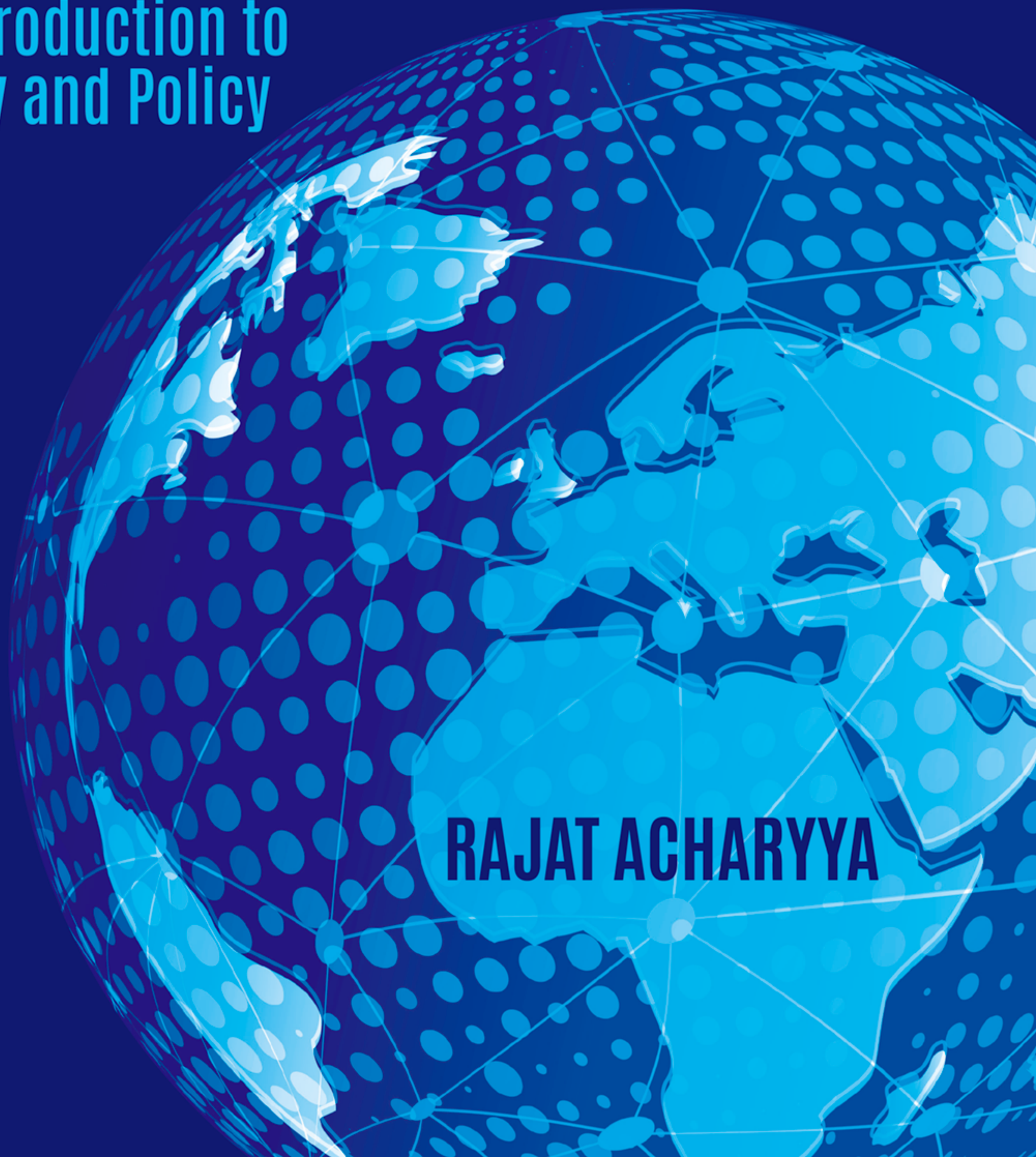
SECOND EDITION

INTERNATIONAL ECONOMICS

An Introduction to Theory and Policy



RAJAT ACHARYYA

OXFORD

International Economics

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An Introduction to Theory and Policy

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Second Edition

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Preface

Over the last three decades, the nature of economic interdependence of countries has changed quite substantially as well as qualitatively due to their rapid integration through fragmentation, outsourcing of production processes, global value chains, and greater mobility of people. International capital flows and flexible exchange rate regimes in most countries have also linked their financial markets more significantly than ever before. At the same time, more complex dimensions of international exchange have emerged with the growing share of services in world trade. Development of ICT infrastructure has unlocked potentials for virtual and digital trade, which has emerged as a prominent feature of international economic exchange. Services in particular, which was earlier seen primarily as 'non-traded', have become globally traded aided by the ICT, such as financial services (like banking and insurance) and business services (like software development, call centres, consultancy services including medical advice, and the like). On the other hand, environmental issues now govern to a large extent promotion or restrictions on merchandise trade. The usual gains from trade thus need to be weighed against potential environmental degradation that freer international trade may cause for policy decisions regarding trade promotion or restrictions. Often national policies regarding environmental protection are unilaterally optimum but globally sub-optimum, and this calls for coordination of policies. Regional trading blocs and agreements provide scope for such policy coordination. On the other hand, due to alleged unfair trade practices by the developing countries by not implementing labour standards and TRIPS (or patent protection) strictly, the EU and the United States have been mandatorily linking these issues with their negotiations on free trade agreements with the developing countries.

