international flows of goods, services, and resources give rise to payments and receipts in foreign currencies, which change in value over time.

International economics has enjoyed a long, continuous, and rich development over the past two centuries, with contributions from some of the world's most distinguished economists, from *Adam Smith* to *David Ricardo, John Stuart Mill, Alfred Marshall, John Maynard Keynes,* and *Paul Samuelson.* We will be examining the contribution made by each of these and other great economists in the following chapters. Other special branches of economics are of more recent vintage, and none can claim such a distinguished list of contributors and background.

1.4 Purpose of International Economic Theories and Policies

The purpose of economic theory in general is to predict and explain. That is, economic theory abstracts from the details surrounding an economic event in order to isolate the few variables and relationships deemed most important in predicting and explaining the event. Along these lines, international economic theory usually assumes a two-nation, two-commodity, and two-factor world. It further assumes no trade restrictions to begin with, perfect mobility of factors within the nations but no international mobility, perfect competition in all commodity and factor markets, and no transportation costs.

These assumptions may seem unduly restrictive. However, most of the conclusions reached on the basis of these simplifying assumptions hold even when they are relaxed to deal with a world of more than two nations, two commodities, and two factors, and with a world where there is some international mobility of factors, imperfect competition, transportation costs, and trade restrictions.

Starting with the simplifying assumptions just mentioned, international eco-

the effects of trade restrictions, policies directed at regulating the flows of international payments and receipts, and the effects of these policies on a nation's welfare and on the welfare of other nations. International economic theory also examines the effectiveness of macroeconomic policies under different types of international monetary arrangements or monetary systems.

Although most of international economics represents the application of general microeconomic and macroeconomic principles to the international context, many theoretical advances were made in the field of international economics itself, and only subsequently did they find their way into the body of general economic theory. One example is the so-called theory of the second best (discussed in Section 10.4A). Production and general equilibrium theory, growth theory, welfare economics, as well as many other economic theories, have also benefited from work in the international sphere. These contributions attest to the vitality and importance of international economics as a special branch of economics.

1.5 Current International Economic Problems

In this section, we briefly identify the most important international economic problems facing the world today. These are the problems that the study of international economic theories and policies can help us understand and offer suggestions for their resolution. Indeed, it would be very interesting if you recorded your present ideas on how you would solve these problems now, and compared your answers with those that you will give after the study of international economics (which will probably be very similar to the answers summarized in the last chapter of the text).

The most serious international trade problem facing the world today is the rising protectionism in industrial countries and the tendency for the world to break up into three major trading blocs. The most serious international monetary problem is the excessive volatility of exchange rates (i.e., the very large fluctuations in the international value of national currencies) and their large and persistent misalignments (i.e., the fact that exchange rates can be far out of equilibrium for long periods of time). Other serious international economic problems are the frequent financial crises in developing and transition economies, the large and persistent structural unemployment problem and slow growth in Europe and the decade-old economic crisis in Japan, job insecurity from continued restructuring and downsizing in the United States, the problems of transition economies of Central and Eastern Europe and the former Soviet Republics in moving to full market economies, and the deep poverty and widening international inequalities facing many of the poorest developing countries of the world.

1.5A Trade Protectionism in Industrial Countries

In the study of the pure theory of international trade in Part One (Chapters 2–7), we will see that the best policy for the world as a whole is free trade. Each nation will then specialize in the production of the commodities that it can produce most

commodities than it could produce at home. In the real world, however, most nations impose some restrictions on the free flow of trade. Although invariably justified on national welfare grounds, trade restrictions are usually advocated by and greatly benefit a small minority of producers in the nation at the expense of a mostly silent majority of consumers. This problem is now rendered more complex by the tendency of the world to break up into three major trading blocs: A North American bloc (including the United States, Canada, and Mexico), a European trading bloc, and a much less defined and looser Asian trading bloc. In Part Two of the text (Chapters 8–12), we examine the reason for trade protectionism, the serious dangers that it creates, and how best to deal with this problem.

1.5B Excessive Fluctuations and Large Disequilibria in Exchange Rates

In the study of international finance in Part Three (Chapters 13–15), we will see that exchange rates have exhibited excessive fluctuations and volatility, as well as persistent misalignments or disequilibria. These can disrupt the pattern of international trade and specialization and can lead to unstable international financial conditions throughout the world. The persistence of excessive volatility and disequilibria in exchange rates has led to renewed calls for reforms of the present international monetary system, along the lines of establishing target zones of allowed fluctuation for the major currencies and more international coordination of macroeconomic policies among the leading industrial nations. These problems and proposals for their solution are examined in Part Four (Chapters 16–21) of the text.

1.5C Financial Crises in Emerging Market Economies

Since the early 1990s, there have been a series of financial crises in emerging market economies that threatened the stability of the entire international monetary system. In 1994–1995, Mexico faced financial and economic collapse; in 1997, a deep financial and economic crisis started in the countries of Southeast Asia (Thailand, Korea, Malaysia, Indonesia, and the Philippines); in the summer 1998, Russia suffered a financial, economic, and political collapse; and in January 1999, Brazil plunged into a crisis. Since the beginning of the new century, Turkey and Argentina have gotten into trouble, and there is a danger that Brazil might join them. Although each crisis was somewhat different, most were precipitated by a massive and sudden withdrawal of the short-term (liquid) capital that had poured into these emerging economies as a result of the liberalization of capital markets during the past decade. Some reforms are now being adopted, and more are being proposed to avoid such crises in the future, or at least to minimize their depth and chance of spreading to other countries.

