

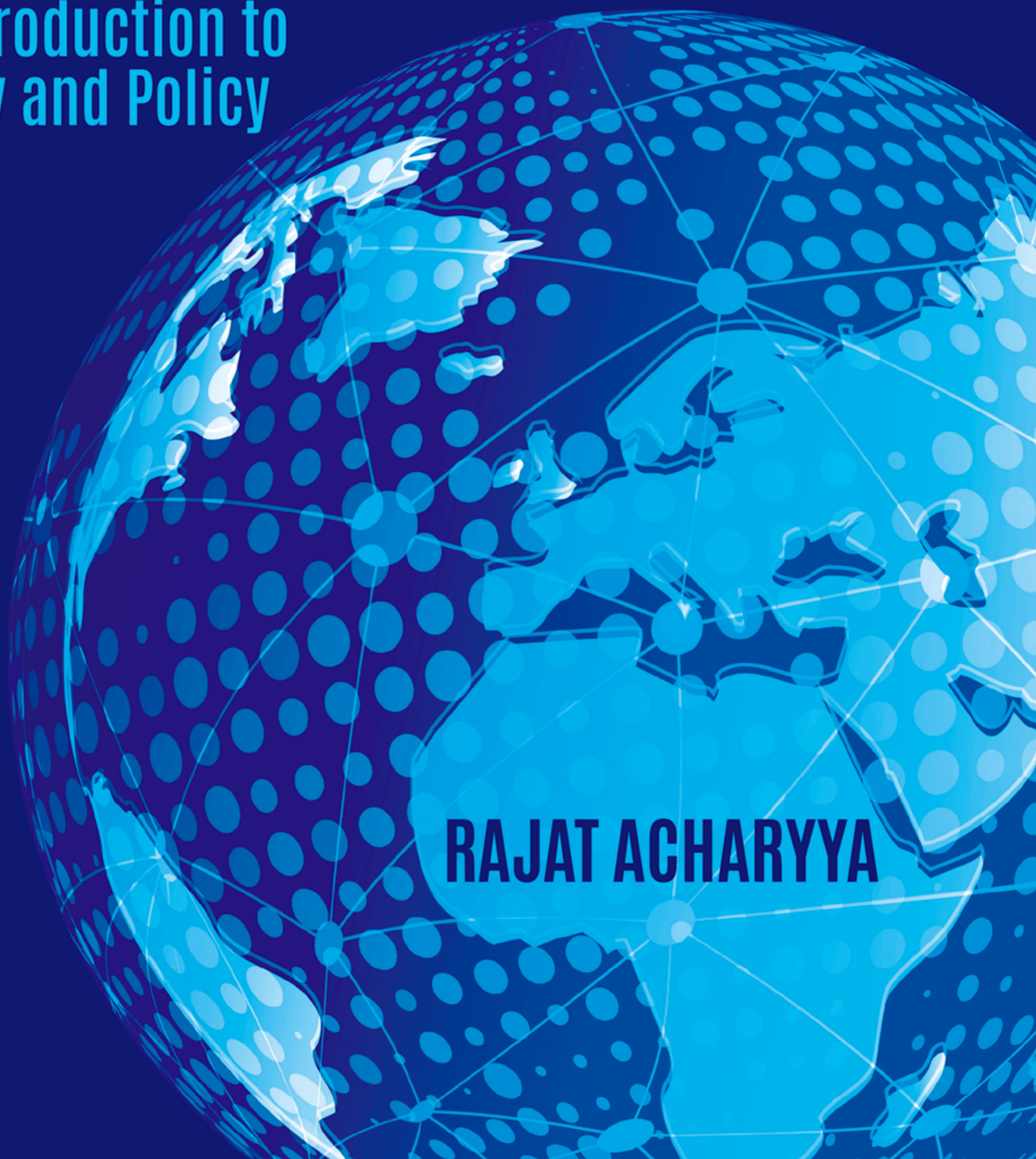
SECOND EDITION

# INTERNATIONAL ECONOMICS

An Introduction to  
Theory and Policy

**RAJAT ACHARYYA**

OXFORD



# **International Economics**



# International Economics

An Introduction to Theory and Policy

RAJAT ACHARYYA

Second Edition

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# Contents

<i>List of Tables, Figures, and Boxes</i>	xv
<i>Preface</i>	xxiii
<i>Introduction</i>	xxvii