Being a textbook meant for beginners, dealing with all the complexities and intricacies of international trade and payments in larger details is beyond its scope. Instead, the book aims to provide students the basic tools and foundations of principles underlying international exchange, trade policies, and exchange rate policies, which will enable them to analyse issues of a more complex nature at a later stage. The approach taken in this book is distinctly different from most of the existing textbooks on international economics in more than one way. Instead of model-specific discussions on international trade theory, this book begins with basic concepts like the basis, pattern, and gains from trade, characteristics of international equilibrium, and

terms of trade, in the context of a general trading environment of open economies. Having developed the basic tools of international exchange and gains thereof, specific models of trade are introduced as alternative theoretical explanations for the basic principles of such exchanges.

WHAT IS NEW IN THIS EDITION

With rapid changes in the qualitative nature of global trade over the last one decade, in particular, inclusion of new contents and reorientation of some of the chapters have become highly relevant. International exchange has been taking place increasingly in intermediate and semi-finished products and in value chains along the vertical stages of production. This *vertical specialization* is in contrast to comparative advantage of nations in *different commodities*, or *the horizontal specialization*. With the advent of globalization on the one hand, and development of digital technology (ICT), on the other hand, virtual/digital trade has emerged as a prominent feature of service trade. After introducing these dimensions of international exchange and trade in Chapter 1, a detailed discussion of global value chains has been included in Chapter 16, and of virtual trade in intermediate services driven by time zone differences of countries in Chapter 17.

Welfare Property of International Equilibrium and revisiting the gains from trade theorem in light of that have been introduced in Chapter 4 on International Equilibrium and the Terms of Trade. The role of relative size of countries, or their respective workforces, is more precisely explained and exact conditions for post-trade complete specialization has been derived in Chapter 5 on Ricardian model of trade. Chapter 6 includes several new discussions. First, the price definition of factor abundance of a country is defined and a distinction of this definition from the physical definition is drawn (see Box 6.1). Second, additional explanations, insights, and implications of important theorems like output and price magnification effects and the Factor Price Equalization theorem have been discussed. In Chapter 8 on Theories of Intra Industry Trade, two theoretical discussions have been added. First is the factor endowment explanations for low-quality phenomenon of exports of developing countries, and the other is the firm heterogeneity model of Melitz (2003) that studies which firms in an industry export and which firms produce for the domestic market.

There are innumerable policies against the use of child labour like fines on employing firms, trade sanctions, boycotts of goods produced by child labour, and the like. None of these policies, however, have worked in reducing the incidence of child labour to any significant extent. It is important, therefore, to understand the supply side and demand side explanations for the prevalence of child labour in order to formulate effective policies to eliminate this menace. Box 18.5 in Chapter 18 summarizes these explanations.

Recent examples of interventions by the central banks of India and China to stabilize or defend pegged exchange rates of their respective currencies are added in Chapter 22 on International Currency Systems and Exchange Rate Regimes (see Box 22.4 and Box 22.5). An elaborate discussion on speculative attacks on domestic currency narrowing down its variations near the bands in a Target Zone is also presented. A new chapter (as Chapter 25, with the Chapter 25 of the First Edition being re-numbered as Chapter 26) has been added wherein financial crises in the developing world, and most significantly, occurring under overvalued pegged (or crawling peg) exchange rate regimes with or without capital and exchange controls

have been discussed. Two major crises during the last two decades of the last century have been the focus in this context. First, the 1980 Debt Crisis in Latin America that led to a lost decade of development for these countries, and the policy issues involved in and management of the crises. Second, the dual financial crisis—balance-of-payments and banking crises—in Asia during 1997–98, that also spilled over to other parts of the globe, particularly in Latin America and East Europe.

Apart from these additional contents, data sets, tables, and charts have been updated throughout the book. New exercises are included in several chapters that will help the students comprehend the discussions in the chapters better.

ACKNOWLEDGEMENT

I have inherited intellectual debts over a long period of time spanning over almost 40 years, through repeated interactions on various issues in trade theory and policy with my teachers, co-authors, colleagues, and, of course, my students at different universities and institutes in India and abroad. It will be a rather long list to mention each of them, but I recollect and gratefully acknowledge contributions of all of them. It has been eight years since the First Edition of this textbook was published. During this long period I have gained new insights while teaching different aspects of international exchange and trade policy choices using the materials from the First Edition, and interacting with the students in the class. This Second Edition has been shaped much by these interactions, and also by informal discussions on many of the issues with Asis Banerjee, Dyuti S. Banerjee, Bill Ethier, Partha Pratim Ghosh, Kausik Gupta, Arye Hillman, Saibal Kar, Ngo Van Long, Surajit Mazumdar, Arup Mallik, Sugata Marjit, Biswajit Nag, Ranjanendra Nag, Pulin Nayak, Partha Ray, and C. Veeramani. Thanks also go to Shrimoyee Ganguly for providing valuable inputs and excellent research assistance on many of the new and additional materials of this Edition.

June 2022

Introduction

International economics is all about economic interactions between nations. Such interactions take many forms such as exchange of goods and services between economic agents of different countries, movement of labour and capital from one country to another, and competition and coordination among nations regarding economic policies to regulate exchange of goods and services and factor movements. Like the basic motive of an economic agent is to have a more desirable basket of resources in her possession, and thereby to increase her utility level, through exchange of goods with others, international trade in the eighteenth century was viewed by nations as a means of acquiring wealth for themselves through voluntary exchange of goods and services rather than through the exercise of military power. In the early history of such international trade, exchange was primitive and simple and was mostly confined to basic goods like cloth, consumables like wine, factors of production such as raw materials, and precious metals like gold and silver. But over centuries, international exchange has become more complex in nature, particularly with cross-country location of different stages of production processes and exchange of services of different kinds. It has also become more pervasive and important in the present era of globalization in which nations are increasingly integrated into the world economy. Nations are now more closely linked with each other than ever before. Business strategies of firms and economic policies of the government in a particular country must now take into account what firms and governments in other countries are doing. This has made the study of international economics and understanding the principles of international exchange all the more relevant and important.