1.5D High Structural Unemployment and Slow Growth in Europe and Stagnation in Japan

In Western Europe, unemployment averaged above 10 percent of the labor force

Worse still, almost half of Europe's jobless were unemployed for over a year, as compared with 11 percent in the United States. Although conditions have improved somewhat since the beginning of the present decade, the problem persists. The problem is believed to be caused by rigidities and inflexibility in the economic system, especially in labor markets. The attempt to increase flexibility, however, is being strongly resisted by labor, which asks for trade protection in the vain effort to protect jobs. Overregulation also leads to sluggish growth in Europe. Japan, on the other hand, has been in a deep financial and economic crisis and seems unable to come out of it. It has suffered three recessions and anemic growth since the early 1990s. Slow growth in Europe and Japan leads to protectionism and dampens the growth of the entire world economy. Thus, we see how national and regional problems quickly become global problems in our interdependent world. In Part Four of the text (dealing with open-economy macroeconomics), we will examine the policies available to address these problems.

1.5E Job Insecurity from Restructuring and Downsizing in the United States

Rapid technological change, globalization, and increased competition from the manufactured exports of emerging market economies, such as China and Korea, are causing widespread downsizing and job insecurity in the United States. Thus, while many new jobs are being created in the United States, firms go through periodic restructuring and downsizing, forcing tens of thousands of workers to look for other jobs, often at lower pay. Even those who retain a job often feel insecure and face wage stagnation. Technological change, globalization, and increased international competition are certainly the major reasons for downsizing and job insecurity, but as we will see in Parts Two and Four of the text, the solution to these problems is not to discourage technological change, restrict trade, or reduce international competition.

1.5F Restructuring Problems of Transition Economies

Although considerable progress has been made in the restructuring of transition economies (the former centrally planned economies of Central and Eastern Europe and the Soviet Union), there is still the danger of reversals and economic collapse, especially in Russia. These countries need massive amounts of capital and technology from the West, as well as more liberal access for their exports into Western markets, in order to establish market economies and be integrated into the world economy. The study of international economics can help us to better understand the nature of these problems and to evaluate current and proposed efforts for their solution.

1.5G Deep Poverty in Many Developing Countries

Even though many developing countries, especially China and India, are now

selected bibliography, and NetLinks with Internet site addresses. Sections of each chapter are numbered for easy reference (as in this chapter). Long sections are broken down into two or more numbered subsections.

Each section of the chapter is summarized in one paragraph in the summary. Following the summary, a paragraph under the title of A Look Ahead tells what follows in the subsequent chapter. The purpose of this feature is to integrate the material more closely and show the relationship between the various chapters. Important terms are printed in boldface when they are first introduced and explained (as in this chapter); they are listed under Key Terms at the end of each chapter and are then collected with their definitions in the general Glossary of Key Terms at the end of the text.

There are from 12 to 14 questions for review and an equal number of problems for each chapter. The questions for review refer to the most important concepts covered in each chapter. The problems differ from the questions for review in that either they ask the student to analyze a current real-world international economic problem, or they ask the student to get a pencil and paper and draw a graph illustrating a particular theory or actually calculate a specific measure. These graphs and calculations are challenging but not tricky or time consuming. They are intended to show whether or not the student understands the material covered in the chapter to the point where he or she can use it to analyze similar problems. The student is urged to work through these problems because only with his or her active participation will international economics truly come alive.

The selected bibliography gives the most important references, clearly indicating the particular concept of the theory or application to which they refer, as well as the level of difficulty of each selection or groups of selections. INTERNet provides International Economics Internet site addresses or Links with information on where to access additional information on the topics presented in each chapter. Answers to asterisked (*) problems are provided at the end of the book for the type of quick feedback so essential to effective learning.

Summary

1. Some knowledge of international economics is necessary to understand what goes on in the world of today and to be informed consumers, citizens, and voters. On a more practical level, the study of international economics is required for numerous jobs in international corporations, international banking, various government agencies, and international organizations.
2. The United States relies on international trade to obtain many products that it does not produce and some minerals (either because it has no deposits of them or because domestic reserves are dwindling). More important *quantitatively* for the nation's standard of living are the many products that could be produced domestically but only at a higher cost than abroad. International trade is even more crucial to the well-being of other nations.
3. International economics deals with the pure theory of trade, the theory of

adjustment in the balance of payments or open-economy macroeconomics. The first two topics are the microeconomic aspects of international economics; the latter two are the macroeconomic aspects, also known as international finance.

4. Starting with many simplifying assumptions, international economic theories examine the basis for and the gains from trade, the reasons for and the effects of trade restrictions, the policies directed at regulating the flow of international payments and receipts, and the effects of these policies on a nation's welfare.
5. The major international economic problems facing the world today are (1) rising trade protectionism in industrial countries, (2) excessive volatility and disequilibria in exchange rates, (3) the frequent financial crises in developing and transition economies, (4) the high structural unemployment and slow growth in Europe, as well and stagnation in Japan, (5) the downsizing and job insecurity in the United States, (6) restructuring problems facing the countries of Central and Eastern Europe and the former Soviet Union, and (7) deep poverty of widening international inequalities facing the people of many of the poorest developing nations in the world.
6. The book is organized into four parts. Part One (Chapters 2–7) deals with international trade theory. Part Two (Chapters 8–12) examines international trade policies. Part Three (Chapters 13–15) covers the balance of payments and foreign exchange markets. Part Four (Chapters 16–21) examines the various mechanisms to adjust balance-of-payments disequilibria and open-economy macroeconomics.

A Look Ahead

In Chapter 2, we begin our presentation of the pure theory of international trade and present the law of comparative advantage. This is one of the most important and still unchallenged laws of economics, with many interesting and practical applications. The law of comparative advantage is the cornerstone of the pure theory of international trade, and it is crucial to master it completely before going on to other chapters.

Key Terms

Interdependence
International trade theory
International trade policy
New protectionism
Balance of payments
Adjustment in the balance of payments
Microeconomics
Macroeconomics
Open-economy macroeconomics
International finance

CHAPTER 2

The Law of Comparative Advantage

2.1 Introduction

In this chapter, we examine the development of trade theory from the seventeenth century through the first part of the twentieth century. This historical approach is useful not because we are interested in the history of economic thought as such but because it is a convenient way of introducing the concepts and theories of international trade from the simple to the more complex and realistic.