## **PART I BASIS AND GAINS FROM INTER-INDUSTRY TRADE**

<b>CHAPTER 1 Basis of Inter-industry Trade</b>	<b>3</b>
1.1 Arbitrage and Inter-industry Trade	4
1.2 Comparative Advantage	8
1.2.1 <i>Public Policy and Induced Comparative Advantage:             Fundamental Sources</i>	8
1.2.2 <i>Selective Factor Disadvantage, Innovations, and Shifting             Comparative Advantage</i>	11
1.2.3 <i>Comparative Advantage in vertical stages of production:             Global Value Chain</i>	13
1.3 Digital and Virtual Trade	14
1.4 Advanced Topic: Revealed Comparative Advantage	15
<b>CHAPTER 2 Gains from Trade</b>	<b>22</b>
2.1 Trade, Gains, and Redistribution	22
2.2 Resource Reallocation and Gains from Trade	26
2.3 Decomposition of GFT: Specialization and Exchange Gains	30
2.3.1 <i>Substitution Possibility in Consumption and the Exchange Gain</i>	31
2.3.2 <i>Substitution Possibility in Production and Specialization Gain</i>	31
2.4 Sufficient Conditions for GFT	32
2.5 Pollution: A Trade-Off between GFT and Environmental Degradation	35
2.6 Increasing Returns to Scale (IRS) and GFT	36
2.6.1 <i>Case I: GFT under Weak IRS and Violation of Tangency Condition</i>	36
2.6.2 <i>Case II: GFT under Strong IRS and Non-convexity</i>	36
<b>Appendix A2</b>	<b>37</b>
I. Returns to Scale and Convexity of the Production Set	37

<b>CHAPTER 3</b>	<b>Test of Comparative Advantage and Measuring GFT</b>	<b>44</b>
3.1	Measuring the Welfare Change: Compensating and Equivalent Variations	44
3.2	GFT by CV Measure	45
3.3	Equivalent Variation and GFT	46
3.4	A Test of Comparative Advantage: The Case of Japan	48
<b>CHAPTER 4</b>	<b>International Equilibrium and the Terms of Trade</b>	<b>52</b>
4.1	Offer Curve of the Home Country	53
4.2	Backward Bending Offer Curve	55
4.3	Offer Curve under Constant Opportunity Cost	57
4.4	Foreign Offer Curve and the International Equilibrium	57
4.5	Welfare Properties of the International Equilibrium	60
4.5.1	<i>Gains from trade revisited</i>	60
4.5.2	<i>Global Pareto optimality of free trade bundle</i>	61
	<b>Appendix A4</b>	<b>62</b>
I.	<i>Geometric Measurement of the Import Demand Elasticity along Offer Curve</i>	62
II.	<i>Existence, Uniqueness, and Stability of International Equilibrium</i>	63
III.	<i>Trade Indifference Curves and Alternative Derivation of Offer Curves</i>	65
IV.	<i>Measurement and Trends in Barter TOT</i>	66
<b>PART II THEORIES OF COMPARATIVE ADVANTAGE AND PATTERN OF TRADE</b>		
<b>CHAPTER 5</b>	<b>Technology and Trade</b>	<b>73</b>
5.1	Constant Opportunity Cost, Technology, and Trade	73
5.2	Role of Relative Size of Trading Nations and Distribution of GFT	78
5.3	Advanced Topics	81
5.3.1	<i>Many Commodity Extension</i>	81
5.3.2	<i>World Production Possibility Frontier and Many Countries Extension</i>	84
5.3.3	<i>Technology for Sale</i>	86
5.4	International Trade and Technology Choice	87
<b>CHAPTER 6</b>	<b>Factor Endowment and Trade</b>	<b>95</b>
6.1	Assumptions and the Structure of the HOS Model	95
6.2	Autarchic Equilibrium and the Pattern of Trade	100
6.3	Two Properties of the Model: Output and Price Magnification Effects	103
6.3.1	<i>Endowment Shock and Output Changes</i>	103
6.3.2	<i>Price Magnification Effect</i>	106
6.4	Factor Prices at the Post-trade Equilibrium	108
	<b>Appendix A6</b>	<b>115</b>
I.	<i>Full Employment Output Levels and Conditions for Incomplete Specialization</i>	115
II.	<i>Price Magnification Effect</i>	116
III.	<i>Algebraic Derivation of the Relative Supply Curve</i>	118
IV.	<i>Output Magnification Effect or the Rybczynski Theorem</i>	121
V.	<i>A Fixed Coefficient HOS Model</i>	121