WHAT DOES INTERNATIONAL ECONOMICS STUDY?

The subject matter of international economics can be divided into three broad categories—the theory of international trade and factor flows; analyses of unilateral, multilateral, and coordinated trade policies; and the theory of balance of payments and exchange rate. The theory of international trade and factor flows examines the basic principles of international exchange and analyses the consequences of international trade in goods, services, and factors of production. The consequences are usually evaluated in terms of national welfare, income redistribution, employment, and output growth. The theory of trade policy, on the other hand, is concerned

with designing optimal national policies to regulate international trade in goods, services, and inputs and achieving more desirable outcomes than free trade. Finally, the theory of balance of payments and exchange rate analyses the monetary implications of the international exchange of goods and services and factor flows.

Three Basic Issues: Causes, Pattern, and Consequences of International Trade

There are three basic issues that the theory of international trade is primarily concerned with. First, when do countries engage in international trade in goods and services? What are the factors that drive goods and factors to flow from one country to the other? In the neoclassical theory of international trade in the tradition of David Ricardo, Eli Heckscher, Bertil Ohlin, and Paul Samuelson, the dissimilarities between countries in fundamentals like production technology, factor endowments, and tastes and preferences for goods and services provide the basis of trade. Such dissimilarities translate into differences in prices of goods (and services) across nations, or what is known as the *comparative advantage* of nations, and lead to cross-country arbitrage—buying cheap and selling dear—and hence international exchange or trade. Alternatives to this explanation of comparative advantage and arbitrage in international trade are based on economies of scale, product market imperfections, and product differentiation in the new trade theories that were developed in the late 1970s and early 1980s by Paul Krugman, James Brander, and Elhanan Helpman among others. For example, pricing above marginal cost under monopoly production of the same good in each country generates scope for national monopolists to dump their production in each other's markets and yet make profits. International trade in an identical good thus takes place through *reciprocal dumping* even when countries are similar, resulting in the same prices of similar goods everywhere and thereby leaving no scope for arbitrage.

The second issue involves two questions: Why do we observe certain patterns of trade between countries? Why do some countries export manufactured goods such as cotton textiles or leather goods and others export agricultural goods like rice? Even within the former group of countries, the pattern of trade varies widely according to the capital and skill content of manufacturing exports. In general, developed countries are observed to export more capital-intensive and more skill-intensive goods. Developing countries, on the other hand, are typically exporters of unskilled-labour-intensive commodities. At the same time, there are developing countries like Brazil, China, and India that export a sizeable volume of high-technology and skill-intensive goods and services like chemical products (including pharmaceutical products), scientific instruments, software, and office equipment, along with low-skill-intensive manufacturing goods like cotton textiles and leather manufactures. All these examples of diverse trade patterns of nations, in fact, reflect their dissimilarities; that is, the pattern of trade is also determined by the principles of comparative advantage. Heckscher and Ohlin, for example, postulated that countries that are relatively labour abundant will export relatively labour-intensive goods and import relatively capital-intensive goods from countries that are relatively capital abundant. This later came to be known as the *Heckscher–Ohlin theorem*.

In contrast to these positive questions concerning international trade, the third issue is the normative one of whether international exchange and trade are always gainful for trading nations. The *Gains from Trade* theorem postulates that under certain market and technological conditions, international exchange of goods and services by atomistic agents raises the

national welfare of *all* trading nations if such exchanges follow the principles of comparative advantage. But in cases where prices fail to signal the true comparative advantage, such as when markets are imperfectly competitive or when externalities are present in production and consumption, international trade may not be welfare improving for all trading nations. More importantly perhaps, even when gains are ensured for all nations, international trade and exchange do not benefit *all* economic agents. It creates winners as well as losers within a trading nation.

What this means is that international exchange and trade redistributes incomes of economic agents within a country. This raises serious concern about who gains and who loses as a consequence of international trade. If unskilled workers lose, then with most of the poor being unskilled workers, international trade would make the poor poorer. In such a case, the Gains from Trade theorem, which means that international trade makes the country *as a whole* better off, makes little sense. Stolper and Samuelson were the first to provide a concrete answer to this question of the income distribution effect of international exchange in the 1940s. Though their original theoretical query was in the context of imposition of an import tariff, it can be reinterpreted in the context of opening up of international trade and exchange. Owners of factors of production that are relatively abundant in a country experience a rise in their *real* incomes, whereas owners of factors of production that are scarce experience a decline in their *real* incomes after the country opens up and engages in trade with the external world. This *Stolper–Samuelson theory* remained the cornerstone of international trade theory till it came in contradiction with empirical evidence regarding a rise in the wages of skilled workers relative to the wages of unskilled workers in most countries during the last two decades and a half. A new set of theories has since then emerged that generalizes the basic Heckscher–Ohlin–Samuelson (HOS) theory of trade to explain the observed wage inequality phenomenon.

International Trade and Output Growth

Achieving a high and sustained growth path constitutes a major economic target for countries since in public perception it is often the sole indicator of successful governance. Whether international trade augments or retards the growth process is thus another important issue in international trade theory and empirics. This issue has received much attention since the writings of Adam Smith in the late eighteenth century on the productivity gains that international trade may usher in by widening the scope of the market, thereby making greater division of labour possible. His productivity theory subsequently led to a theory of export-led growth as coined by Sir Denis Robertson in 1940. To David Ricardo, on the other hand, international trade was a way of delaying the stationary state for the fast-growing industrialized nations. Country experiences, however, do not always support the export-led growth hypothesis. More recent empirical studies by Dani Rodrik and others have refined this export-led growth hypothesis by emphasizing on the fact that *what* a country exports may matter more than *how much* it exports. High growth rate in many countries seems to have been driven more by exports of high-technology and skill-intensive goods rather than by low-skill-intensive and low-value addition goods than anything else. On the other hand, a diversified export basket, rather than a very specialized and concentrated export basket, seems to make the trade–growth relationship stronger at relatively lower stages of growth of countries. Specialization matters only after countries are already on a higher growth path.