The basic questions that we seek to answer in this chapter are:

1. What is the **basis for trade** and what are the **gains from trade?** Presumably (and as in the case of an individual), a nation will voluntarily engage in trade only if it benefits from trade. But how are gains from trade generated? How large are the gains and how are they divided among the trading nations?
2. What is the **pattern of trade?** That is, what commodities are traded and

We begin with a brief discussion of the economic doctrines known as mercantilism that prevailed during the seventeenth and eighteenth centuries. We then go on to discuss the theory of absolute advantage, developed by Adam Smith. It remained, however, for David Ricardo, writing some 40 years after Smith, to truly explain the pattern of and the gains from trade with his law of comparative advantage. The law of comparative advantage is one of the most important laws of economics, with applicability to nations as well as to individuals and useful for exposing many serious fallacies in apparently logical reasoning.

One difficulty remained. Ricardo had based his explanation of the law of comparative advantage on the labor theory of value, which was subsequently rejected. In the first part of the twentieth century, Gottfried Haberler came to Ricardo's "rescue" by explaining the law of comparative advantage in terms of the opportunity cost theory, as reflected in production possibility frontiers, or transformation curves.

For simplicity, our discussion will initially refer to only two nations and two commodities. In the appendix to this chapter, the conclusions will be generalized to trade in more than two commodities and among more than two nations. It must also be pointed out that while comparative advantage is the cornerstone of international trade theory, trade can also be based on other reasons, such as economies of large-scale production. These are examined in Chapter 6. Furthermore, the comparative advantage of nations can change over time, especially as a result of technological change, as explained in Chapter 7.

2.2 The Mercantilists' Views on Trade

Economics as an organized science can be said to have originated with the publication in 1776 of *The Wealth of Nations* by Adam Smith. However, writings on international trade preceded this date in such countries as England, Spain, France, Portugal, and the Netherlands as they developed into modern national states. Specifically, during the seventeenth and eighteenth centuries a group of men (merchants, bankers, government officials, and even philosophers) wrote essays and pamphlets on international trade that advocated an economic philosophy known as **mercantilism.** Briefly, the mercantilists maintained that the way for a nation to become rich and powerful was to export more than it imported. The resulting export surplus would then be settled by an inflow of bullion, or precious metals, primarily gold and silver. The more gold and silver a nation had, the richer and more powerful it was. Thus, the government had to do all in its power to stimulate the nation's exports and discourage and restrict imports (particularly the import of luxury consumption goods). However, since all nations could not simultaneously have an export surplus and the amount of gold and silver was fixed at any particular point in time, one nation could gain only at the expense of other nations. The mercantilists thus preached economic nationalism, believing as they did that national interests were basically in conflict (see Case Study 2-1).

Note that the mercantilists measured the wealth of a nation by the stock of precious metals it possessed rather than by the stock of human, man-made, and natural resources available for producing goods and services. The greater this stock of useful resources, the greater is the *flow* of goods and services to satisfy human wants, and the higher the standard of living in the nation.

At a more sophisticated level of analysis, there were more rational reasons for the mercantilists' desire for the accumulation of precious metals. This can be understood if it is remembered that the mercantilists were writing primarily for rulers and to enhance national power. With more gold, rulers could maintain larger and better armies and consolidate their power at home; improved armies and navies also made it possible for them to acquire more colonies. In addition, more gold meant more money (i.e., more gold coins) in circulation and greater business activity. Furthermore, by encouraging exports and restricting imports, the government would stimulate national output and employment.

In any event, mercantilists advocated strict government control of all economic activity and preached economic nationalism because they believed that a

Case Study 2-1 Munn's Mercantilistic Views on Trade

Thomas Munn (1571–1641) was perhaps the most influential of the mercantilist writers, and his *England's Treasure by Foreign Trade* was the outstanding exposition of mercantilist thought on trade. Indeed, Adam Smith's attacks on mercantilist views on trade (see the next section) were directed primarily at Munn. Following is an excerpt from Munn's writing:

> Although a Kingdom may be enriched by gifts received, or by purchase taken from some other Nations, yet these are things uncertain and of small consideration when they happen. The ordinary means therefore to encrease our wealth and treasure is by *Foreign Trade,* wherein we must ever observe this rule; to sell more to strangers yearly than we consume of theirs in value. For . . . that part of our stock [exports] which is not returned to us in wares [imports] must necessarily be brought home in treasure [bullion] . . . .
>
> We may . . . diminish our importations, if we would soberly refrain from excessive consumption of foreign wares in our diet and rayment [dress]. . . . In our exportations we must not only regard our superfluities, but also we must consider our neighbours necessities, that so . . . we may . . . gain so much of the manufacture as we can, and also endeavour to sell them dear, so far forth as the high price cause not a less vent in the quantity [of our exports]. But the superfluity of our commodities which strangers use, and may also have the same from other Nations, or may abate their vent by the use of some such like wares from other places, and with little inconvenience; we must in this case strive to sell as cheap as possible we can, rather than to lose the utterance [the sale] of such wares . . . .

Source: Thomas Munn, *England's Treasure by Foreign Trade* (Reprinted, Oxford: Basil Blackwell, 1928). The words in brackets have been added to clarify the meaning.

nation could gain in trade only at the expense of other nations (i.e., trade was a zero-sum game). These views are important for two reasons. First, the ideas of Adam Smith, David Ricardo, and other classical economists can best be understood if they are regarded as reactions to the mercantilists' views on trade and on the role of the government. Second, today there seems to be a resurgence of neomercantilism, as nations plagued by high levels of unemployment seek to restrict imports in an effort to stimulate domestic production and employment (this is examined in detail in Chapter 9). In fact, aside from England during the period 1815–1914, no Western nation has ever been completely free of mercantilist ideas (see Case Study 2-2).