<b>CHAPTER 7</b>	<b>Digressions on Factor Endowment Theory and Trade Empirics</b>	<b>128</b>
7.1	Empirical Tests of the HO Theorem: Leontief Paradox	128
7.2	Factor Content and the HOV Theorem	130
7.3	Price Magnification Effect and FPE Revisited	132
7.3.1	<i>Factor Immobility and Specific Factors</i>	132
7.3.2	<i>Non-traded Goods</i>	139
7.3.3	<i>Advanced Topic: FPE in Higher Dimensions</i>	144
7.4	Advanced Topic: Evidence on Within Country Wage Movements and the Wage Gap Debate	145
	<b>Appendix A7</b>	<b>150</b>
I.	<i>Price Magnification Effect in the SF Model</i>	150
II.	<i>Growth in Labour Force and Relative Supply</i>	151
<b>PART III BASIS AND GAINS FROM INTRA-INDUSTRY TRADE</b>		
<b>CHAPTER 8</b>	<b>Theories of Intra-industry Trade</b>	<b>159</b>
8.1	IIT in Identical Products	160
8.2	IIT in Horizontally Differentiated Products	164
8.2.1	<i>Love for Variety Approach, Monopolistic Competition, and IIT</i>	164
8.2.2	<i>Characteristic Approach</i>	165
8.3	Product Development and IIT in Vertically Differentiated Products	168
8.4	Firm Heterogeneity and Export Decision	173
8.5	Advanced Topic: Intra-industry Trade Indices	174
8.5.1	<i>The Grubel–Lloyd (GL) Index of Intra-industry Trade</i>	174
8.5.2	<i>Other Measures and Refinements of the GL Index of Intra-industry Trade</i>	177
	<b>Appendix A8</b>	<b>179</b>
I.	<i>Algebra of Brander (1981) Model with Transport Cost: Linear Market Example</i>	179
II.	<i>Monopolistic Competition and IIT in Differentiated Goods: Krugman (1979)</i>	182
<b>PART IV TRADE INTERVENTION AND COORDINATION</b>		
<b>CHAPTER 9</b>	<b>Import Tariff and Export Subsidies</b>	<b>193</b>
9.1	Economic Effects of an Import Tariff: A Partial Equilibrium Analysis	194
9.2	Revenue Motive and Revenue Maximizing Tariff	196
9.3	General Equilibrium Analysis: TOT and Volume of Trade (VOT) Effects	198
9.3.1	<i>Change in Output, Consumption, and Volume of Trade for a Small Economy</i>	198
9.3.2	<i>TOT Effect, Welfare Change, and the Optimum Tariff for a Large Country</i>	200
9.3.3	<i>Tariff Retaliation and Trade War among Countries</i>	204
9.4	Tariffs and Protection of Domestic Industries	206
9.4.1	<i>Infant Industry Argument for Protection</i>	207
9.4.2	<i>Imported Input and Effective Rate of Protection</i>	207
9.4.3	<i>Tariff Protection in a Large Country: The Metzler Paradox</i>	210



9.5	Tariff and Income Distribution	212	
9.6	Export Subsidy, TOT Deterioration, and Welfare Loss	213	
	<b>Appendix A9</b>		216
I.	<i>Import Demand Elasticity and Its Decomposition</i>	216	
II.	<i>Change in Real Income and the Optimum Tariff</i>	216	
III.	<i>Revenue Maximizing and Optimum Tariffs</i>	218	
IV.	<i>Welfare Reaction Curves</i>	221	
V.	<i>Lerner's Symmetry Result</i>	222	
VI.	<i>Lerner's Case: Government Spending and TOT Deterioration</i>	222	
VII.	<i>Symmetry of Lerner's Case and the Metzler Paradox</i>	223	
	<b>CHAPTER 10 Quantitative Restrictions, Non-tariff Barriers, and Equivalence</b>		229
10.1	Import Quota, Implicit Tariff, and Scarcity Rent	229	
10.2	Voluntary Export Restraints	233	
10.3	Other Non-tariff Barriers	237	
	<b>CHAPTER 11 Market Imperfection and Trade Policy</b>		241
11.1	Competitive World Production and Domestic Monopoly	241	
11.2	Protection of a Domestic Monopoly	243	
11.2.1	<i>Competitive Foreign Supply: Non-equivalence of Tariff and Quota</i>		243
11.2.2	<i>Monopoly Foreign Supplier and Strategic Competition</i>		244
11.3	International Price Discrimination and Dumping	247	
11.4	International Market Share Rivalry and Strategic Trade Policy	248	
11.4.1	<i>Export Subsidies and Market Share Rivalry</i>	249	
11.4.2	<i>Tariff as an Export Promotion Strategy</i>	252	
11.5	Advanced Topic: Monopoly, Pareto Sub-Optimality, and GFT	252	
	<b>Appendix A11</b>		255
I.	<i>Decomposition of the Change in Real Income in a Non-competitive Economy</i>	255	
	<b>CHAPTER 12 Political Economy of Trade Policy</b>		260
12.1	DUP Lobbying Activities	260	
12.2	Political Economy of Trade Policy Choice	264	
12.2.1	<i>Democracy, Political Risk, and Political Support Approach</i>	264	
12.2.2	<i>Lobbying and Contribution Approaches</i>	267	
	<b>Appendix A12</b>		270
I.	<i>Comparison of Profits Under Import Quota and Import Tariff</i>	270	
	<b>CHAPTER 13 Market Failure, Distortions, and Trade Policy</b>		274
13.1	Taxonomy of Distortions	275	
13.1.1	<i>Types of Distortions</i>	276	
13.1.2	<i>Causes of Distortions</i>	277	
13.2	Optimal Intervention	286	
13.2.1	<i>Tariff or Quota as Optimal Policy Intervention for Foreign Distortion</i>		286
13.2.2	<i>Optimal Policy Intervention for Production Distortion</i>	288	
13.2.3	<i>Optimal Policy Intervention for Consumption Distortion</i>	290	
	<b>Appendix A13</b>		290
I.	<i>Product Distortion under Wage Differential</i>	290	