At the same time serious concerns were raised by economists like Jagdish Bhagwati and Harry Johnson, among others, about welfare consequences of such export-led or export-biased growth. If growth caused by domestic factor accumulation augments the exports of a country, its terms of trade may move against it. This inflicts a secondary burden, which if large enough may outweigh the primary benefits of growth. Thus, growth in an open economy may be *immiserizing*. The other concern that arises and has been the subject of empirical study is the redistributive effect of growth that international trade causes. During the 1950s, Simon Kuznets argued about an inverted-U relationship between per capita income growth and income inequality. At the initial stages of growth, income inequality accentuates and beyond a threshold growth level it declines. This relationship, known as the Kuznets Curve, means that international trade may cause further income inequality through its growth impact, in addition to its short-run income redistribution effects. Growth may also be exclusive rather than inclusive as it may bypass the unskilled and the poor and benefit only the handful of rich. Faster output growth achieved by many countries in the present era of globalization and trade liberalization often has this inherent exclusiveness.

Free Trade versus Protection

Despite gains from trade, countries have often been observed, at least till the recent waves of globalization beginning in the 1980s, to restrict trade through import tariffs and non-tariff barriers. History of protectionism dates a long way back to the mercantilist idea in seventeenth- and eighteenth-century Europe that manufacturing exports should be encouraged and imports of the same should be discouraged. For raw materials, imports should be encouraged instead. The idea behind this selective trade restriction and promotion was that manufacturing production and exports are essential for development and growth and raw materials are an important component of the production for manufacturing. Later in the nineteenth century, Robert Torrens, John Stuart Mill, and Alfred Marshall argued that there exists scope for further improvement in a nation's welfare over and above the free trade level by restricting trade if the country is large enough to influence the terms of trade in its favour. This led to the theory of optimum tariff by Francis Edgeworth and Nicholas Kaldor.

The post–World War II development in the theory of international trade identified at least three more justifications for trade interventions. First, when externalities in production or consumption are present, which lead to incorrect patterns of production specialization and trade, trade intervention *might* be a better trade policy than free trade. This is, however, the theory of second best, since trade interventions cannot fully correct—and in some cases they may actually accentuate—these kind of *domestic* distortions. Second, a newly developed industry requires protection from foreign competition in its initial formative years when production and other operational costs are high. When the industry has grown sufficiently enough over time to attain its optimum scale of operation, average costs come down and it can then withstand foreign competition. The long-run gains to be had from protecting an infant industry must be thus weighed against the consumption and production losses in the short run. This is the *infant industry* argument for protection, which is essentially a dynamic argument.

Last but not least, the *strategic trade* theories provide a further justification for trade interventions. When national monopolies are large conglomerates and have market powers even in international markets for the goods that they produce, trade policies can be used by national

governments to influence the international market share rivalry amongst these large monopolies to the national advantage.

However, in most of the cases discussed earlier, unilateral trade protection and promotion benefits a country at the cost of its trading partners. Thus, trading partners retaliate and this leads to multilateral trade protection, making everyone worse off. This, in turn, opens up the issue of *trade policy coordination and cooperation* by forming a regional trade bloc. Without such a binding agreement, multilateral trade liberalization within a region cannot be a self-enforcing proposition since all countries in that region will have unilateral incentives to impose tariffs on imports from others. Motivated primarily by this potential welfare gain through reciprocal market access, regional trading arrangements have proliferated since the 1990s. This has been a cause of concern as regional agreements have often overlapped and led to what Bhagwati calls the spaghetti bowl effect. Moreover, this regional approach has only slowed down the momentum in the multilateral approach to global free trade through GATT (General Agreement on Tariffs and Trade) and later WTO rounds of negotiations, and consequently raised the concern of whether the bilateral and regional approach to trade liberalization is a stepping stone or a stumbling block to multilateralism and global free trade.

Balance of Payments and Exchange Rate Regime

Values of exports and imports of goods and services and buying and selling of assets undertaken by economic agents according to principles of comparative advantage may not exactly match with each other. But a country cannot print foreign currency to meet the demand for these currencies by its importers of goods and services; that is, it will have to earn foreign currency by exporting goods and services or selling its domestic assets. So the issue that is of utmost importance is how to correct for payment imbalances when a country's receipts of foreign currency fall short of payments to be made for imports. This is linked to a country's choice of exchange rate regime. If a market-determined flexible exchange rate for its own currency vis-à-vis foreign currencies is chosen, then payment imbalances that actually mean excess demand for or excess supply of foreign currencies can be automatically corrected through changes in the exchange rate. But this comes with a cost as such exchange rate movements may cause inflation or trigger recession. A pegged exchange rate for its domestic currency, on the other hand, can insulate the real sectors of an economy from such adverse effects, but it calls for some policy interventions to correct for payment imbalances. Moreover, to meet the excess demand for foreign currency in cases of payment deficits, the monetary authority of the country must sell foreign currencies from its reserves. As we will learn from this book, this may potentially lead to a balance of payments crisis for the country in the long run when perpetual payment deficits run down reserves of foreign currencies. The country will then default on its international debt obligations as was almost the case for India in March 1991.