Case Study 2-2 Mercantilism Is Alive and Well in the Twenty-First Century

Although most nations claim to be in favor of free trade, most of them continue to impose many restrictions on international trade. Most industrial nations restrict imports of agricultural commodities, textiles, shoes, steel, and many other products in order to protect domestic employment. They also provide subsidies to some of their hi-tech industries, such as computers and telecommunication, deemed essential for the international competitiveness of the nation and its future growth. Developing countries are even more protective of domestic industries. As some forms of overt protection (such as tariffs and quotas) on some products have been reduced or eliminated over the years through multilateral negotiations, other less explicit types of protection (such as tax benefits and research and development subsidies) have been increased. This is evidenced by the numerous trade disputes that have arisen over time.

During the past few years, there have been disputes between the United States and the European Union (EU) on the latter's prohibition of U.S. beef exports from cattle raised with hormones; on the EU preferences for banana imports from African countries at the expense of bananas from Central American plantations (owned by American business interests); on EU subsidies to Airbus Industrie for the development of its new super jumbo jet that would take sales away from the Boeing's 747; on the tax rebates that the U.S. government was providing some exporters; and on the 30 percent import tariff that the United States imposed on imported steel in 2002. There are similarly many other trade disputes between the United States, Japan, other developed and developing countries, and among all these countries with one another. Indeed, the list of protected products is long and varied. Trade restrictions are demanded to protect domestic jobs from foreign competition and to encourage domestic high-tech industries—all classic mercantilist arguments. Mercantilism, though declining, is alive and well in the twenty-first century.

Source: J. N. Bhagwati, *Free Trade Today* (Princeton, N.J.: Princeton University Press, 2002); D. A. Irwin, *Free Trade under Fire* (Princeton, N.J.: Princeton University Press, 2002); and D. Salvatore, ed., *Protectionism and World Welfare* (New York: Cambridge University Press, 1993).

2.3 Trade Based on Absolute Advantage: Adam Smith

Smith started with the simple truth that for two nations to trade with each other *voluntarily,* both nations must gain. If one nation gained nothing or lost, it would simply refuse to trade. But how does this *mutually beneficial* trade take place, and from where do these gains from trade come?

2.3A Absolute Advantage

According to Adam Smith, trade between two nations is based on **absolute advantage.** When one nation is more efficient than (or has an absolute advantage over) another in the production of one commodity but is less efficient than (or has an absolute disadvantage with respect to) the other nation in producing a second commodity, then both nations can gain by each *specializing* in the production of the commodity of its absolute advantage and exchanging part of its output with the other nation for the commodity of its absolute disadvantage. By this process, resources are utilized in the most efficient way and the output of *both* commodities will rise. This increase in the output of both commodities measures the gains from specialization in production available to be divided between the two nations through trade.

For example, because of climatic conditions, Canada is efficient in growing wheat but inefficient in growing bananas (hothouses would have to be used). On the other hand, Nicaragua is efficient in growing bananas but inefficient in growing wheat. Thus, Canada has an absolute advantage over Nicaragua in the cultivation of wheat but an absolute disadvantage in the cultivation of bananas. The opposite is true for Nicaragua.

Under these circumstances, both nations would benefit if each specialized in the production of the commodity of its absolute advantage and then traded with the other nation. Canada would specialize in the production of wheat (i.e., produce more than needed domestically) and exchange some of it for (surplus) bananas grown in Nicaragua. As a result, both more wheat and more bananas would be grown and consumed, and both Canada and Nicaragua would gain.

In this respect, a nation behaves no differently from an individual who does not attempt to produce all the commodities he needs. Rather, he produces only that commodity that he can produce most efficiently and then exchanges part of his output for the other commodities he needs or wants. This way, total output and the welfare of all individuals are maximized.

Thus, while the mercantilists believed that one nation could gain only at the expense of another nation and advocated strict government control of all economic activity and trade, Adam Smith (and the other classical economists who followed him) believed that all nations would gain from free trade and strongly advocated a policy of **laissez-faire** (i.e., as little government interference with the economic system as possible). Free trade would cause world resources to be utilized most efficiently and would maximize world welfare. There were to be only a few exceptions to this policy of laissez-faire and free trade. One of these was the protection of

In view of this belief, it seems paradoxical that today most nations impose many restrictions on the free flow of international trade. Trade restrictions are invariably rationalized in terms of national welfare. In reality, trade restrictions are advocated by the few industries and their workers who are hurt by imports. As such, trade restrictions benefit the few at the expense of the many (who will have to pay higher prices for competing domestic goods). These issues will be examined in detail in Part Two.

Also to be noted is that Smith's theory served the interest of factory owners (who were able to pay lower wages because of cheaper food imports) and harmed landowners in England (because food became less scarce due to cheaper imports), and it shows the link between social pressures and the development of new economic theories to support them.

2.3B Illustration of Absolute Advantage

We will now look at a *numerical* example of absolute advantage that will serve to establish a frame of reference for presenting the more challenging theory of comparative advantage in the next section.

Table 2.1 shows that one hour of labor time produces six bushels of wheat in the United States but only one in the United Kingdom. On the other hand, one hour of labor time produces five yards of cloth in the United Kingdom but only four in the United States. Thus, the United States is more efficient than, or has an absolute advantage over, the United Kingdom in the production of wheat, while the United Kingdom is more efficient than, or has an absolute advantage over, the United States in the production of cloth. With trade, the United States would specialize in the production of wheat and exchange part of it for British cloth. The opposite is true for the United Kingdom.