<b>CHAPTER 14</b>	<b>Multilateralism and Regionalism</b>	<b>295</b>
14.1	Typology of Regional Trading Agreements (RTAs) and Economic Cooperation	296
14.1.1	<i>Different Stages of Regional Economic Cooperation</i>	296
14.1.2	<i>Evolution of the European Union through Successive Stages of Cooperation</i>	297
14.1.3	<i>Open and Unanimous Regionalism</i>	299
14.1.4	<i>Scope and Coverage of RTAs</i>	300
14.2	Bilateralism and Regionalism: Old and the Contemporary	300
14.2.1	<i>Pre–World War I Bilateralism and Regionalism</i>	300
14.2.2	<i>Post–World War and Contemporary Regionalism</i>	301
14.3	Regional Trading Agreements: Trends, Causes, and Effects	302
14.3.1	<i>Growth, Composition, and Distribution of RTAs</i>	302
14.3.2	<i>Economic Effects and Gains from Regionalism</i>	303
14.3.3	<i>Why are RTAs Formed?</i>	307
14.4	Multilateralism in the Post-WTO Era and Global Free Trade	310
14.4.1	<i>From Regionalism to Multilateralism?</i>	311
<b>PART V INPUT TRADE, SERVICES, AND GROWTH</b>		
<b>CHAPTER 15</b>	<b>Trade, Growth, and Inclusion</b>	<b>321</b>
15.1	International Trade and Growth	322
15.1.1	<i>Trade as an Engine of Growth</i>	322
15.1.2	<i>Trade as Vent for Surplus</i>	323
15.1.3	<i>Trade, Redistribution, and Growth</i>	323
15.1.4	<i>Trade, Variety, and Growth</i>	324
15.1.5	<i>Import-led Growth (ILG)</i>	325
15.1.6	<i>Country Experiences</i>	325
15.2	Growth, TOT, and Welfare	327
15.2.1	<i>Secular Deterioration in TOT for a Primary Good Exporter</i>	328
15.2.2	<i>Immiserizing Growth</i>	330
15.3	Trade, Growth, and Inclusion	332
	<b>Appendix A15</b>	<b>335</b>
I.	<i>Diversification of the Export Basket</i>	335
II.	<i>Composition of the Export Basket: Manufacturing and High-Technology Exports</i>	335
<b>CHAPTER 16</b>	<b>Foreign Capital Inflow, Multinationals, and Migration</b>	<b>342</b>
16.1	Factor Flows and the Goods Price Equalization (GPE) Theorem	343
16.2	Foreign Capital Inflow: Causes and Consequences	345
16.2.1	<i>Growth, Welfare, and Distributional Consequences of Foreign Capital Inflow</i>	346
16.2.2	<i>Foreign Capital Inflow and Aggregate Employment in the Host Country</i>	351
16.3	Foreign Direct Investment and Multinational Corporations (MNCs)	352
16.3.1	<i>Tariff Jumping Theory</i>	354
16.3.2	<i>Fragmentation and Economies of Scale</i>	357
16.3.3	<i>Fragmentation, Vertical Specialization and Global Value Chain</i>	358