SCOPE AND ORGANIZATION OF THE BOOK

Given these perspectives, this textbook introduces students and researchers to the basic principles of international exchange and its causes and consequences, as expounded by David Hume in his international monetary analysis in the eighteenth century and David Ricrado in his principles of comparative advantage in the early nineteenth century, and further developed

later by Eli Heckscher, Bertil Ohlin, and Paul Samuelson. More complex dimensions of trade and factor flows, intricacies of trade and exchange rate policies, international trade rules and standards, and open economy macroeconomic issues are also discussed in the later part of the book. Though this textbook is primarily meant for undergraduate students, some advanced topics are intended to take them beyond the standard undergraduate courses taught in universities and institutes around the globe. These topics can also be used as a primer for postgraduate courses on international trade theory and policy. In particular, Chapters 3, 12, 13, and 18 discuss such advanced topics, which may be skipped by for a basic undergraduate course without any loss of logical continuity. Similarly, there are a few sub-sections in some of the chapters marked as advanced topics, which may be optional segments in the basic undergraduate courses on international economics.

The prerequisite for this textbook is a basic understanding of intermediate-level microeconomics and macroeconomics, and high-school algebra. Basic concepts and issues of international economics are introduced through simple logical arguments followed by graphical illustrations. Algebra comes in only as a supplement to provide a structure to the argument, or where the issues at hand require quantification.

Part I of the book is devoted to providing answers to the three basic questions of international economics. Chapter 1 discusses the basic principles of international exchange and trade. It encompasses both the Smithian concept of absolute advantage and the Ricardian concept of comparative (cost) advantage. Public policies influencing a country's comparative advantage and pattern of trade are the added dimensions in the discussion on the basis of trade. Chapter 2 analyses when countries gain from trade and what such gains mean for different groups of economic agents within countries. Chapter 3 is meant for advanced readers who would like to know how the principles of comparative advantage can be estimated empirically. The determination of the terms of trade and properties of international equilibrium are discussed in Chapter 4.

Part II discusses alternative theories of comparative advantage and inter-industry trade whereas Part III focuses on the recent developments in the theory of intra-industry trade. The two basic models of trade that constitute the building blocks of international trade theory and policy—the Ricardian model and the HOS model—and their properties are discussed in Chapters 5 and 6, respectively. Chapter 7 discusses several digressions in the HOS model including higher dimensional issues. In contrast to these theories and models of inter-industry trade among dissimilar countries, Chapter 8 introduces alternative explanations for intra-industry trade among similar countries.

Part IV is devoted to unilateral and coordinated trade policy choices for countries. Chapters 9 and 10 examine implications of tariffs, subsidies, and non-tariff barriers to trade. Chapter 11 extends these analyses to cases of domestic and international monopolies. These market imperfections open up the possibility of a strategic use of trade policies as emphasized in more recent theories developed since the mid-1980s. Chapters 12 and 13 cover advanced topics. Political economy and endogeneity of trade policies are discussed in Chapter 12 whereas trade interventions in cases of distortions are discussed in Chapter 13. Chapter 14 examines costs and benefits of trade policy coordination among countries through regional trading arrangements. Evolution of the European Union is discussed as a case study in this context.

Part V discusses issues in input and services trade and trade–growth relationships. Different theoretical channels through which increased trade may augment output growth as well as the welfare implications of growth in an open economy are discussed in Chapter 15. An added dimension of the discussions on such a relationship is the current debate on whether growth is inclusive or exclusive. Chapter 16 studies the implications of international factor flows, foreign direct investment, and more topical issues like the fragmentation of the vertical chain of production, outsourcing and global value chain. Causes and consequences of services trade, which is growing in volume as well as in complexity, are discussed in Chapter 17. A new dimension that has been discussed in this context is virtual trade in intermediate services caused by time zone differences of countries. The emerging rules of international exchange and the role of the WTO are discussed in Part VI. Chapter 18 focuses on how product standards—labour and quality—and environmental regulations affect international exchange as new forms of non-tariff barriers. Chapter 19 introduces students to the role of the WTO and its rules in governing world trade.

Part VII is devoted to analyses of monetary issues and international currency systems. Chapter 20 studies the balance of payments account of a country, its different components, and the concepts of equilibrium and disequilibrium in the payments account. Determination of national income of an open economy and its relation to the balance of trade and current account are studied in Chapter 21. Chapter 22 narrates the evolution of international currency systems and different national exchange rate regimes. The origin of India's balance of payments crisis and the exchange rate policies introduced to manage the crisis are discussed as a case study. Chapter 23 discusses different balance of payment adjustment policies under a pegged exchange rate regime. The policy conflict that may arise in maintaining both internal and external balance is the focal point of analysis here. Monetarists view balance of payment imbalances as essentially reflections of monetary adjustments in an economy. In the long run, when such monetary adjustments are complete, the balance of payments is in equilibrium. This approach and its subsequent variations by Robert Mundell and J.M. Fleming are discussed in Chapter 24. In Chapter 25, a new chapter in this Second Edition, financial crises originating in the developing world, and occurring under overvalued pegged (or crawling peg) exchange rate regimes with or without capital and exchange controls have been discussed. Finally, Chapter 26 makes a comparison of flexible and pegged exchange rate regimes in light of the theories discussed in the earlier chapters. At the end of the book, a glossary of some of the important inter-governmental agencies is presented for ready reference.

PART I

Basis and Gains from Inter-industry Trade

1 Basis of Inter-industry Trade

International trade in commodities among countries can take a variety of forms. According to the nature of commodities being exported and imported, international trade can be classified into inter-industry and intra-industry trade. Trade is inter-industry in character if the commodities that are being exported and imported by a country belong to distinctly different industry groups. For example, when India exports rice, fruits and vegetables, and textiles, and imports wheat, sugar, and scientific instruments, such trade is inter-industry trade. But India, like many other countries, also exports and imports commodities that belong to the same industry group and are similar or may even be identical. These products are differentiated from each other either marginally or substantially. For example, software of different kinds and uses, or automobiles of different varieties and models, are exported as well as imported by India. This type of trade falls under the category of intra-industry trade.