If the United States exchanges six bushels of wheat (6W) for six yards of British cloth (6C), the United States gains 2C or saves ½ man-hour or 30 minutes of labor time (since the United States can only exchange 6W for 4C domestically). Similarly, the 6W that the United Kingdom receives from the United States is equivalent to or would require six man-hours of labor time to produce in the United Kingdom. These same six man-hours can produce 30C in the United Kingdom (6 hours times 5 yards of cloth per man-hour). By being able to exchange 6C (requiring a little over one hour to produce in the United Kingdom) for 6W with the United States, the United Kingdom gains 24C, or saves almost five man-hours.

The fact that the United Kingdom gains much more than the United States is not important at this time. What is important is that *both* nations can gain from specialization in production and trade. (We will see in Section 2.6B how the rate at which commodities are exchanged for one another is determined, and we also

TABLE 2.1. *Absolute Advantage*

	U.S.	U.K.
Wheat (bushels/man-hour)	6	1

examine the closely related question of how the gains from trade are divided among the trading nations.)

Absolute advantage, however, can explain only a very small part of world trade today, such as some of the trade between developed and developing countries. Most of world trade, especially trade among developed countries, could not be explained by absolute advantage. It remained for David Ricardo, with the law of comparative advantage, to truly explain the basis for and the gains from trade. Indeed, absolute advantage will be seen to be only a special case of the more general theory of comparative advantage.

2.4 Trade Based on Comparative Advantage: David Ricardo

In 1817 Ricardo published his *Principles of Political Economy and Taxation,* in which he presented the law of comparative advantage. This is one of the most important and still unchallenged laws of economics, with many practical applications. In this section, we will first define the law of comparative advantage; then we will restate it with a simple numerical example; finally, we will prove it by demonstrating that both nations can indeed gain by each specializing in the production and exportation of the commodity of its comparative advantage. In Section 2.6A, we will prove the law *graphically.*

2.4A The Law of Comparative Advantage

According to the **law of comparative advantage,** even if one nation is less efficient than (has an absolute disadvantage with respect to) the other nation in the production of *both* commodities, there is still a basis for mutually beneficial trade. The first nation should specialize in the production of and export the commodity in which its absolute disadvantage is smaller (this is the commodity of its *comparative advantage*) and import the commodity in which its absolute disadvantage is greater (this is the commodity of its *comparative disadvantage*).

The statement of the law can be clarified by looking at Table 2.2. The only difference between Tables 2.2 and 2.1 is that the United Kingdom now produces only two yards of cloth per man-hour instead of five. Thus, the United Kingdom now has an absolute disadvantage in the production of *both* wheat and cloth with respect to the United States.

However, since U.K. labor is half as productive in cloth but six times less productive in wheat with respect to the United States, *the United Kingdom has a comparative advantage in cloth.* On the other hand, the United States has an absolute advantage in

TABLE 2.2. *Comparative Advantage*

	U.S.	U.K.
Wheat (bushels/man-hour)	6	1

both wheat and cloth with respect to the United Kingdom, but since its absolute advantage is greater in wheat (6:1) than in cloth (4:2), *the United States has a comparative advantage in wheat.* To summarize, the United States' absolute advantage is greater in wheat, and so the United States has a comparative advantage in wheat. The United Kingdom's absolute disadvantage is smaller in cloth, so its comparative advantage lies in cloth. According to the law of comparative advantage, both nations can gain if the United States specializes in the production of wheat and exports some of it in exchange for British cloth. (At the same time, the United Kingdom is specializing in the production of and exporting cloth.)

Note that in a two-nation, two-commodity world, once it is determined that one nation has a comparative advantage in one commodity, then the other nation *must* necessarily have a comparative advantage in the other commodity.

4B The Gains from Trade

So far, we have stated the law of comparative advantage in words and then restated it with a simple numerical example. However, we have not yet proved the law. To do so, we must be able to show that the United States and the United Kingdom can both gain by each specializing in the production of and exporting the commodity of its comparative advantage.

To start with, we know that the United States would be indifferent to trade if it received only 4C from the United Kingdom in exchange for 6W, since the United States can produce exactly 4C domestically by utilizing the resources released in giving up 6W (see Table 2.2). And the United States would certainly not trade if it received less than 4C for 6W. Similarly, the United Kingdom would be indifferent to trade if it had to give up 2C for each 1W it received from the United States, and it certainly would not trade if it had to give up more than 2C for 1W.

To show that both nations can gain, suppose the United States could exchange 6W for 6C with the United Kingdom. The United States would then gain 2C (or save ½ hour of labor time) since the United States could only exchange 6W for 4C domestically. To see that the United Kingdom would also gain, note that the 6W that the United Kingdom receives from the United States would require six man-hours to produce in the United Kingdom. The United Kingdom could instead use these six man-hours to produce 12C and give up only 6C for 6W from the United States. Thus, the United Kingdom would gain 6C or save three hours of labor time. Once again, the fact that the United Kingdom gains more from trade than the United States is not important at this point. What is important is that both nations can gain from trade even if one of them (in this case the United Kingdom) is less efficient than the other in the production of both commodities.

We can convince ourselves of this by considering a simple example from everyday life. Suppose a lawyer can type twice as fast as his secretary. The lawyer then has an absolute advantage over his secretary in both the practice of law and typing. However, since the secretary cannot practice law without a law degree, the lawyer has a greater absolute advantage or a comparative advantage in law, and the secretary has a comparative advantage in typing. According to the law of comparative advantage, the lawyer should spend all of his time practicing law and let his secretary do

the typing. For example, if the lawyer earns $100 per hour practicing law and must pay his secretary $10 per hour to do the typing, he would actually lose $80 for each hour that he typed. The reason for this is that he would save $20 (since he can type twice as fast as his secretary) but forgo earning $100 in the practice of law.