A first-hand distinction between inter- and intra-industry trade can be made in the context of bilateral trade between China and India in 2004 as reported in Table 1.1. The top six export items for each country in terms of their shares in the respective total exports are shown in Table 1.1. Exports of iron and steel, plastics, cotton, and salt by India to China and exports of electrical machinery, nuclear reactors, silk, and mineral fuels by China to India are inter-industry in character. Both countries also export organic and inorganic chemicals to each other. In terms of this broad classification of industrial goods, this part of bilateral trade, which accounts for 11 and 18 per cent of the total bilateral exports from India and China respectively, is intra-industry in character.

Issues and explanations for these two types of trade are totally different. For example, in the context of inter-industry trade the relevant issue is what governs the pattern of trade between countries such as the one reported here between China and India. For intra-industry trade, on the other hand, it is important to know why both countries export similar industrial goods such as organic and inorganic chemicals in the above example, to each other. In this chapter we begin with the traditional explanations of inter-industry trade. Alternative explanations of intra-industry trade are discussed later in Chapter 8.

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Table 1.1 Bilateral Trade between China and India in 2004

Share of Commodity in Total Exports from India to China	
Iron and Steel	20.42
Plastics and Articles thereof	9.03
Organic Chemicals	7.50
Cotton	3.64
Inorganic Chemicals	3.42
Salt, Sulphur, Stone, Lime, and Cement	3.05
Share of Commodity in Total Exports from China to India	
Electrical Machinery and Equipment	29.17
Organic Chemicals	15.89
Nuclear Reactors, Boilers	12.20
Silk	5.46
Mineral Fuels, Mineral Oils, and Mineral Waxes	5.46
Inorganic Chemicals	2.74

Source: WITS Commodity Trade Database, UNCTAD.

1.1 ARBITRAGE AND INTER-INDUSTRY TRADE

Arbitrage—*buying cheap and selling dear*—is the basic force behind most of the trade or exchange that takes place, whether spatial or across time. When arbitrage takes place across different geographical or national boundaries, it is known as international trade. Arbitrage (and hence trade) is possible only when price differences exist. It determines which of the goods produced in an economy are to be exported and which are to be imported. For example, if computers are sold at a lower price in the United States than they are in India, these will be bought cheap there and sold dearer in India. This will then constitute imports of computers by India from the United States. On the other hand, if cotton textiles are sold cheaper in India than in the United States or elsewhere, these goods will be bought cheap in India and sold dearer in the United States by Indian traders. This will then constitute exports of cotton textiles from India. Of course, the cost of transporting goods from India to the United States will also matter. If the cost of transporting goods to the United States is larger than the prevailing price difference, it will not pay to export cotton textiles there. Similarly, it will be profitable for traders to import computers from the United States only if even after paying for transport costs, the computers produced there can be sold at a lower price to Indian buyers than computers locally produced in India. Apart from transport costs, another important factor which determines the possibility of arbitrage and international trade is the price prevailing in countries that potentially compete with the country concerned. For example, for India to be able to export cotton textiles to the United States, it is not sufficient to know whether Indian cotton textiles are cheaper than American cotton textiles, but also whether they are cheaper than those produced in Bangladesh or China, or India's other major competitors in cotton textiles. Otherwise American traders will buy cotton textiles cheap from those countries, rather than from India, and will sell them dearer in the United States.

Note that cross-country price differences, net of transport costs, and consequent arbitrage become the only driving force of international trade if computers and cotton textiles, in our

example, produced in India and elsewhere are of the same variety or quality. But, if these products are differentiated, and buyers prefer different varieties of the same good, international trade can take place in such differentiated varieties even if there is no cross-country price difference and hence no scope of arbitrage. We will return to this later in Chapter 8.

Thus, as long as we consider inter-industry trade in non-differentiated goods, arbitrage is the key force behind international trade, and for this there must exist cross-country differences in *pre-trade* prices. However, price differences are only a manifestation of the basis of trade. To understand the actual basis of trade, we need to know why prices may differ across countries for the *same* good that they produce. Suppose, India and the United States are the only two countries in our world and that computers and cotton textiles are the only two goods that they produce. Pre-trade or autarchic prices of these goods in the two countries depend on many factors. But in essence it is the relative scarcity or abundance that makes prices higher or lower in one country than in the other.

To exemplify and illustrate, suppose the relative demand for computers, which is the ratio of quantity demanded of computers per unit of quantity demanded of cotton textiles, $\left(d = \frac{D_c}{D_T}\right)$, is higher in India than in the United States. In other words, India has a relative *demand bias* in computers. In Figure 1.1, this pre-supposition implies that the relative demand for computers in India (I), labeled d_I, lies to the right of the relative demand for computers in the United States (U), labeled d_U. But suppose the domestic supplies of computers relative to that of cotton textiles, $\frac{S_c}{S_T}$, are the same in the two countries, as represented by the relative supply curve *s*. Computers would, therefore, be relatively scarce in India than they are in the United States resulting in a higher relative pre-trade price of computers that are locally produced: $p_I > p_U$. This difference in relative price will create scope for arbitrage and hence international trade. Note that in this example cotton textiles, on the other hand, are relatively abundant and hence their (relative) price is lower in India than it is in the United States. Thus, arbitrage will dictate international trade and its pattern: India will export cotton textiles to the United States and import computers from there. Of