Returning to the United States and the United Kingdom, we see that both nations would gain by exchanging 6W for 6C. However, this is not the only rate of exchange at which mutually beneficial trade can take place. Since the United States could exchange 6W for 4C domestically (in the sense that both require 1 man-hour to produce), the United States would gain if it could exchange 6W for more than 4C from the United Kingdom. On the other hand, in the United Kingdom 6W = 12C (in the sense that both require 6 man-hours to produce). Anything less than 12C that the United Kingdom must give up to obtain 6W from the United States represents a gain from trade for the United Kingdom. To summarize, the United States gains to the extent that it can exchange 6W for more than 4C from the United Kingdom. The United Kingdom gains to the extent that it can give up less than 12C for 6W from the United States. Thus, the range for mutually advantageous trade is

$$4C < 6W < 12C$$

The spread between 12C and 4C (i.e., 8C) represents the total gains from trade available to be shared by the two nations by trading 6W. For example, we have seen that when 6W are exchanged for 6C, the United States gains 2C and the United Kingdom 6C, making a total of 8C. The closer the rate of exchange is to 4C = 6W (the *domestic,* or *internal,* rate in the United States—see Table 2.2), the smaller is the share of the gain going to the United States and the larger is the share of the gain going to the United Kingdom. On the other hand, the closer the rate of exchange is to 6W = 12C (the domestic, or internal, rate in the United Kingdom), the greater is the gain of the United States relative to that of the United Kingdom.

For example, if the United States exchanged 6W for 8C with the United Kingdom, both nations would gain 4C, for a total gain of 8C. If the United States could exchange 6W for 10C, it would gain 6C and the United Kingdom only 2C. (Of course, the gains from trade are proportionately greater when more than 6W are traded.) In Section 2.6B we will see how this rate of exchange is actually determined in the real world by demand as well as supply considerations. The rate of exchange will also determine how the total gains from trade are actually shared by the trading nations. Up to this point, all we have wanted to do was to prove that mutually beneficial trade can take place even if one nation is less efficient than the other in the production of both commodities.

So far, the gains from specialization in production and trade have been measured in terms of cloth. However, the gains from trade could also be measured exclusively in terms of wheat or, more realistically, in terms of both wheat and cloth. This will be done in the graphical presentation of the law of comparative advantage in Section 2.6A.

2.4C Exception to the Law of Comparative Advantage

There is one (not very common) *exception to the law of comparative advantage.* This occurs when the absolute disadvantage that one nation has with respect to another

nation is the *same* in both commodities. For example, if one man-hour produced 3W instead of 1W in the United Kingdom (see Table 2.2), the United Kingdom would be exactly half as productive as the United States in both wheat and cloth. The United Kingdom (and the United States) would then have a comparative advantage in neither commodity, and no mutually beneficial trade could take place.

The reason for this is that (as earlier) the United States will trade only if it can exchange 6W for more than 4C. However, now the United Kingdom is not willing to give up more than 4C to obtain 6W from the United States because the United Kingdom can produce either 6W or 4C with two man-hours domestically. Under these circumstances, no mutually beneficial trade can take place.

This requires slightly modifying the statement of the law of comparative advantage to read as follows: Even if one nation has an absolute disadvantage with respect to the other nation in the production of both commodities, there is still a basis for mutually beneficial trade, *unless the absolute disadvantage (that one nation has with respect to the other nation) is in the same proportion for the two commodities.* While it is important to note this exception in theory, its occurrence is rare and a matter of coincidence so that the applicability of the law of comparative advantage is not much affected. Furthermore, natural trade barriers such as transport costs can preclude trade even when some comparative advantage exists. At this point, however, we assume that no such natural or artificial (such as tariffs) barriers exist.

2.4D Comparative Advantage with Money

According to the law of comparative advantage (and disregarding the exception noted above), even if one nation (the United Kingdom in this case) has an absolute disadvantage in the production of both commodities with respect to the other nation (the United States), there is still a basis for mutually beneficial trade. But how, you may ask, can the United Kingdom export anything to the United States if it is less efficient than the United States in the production of both commodities? The answer is that wages in the United Kingdom will be sufficiently lower than wages in the United States so as to make the price of cloth (the commodity in which the United Kingdom has a comparative advantage) lower in the United Kingdom, and the price of wheat lower in the United States *when both commodities are expressed in terms of the currency of either nation.* Let us see how this works.

Suppose that the wage rate in the United States is \$6 per hour. Since one man-hour produces 6W in the United States (see Table 2.2), the price of a bushel of wheat is P_w = \$1. On the other hand, since one man-hour produces 4C, P_c = \$1.50 (from \$6/4C). Suppose that at the same time the wage rate in England is £1 per hour (the symbol "£" stands for pound, the U.K. currency). Since one man-hour produces 1W in the United Kingdom (see Table 2.2), P_w = £1 in the United Kingdom. Similarly, since one man-hour produces 2C, P_c = £0.5. If the exchange rate between the pound and the dollar is £1 = \$2, then P_w = £1 = \$2 and P_C = £0.5 = \$1 in the United Kingdom. Table 2.3 shows the dollar price of wheat and cloth in the United States and the United Kingdom at the exchange rate of £1 = \$2.

TABLE 2.3. *Dollar Price of Wheat and Cloth in the United States and United Kingdom at £1 = \$2*

	U.S.	U.K.
Price of one bushel of wheat	\$1.00	\$2.00
Price of one yard of cloth	1.50	1.00

From Table 2.3 we can see that the dollar price of wheat (the commodity in which the United Kingdom has a comparative advantage) is lower in the United Kingdom. (The result would be the same if the price of both commodities had been expressed in pounds.)