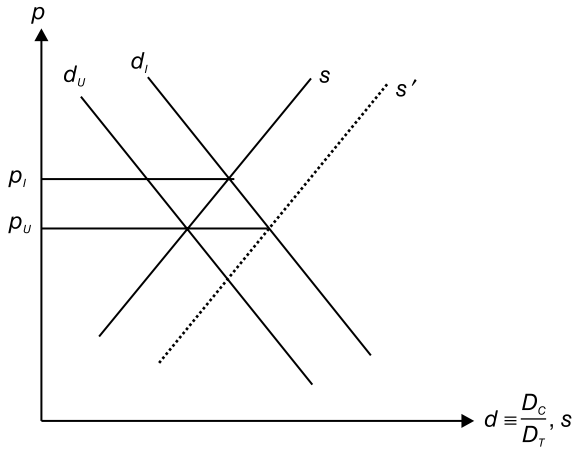


Figure 1.1 Cross-Country Pre-trade Relative Price Differential

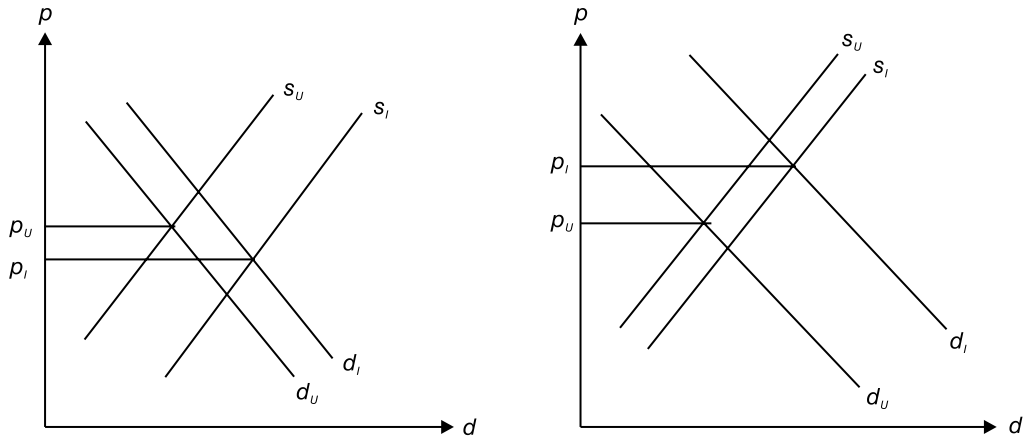
course, as mentioned earlier, this pattern of trade will take place as long as transport costs do not erode the profits that the traders can realize through buying cheap and selling dear.

Alternatively, a similar pattern of trade will arise if the demand conditions prevailing in the two countries are the same, say as represented by the demand curve d_I, but relative production and supply of computers is larger in the United States than it is in India as represented by the relative supply curves s' and s respectively. Thus, in this case, the United States has a supply bias in computers. Once again, computers being relatively abundant in the United States, the pre-trade relative price of computers will be lower there. Thus computers will be imported by India from the United States.

In these illustrations, pre-trade price differences across nations and the consequent scope of arbitrage and international trade arise due to either a demand bias in India for computers or a supply bias in the United States for computers. Of course, a country may have both a demand bias and a supply bias in the same good relative to other countries. But in such a case, there may not be any cross-country price differences and hence any trade between the countries at all. For example, suppose India has both a demand bias and a supply bias in computers. Referring back to Figure 1.1, the relative supply curve for India is represented by s' and that for the United States is represented by s. But, as depicted, the demand and supply biases for India (relative to the United States) are such that in both the countries the prevailing pre-trade relative market price is p_U. There will thus be no scope for arbitrage and hence for international trade.

In general, trade will take place when a country has either a demand bias or a supply bias, or has both demand and supply biases but in *different* goods. A demand bias in computers makes it relatively dearer (and cotton textiles relatively cheaper) in that country, and these are imported from the other country. A supply bias in cotton textiles, in addition, makes them even cheaper and computers even dearer, thereby reinforcing the demand bias in computers. But when a country has a demand bias and a supply bias in the same good, that is, it has both a higher demand and higher local production than elsewhere, there are three possibilities. First, at any given relative price, the magnitude of the larger local production of the good relative to production elsewhere is larger than higher local demand for the good. This makes this good relatively abundant and hence its price lower than elsewhere (see Figure 1.2a). This good will then be *exported*. Second, at any given relative price, the magnitude of larger production and higher demand are the same so that the pre-trade local price is the same as elsewhere. In this case no trade takes place as illustrated in Figure 1.1. Finally, at any given relative price, the magnitude of larger local production of the good relative to its production elsewhere is smaller than higher local demand for the good. This makes this good relatively scarce and hence its price higher than elsewhere (see Figure 1.2b). This good will then be *imported*. For example, India can produce larger quantities of wheat than many other countries, and yet it may import wheat if the local demand for wheat is even larger.

What are the sources of these demand and supply biases? While all the factors that influence demand and supply are relevant here, the three fundamental sources are taste or preference, technology, and factor endowment. The traditional neo-classical trade theory emphasizes on cross-country differences in these fundamentals as determinants of trade. If tastes are homothetic in both the countries, the relative demand will depend only on the relative price



(a) A Larger Supply Bias and Export of Computers

(b) A Larger Demand Bias and Import of Computers

Figure 1.2 Demand and Supply Biases and Pattern of Trade

regardless of the per capita income levels of countries.[1] When tastes are identical as well, countries will demand the same relative units of computers. In contrast, the situations depicted in Figures 1.1 and 1.2 reflect India's *taste bias* in computers regardless of the per capita income levels in the two countries. On the other hand, if United States has superior technology in producing computers (or an inferior technology in producing cotton textiles) than India, it will have a supply bias as depicted in Figure 1.1. Thus, for example, if tastes are homothetic and identical, but production technologies are different across countries, a supply bias will arise that will result in differences in pre-trade (relative) market prices. In such a case, the actual basis of trade is cross-country differences in technology. This resembles the explanation given by David Ricardo (1971). As we will see later, a similar supply bias will arise for the United States if it is a relatively capital-abundant country and computers are relatively capital-intensive as compared to cotton textiles. Thus, with homothetic and identical tastes, the United States will export computers to and imports cotton textiles from India. This is the Heckscher-Ohlin explanation of trade between countries. We will have a more elaborate discussion on these explanations in Chapters 4 and 5.