With the dollar price of wheat lower in the United States, businesspeople would buy wheat there and sell it in the United Kingdom, where they would buy cloth to sell in the United States. Even though U.K. labor is half as productive as U.S. labor in cloth production (see Table 2.2), U.K. labor receives only one-third of the U.S. wage rate (£1 = \$2 as opposed to \$6 in the United States), so that the dollar price of cloth is lower in the United Kingdom. To put it differently, the inefficiency of U.K. labor relative to U.S. labor in cloth production is more than compensated for by the lower wages in the United Kingdom. As a result, the dollar price of cloth is less in the United Kingdom, so that the United Kingdom can export cloth to the United States. This is always the case as long as the U.K. wage rate is between ⅙ and ½ of the U.S. wage rate (the same as the productivity difference between the United Kingdom and the United States in the production of wheat and cloth).

If the exchange rate between the dollar and the pound were instead £1 = \$1 (so that the U.K. wage rate was exactly ⅙ the U.S. wage rate), then the dollar price of wheat in the United Kingdom would be P_w = £1 = \$1. Since this is the same price as in the United States (see Table 2.3), the United States could not export wheat to the United Kingdom at this exchange rate. At the same time, P_c = £0.5 = \$0.50 in the United Kingdom, and the United Kingdom would export even more cloth than before to the United States. Trade would be unbalanced in favor of the United Kingdom, and the exchange rate between the dollar and the pound (i.e., the dollar price of the pound) would have to rise.

On the other hand, if the exchange rate were £1 = \$3 (so that the U.K. wage rate was exactly ½ the U.S. wage rate), the price of cloth in the United Kingdom would be P_c = £0.5 = \$1.50 (the same as in the United States—see Table 2.3). As a result, the United Kingdom could not export cloth to the United States. Trade would be unbalanced in favor of the United States, and the exchange rate would have to fall. The rate of exchange between the dollar and the pound will eventually settle at the level that will result in balanced trade (in the absence of any interferences or other international transactions). We will return to this point in the appendix to this chapter and in much greater detail in Parts Three and Four, which deal with international finance.

Thus, the argument that could be advanced in the United States that it needs to protect the high wages and standard of living of its workers against cheap British labor is generally false. Similarly faulty is the opposing argument that could be advanced in the United Kingdom that its labor needs protection against more effi-

Case Study 2-3 The Petition of the Candlemakers

Sometimes satire and ridicule are more effective than theory and logic in influencing public opinion. For example, exasperated by the spread of protectionism under the prevailing mercantilist philosophy of the time, French economist Frédéric Bastiat (1801–1851) overwhelmed the proponents of protectionism by satirically extending their arguments to their logical and absurd conclusions. Nowhere is this more brilliantly accomplished than in the fictitious petition of the French candlemakers, written by Bastiat in 1845, and excerpted here:

> We are suffering from the intolerable competition of a foreign rival, placed, it would seem, in a condition so far superior to ours for the production of light, that he absolutely *inundates* our *national market* at a price fabulously reduced. The moment he shows himself, our trade leaves us—all of our consumers apply to him; and a branch of native industry, having countless ramifications, is all at once rendered completely stagnant. This rival . . . is not other than the sun.
>
> What we pray for is, that it may please you to pass a law ordering the shutting up of all windows, sky-lights, dormerwindows, curtains, blinds, bull's eyes; in a word all openings, holes, chinks, clefts, and fissures, by or through which the light of the sun has been in use to enter houses, to the prejudice of the meritorious manufactures with which we flatter ourselves we have accommodated our country,—a country which, in gratitude, ought not to abandon us now to a strife so unequal . . .
>
> Does it not argue to the greatest inconsistency to check as you do the importation of coal, iron, cheese, and goods of foreign manufacture, merely because and even in proportion as their price approaches zero, while at the same time you freely admit, and without limitation, the light of the sun, whose price is during the whole day at *zero?*
>
> If you shut up as much as possible all access to natural light, and create a demand for artificial light, which of our French manufactures will not be encouraged by it? If more tallow is consumed, then there must be more oxen and sheep; and, consequently, we shall behold the multiplication of artificial meadows, meat, wool, hides, and above all, manure, which is the basis and foundation of all agricultural wealth.

Source: Frédéric Bastiat, *Economic Sophisms* (Edinburgh: Oliver and Boyd, 1873), pp. 49–53, abridged.

2.5 Comparative Advantage and Opportunity Costs

Ricardo based his law of comparative advantage on a number of simplifying assumptions: (1) only two nations and two commodities, (2) free trade, (3) perfect mobility of labor within each nation but immobility between the two nations, (4) constant costs of production, (5) no transportation costs, (6) no technical change,

relaxed, assumption seven (i.e., that the labor theory of value holds) is not valid and should not be used for *explaining* comparative advantage.

2.5A Comparative Advantage and the Labor Theory of Value

Under the **labor theory of value,** the value or price of a commodity depends exclusively on the amount of labor going into the production of the commodity. This implies (1) that either labor is the only factor of production or labor is used in the *same* fixed proportion in the production of all commodities and (2) that labor is homogeneous (i.e., of only one type). Since neither of these assumptions is true, we cannot base the explanation of comparative advantage on the labor theory of value.

Specifically, labor is not the only factor of production, nor is it used in the same fixed proportion in the production of all commodities. For example, much more capital equipment per worker is required to produce some products (such as steel) than to produce other products (such as textiles). In addition, there is usually some possibility of substitution between labor, capital, and other factors in the production of most commodities. Furthermore, labor is obviously not homogeneous but varies greatly in training, productivity, and wages. At the very least, we should allow for different productivities of labor. Indeed, this is how the Ricardian theory of comparative advantage has been tested empirically (see Section 2.7). In any event, the theory of comparative advantage need not be based on the labor theory of value but can be explained on the basis of the opportunity cost theory (which is acceptable).