What follows from these discussions is that the traditional trade theory emphasizes on *dissimilarity of countries as the basis of trade*. If both India and the United States had been identical or similar with respect to tastes, technology, and factor endowment, no arbitrage and trade could have been

[1] By homothetic tastes and preferences we mean that if a consumer prefers the consumption bundle (x_1, x_2) to (y_1, y_2) then she prefers the bundle (tx_1, tx_2) to (ty_1, ty_2) $\forall\ t > 0$. For such preferences, the income consumption curve is a straight line through the origin, meaning that a rich and a poor consumer (or a rich and a poor country) will buy the two goods in the same ratio if they face the same relative prices of the goods.

Box 1.1 Regulations on Arbitrage and Trade

Often a large amount of a country's trade is regulated by the national government, prohibiting the scope of arbitrage and thus not allowing the pattern of trade that price differences and arbitrage would have resulted in. For example, exports and imports of food grains are often restricted on grounds of food security. Rice, wheat, onions, and sugar are some of the commodities that are not allowed to be traded freely by the Government of India according to price differences in India and in other countries. Apart from these specific instances related to food security, national governments may also limit the scope of arbitrage through tariffs on imports to protect domestic producers or to improve national welfare.

possible. Does this mean that similar countries do not trade among themselves? Yes, they do, and, in fact, they trade more among themselves than with dissimilar countries. As we will discuss later, a very large proportion of world trade is among similar countries. The new trade theories that are discussed in Chapter 8, explain such trade among similar countries in terms of economies of scale, strategic motives of firms and product differentiation.

1.2 COMPARATIVE ADVANTAGE

The cross-country differences in *pre-trade relative prices* that lead to arbitrage and trade essentially reflect the *comparative advantage* of the two countries. In our illustrations in Figures 1.1 and 1.2b, the United States has a comparative advantage in computers whereas India has a comparative advantage in cotton textiles. As it follows from the discussions in the earlier section, there are three fundamental sources of comparative advantage—technology asymmetry of countries, factor endowment differences across countries, and demand asymmetry or the taste bias of countries. Thus, comparative advantage reflects the relative strength of a country. Technological superiority of a country vis-à-vis the other, or abundance of a particular factor of production relative to other countries establishes its comparative advantage.

A nation's comparative advantage, however, is essentially determined through interactions of each of these fundamental sources. As exemplified earlier, favourable technological conditions in a nation in producing some goods will not lead to comparative advantage or lower relative pre-trade prices of these goods, if demand conditions and factor endowment conditions are not favourable as well.

An equally important element of a nation's comparative advantage is its government and public policies, which can improve or counter the comparative advantage based on fundamentals. In the next section we elaborate on this aspect.

1.2.1 Public Policy and Induced Comparative Advantage: Fundamental Sources

Public policies often generate externalities for the private sector. For example, public investment in infrastructure or social overheads such as transport, communication, power, and irrigation, generate positive externalities on the production of private consumption goods. Better roads lower the cost of transporting raw materials to factories. In cases of such positive externalities, public investments can offset inferiority of production technology and establish

Box 1.2 Doctrine of Comparative Cost Advantage

Comparative advantage as a determinant of pattern and gains from trade was first conceptualized by David Ricardo in his *Doctrine of Comparative Cost Advantage*. Ricardo argued that a country would have a comparative cost advantage in a good that it can produce at a lower cost due to its technological superiority relative to what other countries can do. Under the presumption of constant costs and perfectly competitive markets, this comparative cost advantage translates into comparative advantage (or relative price difference), which, as explained above, determines trade. But these assumptions do not always best approximate the real-world scenario. Price differentials may not always reflect cost differentials, particularly when marginal costs are increasing. Thus, it is quite possible that countries have a comparative advantage in goods in which they have comparative cost *dis*advantages in the Ricardian sense. Since trade is essentially an arbitrage activity that depends on the price differential, it is obvious that the pattern of trade will be dictated by the comparative advantage which may or may not reflect a comparative cost advantage.

a comparative advantage. Similarly, despite having better technology, a country may suffer from poor infrastructure. A typical example is the hardware industry. India performs many hardware assembly tasks for its domestic market with the components coming from East and Southeast Asia. This ability to organize this aspect of production could itself have been the basis for further development of India's hardware capabilities. Several East Asian countries also began mainly as assemblers of sophisticated components produced elsewhere and later gained comparative advantage in hardware products. But the development trajectory in India has not followed a similar path because the hardware industry requires high quality infrastructure which has not been there.

Even when the countries have no differences in their fundamentals—technology, factor endowment, and taste—differences in infrastructure facilities can create a supply bias and thus establish comparative advantage if positive externalities of public investment in the two sectors are asymmetric.[2] Another important example of public policy inducing comparative advantage is public investment in education and human capital formation. India's growing comparative advantage in information technology and software and in information technology enabled services (ITeS) over the last three decades is an example of this. Public investment in setting up Indian Institutes of Technology (IITs), together with English being the primary mode of instruction in a majority of the schools and institutions of higher education throughout India, has enabled it to enjoy a comparative advantage in these exports and services over China, Israel, and many other Asian and European rival countries. Unlike the hardware industry, poor infrastructure in India did not stand in the way of developing the software industry because

[2] There might also be an indirect demand effect of infrastructure development. To the extent to which infrastructure development raises national income we can expect relative demand to change and therefore differences in infrastructure facilities to generate a taste bias, if income elasticities are not unitary.