2.5B The Opportunity Cost Theory

It was left for Haberler in 1936 to explain or base the theory of comparative advantage on the **opportunity cost theory.** In this form, the law of comparative advantage is sometimes referred to as the *law of comparative cost.*

According to the opportunity cost theory, the cost of a commodity is the amount of a second commodity that must be given up to release just enough resources to produce one additional unit of the first commodity. No assumption is made here that labor is the only factor of production or that labor is homogeneous. Nor is it assumed that the cost or price of a commodity depends on or can be inferred exclusively from its labor content. Consequently, the nation with the lower opportunity cost in the production of a commodity has a comparative advantage in that commodity (and a comparative disadvantage in the second commodity).

For example, if in the absence of trade the United States must give up two-thirds of a unit of cloth to release just enough resources to produce one additional unit of wheat domestically, then *the opportunity cost of wheat is two-thirds of a unit of cloth* (i.e., $1W = \frac{2}{3}C$ in the United States). If $1W = 2C$ in the United Kingdom, then the opportunity cost of wheat (in terms of the amount of cloth that must be given up) is lower in the United States than in the United Kingdom, and the United States

a two-nation, two-commodity world, the United Kingdom would then have a comparative advantage in cloth.

According to the law of comparative advantage, the United States should specialize in producing wheat and export some of it in exchange for British cloth. This is exactly what we concluded earlier with the law of comparative advantage based on the labor theory of value, but now our explanation is based on the opportunity cost theory.

2.5c The Production Possibility Frontier under Constant Costs

Opportunity costs can be illustrated with the production possibility frontier, or transformation curve. The **production possibility frontier** is a curve that shows the *alternative* combinations of the two commodities that a nation can produce by fully utilizing all of its resources with the best technology available to it.

Table 2.4 gives the (hypothetical) production possibility schedules of wheat (in million bushels/year) and cloth (in million yards/year) for the United States and the United Kingdom. We see that the United States can produce 180W and 0C, 150W and 20C, or 120W and 40C, down to 0W and 120C. For each 30W that the United States gives up, just enough resources are released to produce an additional 20C. That is, 30W = 20C (in the sense that both require the same amount of resources). Thus, the opportunity cost of one unit of wheat in the United States is 1W = ⅔C (the same as in Table 2.2) and remains constant. On the other hand, the United Kingdom can produce 60W and 0C, 50W and 20C, or 40W and 40C, down to 0W and 120C. It can increase its output by 20C for each 10W it gives up. Thus, the opportunity cost of wheat in the United Kingdom is 1W = 2C and remains constant.

The United States and United Kingdom production possibility schedules given in Table 2.4 are graphed as production possibility frontiers in Figure 2.1. Each point on a frontier represents one combination of wheat and cloth that the nation can produce. For example, at point A, the United States produces 90W and 60C. At point A', the United Kingdom produces 40W and 40C.

TABLE 2.4. *Production Possibility Schedules for Wheat and Cloth in the United States and the United Kingdom*

United States		United Kingdom	
Wheat	Cloth	Wheat	Cloth
180	0	60	0
150	20	50	20
120	40	40	40
90	60	30	60
60	80	20	80
30	100	10	100

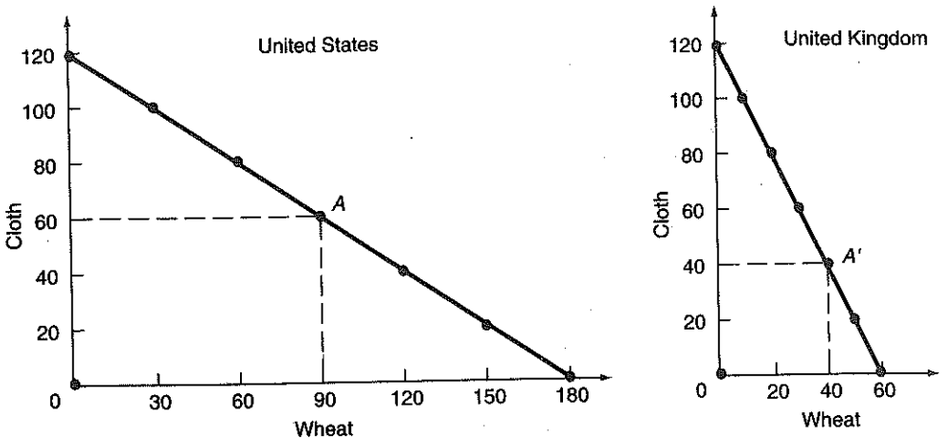

FIGURE 2.1. The Production Possibility Frontiers of the United States and the United Kingdom. The U.S. and U.K. production frontiers are obtained by plotting the values in Table 2.4. The frontiers are downward, or negatively sloped, indicating that as each nation produces more wheat, it must give up some cloth. Straight-line production possibility frontiers reflect constant opportunity costs.

Points inside, or below, the production possibility frontier are also possible but are inefficient, in the sense that the nation has some idle resources and/or is not using the best technology available to it. On the other hand, points above the production frontier cannot be achieved with the resources and technology currently available to the nation.

The downward, or negative, slope of the production possibility frontiers in Figure 2.1 indicates that if the United States and the United Kingdom want to produce more wheat, they must give up some of their cloth production. The fact that the production possibility frontiers of both nations are straight lines reflects the fact that their opportunity costs are constant. That is, for each additional 1W to be produced, the United States must give up ⅔C and the United Kingdom must give up 2C, *no matter from which point on its production possibility frontier the nation starts.*

Constant opportunity costs arise when (1) resources or factors of production are either perfect substitutes for each other or used in fixed proportion in the production of both commodities, and (2) all units of the same factor are homogeneous or of exactly the same quality. Then, as each nation transfers resources from the production of cloth to the production of wheat, it will not have to use resources that are less and less suited to wheat production, no matter how much wheat it is already producing. The same is true for the production of more cloth. Thus, we have constant costs in the sense that the same amount of one commodity must be given up to produce each additional unit of the second commodity.

While opportunity costs are constant in each nation, they differ among nations, providing the basis for trade. Constant costs are not realistic, however. They are discussed only because they serve as a convenient introduction to the more realistic