16.3.4	<i>Government Policies in Developing Countries: Export Processing Zones (EPZs)</i>	361	
16.4	Asymmetry between Labour Migration and Capital Flow	361	
<b>CHAPTER 17</b>	<b>Services Trade</b>		<b>367</b>
17.1	Conceptual Issues	367	
17.2	Services Trade: Types and Trends	368	
17.3	Determinants of Services Trade	372	
17.4	Services Trade, Welfare Gains, and Growth	375	
17.4.1	<i>Welfare Gains and Income Distribution</i>	375	
17.4.2	<i>Services Export-Led Growth</i>	376	
<b>PART VI STANDARDS, REGULATIONS, AND MULTILATERAL TRADE AGREEMENTS</b>			
<b>CHAPTER 18</b>	<b>Product Standards, Regulations, and Trade</b>		<b>385</b>
18.1	Quality Standards, Trade, and Employment	386	
18.2	Labour Standards and Trade Sanctions	388	
18.3	Environmental Standards, Trade, and FDI	392	
18.3.1	<i>Standards, Comparative Advantage, and Unfair Trade</i>	392	
18.3.2	<i>Trade, Income Gains, and Demand for Higher Standards</i>	394	
18.3.3	<i>Capital Flight, Pollution Havens, and Migration of Dirty Industries</i>	395	
<b>CHAPTER 19</b>	<b>World Trade Organization and Trade Agreements</b>		<b>400</b>
19.1	Structure and Functions of the WTO	400	
19.1.1	<i>Structure of the WTO</i>	400	
19.1.2	<i>Functions of the WTO</i>	401	
19.2	Decision Making	402	
19.3	WTO Rules and Principles of Trade Policy	403	
19.4	WTO Agreements	405	
19.4.1	<i>Multilateral Agreements on Trade in Goods</i>	405	
19.4.2	<i>Agreement on Trade Related Intellectual Property Rights (TRIPS)</i>	409	
19.4.3	<i>Plurilateral Trade Agreements: Agreement on Government Procurement (GPA)</i>	413	
<b>Appendix A19</b>			<b>414</b>
I.	Tariff Reductions and Market Access for Non-agricultural Products (NAMA)	414	
<b>PART VII THEORY OF BALANCE OF PAYMENTS AND OPEN ECONOMY MACROECONOMICS</b>			
<b>CHAPTER 20</b>	<b>Balance of Payments and National Income Accounting</b>		<b>423</b>
20.1	Classification of Transactions and Sub-accounts	423	
20.2	BOP Accounting: An Example	426	
20.3	Autonomous and Accommodating Transactions and BOP Equilibrium	428	
20.4	Basic Identities in BOP and National Income Accounting	429	

<b>CHAPTER 21</b>	<b>National Income and Current Account Balance:</b>	
	<b>The Income Approach</b>	437
21.1	Effective Demand, National Income, and Trade Balance: Income Approach	438
21.2	Expenditure and Foreign Trade Multipliers Without the International Transmission Effect	440
21.2.1	<i>Foreign Trade Multipliers</i>	441
21.2.2	<i>Expenditure Multipliers</i>	444
21.3	International Transmission Mechanism	446
21.4	Transfers and Trade Balance: The Transfer Problem	449
21.4.1	<i>The Classical Case</i>	451
21.4.2	<i>Under-Effectuated Transfer in a Keynesian World</i>	453
	<b>Appendix A21</b>	455
I.	<i>Foreign Trade and Expenditure Multipliers without Transmission Mechanism</i>	455
II.	<i>Expenditure Multiplier with Transmission Mechanism</i>	455
III.	<i>Transfer, TOT, and Real Income of the Donor</i>	456
IV.	<i>Under-Effectuated Transfer in an Effective-Demand Model</i>	457
<b>CHAPTER 22</b>	<b>International Currency Systems and Exchange Rate Regimes</b>	463
22.1	The International Monetary System	464
22.1.1	<i>Gold Standard</i>	464
22.1.2	<i>Bretton Woods and Thereafter</i>	464
22.1.3	<i>Different Currency and Exchange Rate Regimes in the Post-Bretton Woods Era</i>	466
22.2	Exchange Rate under a Clean Float	469
22.3	Interventions in the Foreign Exchange Market	474
22.3.1	<i>A Dirty or Managed Float</i>	474
22.3.2	<i>Over-Valued Pegged Exchange Rate Regime</i>	476
22.3.3	<i>Exchange Control and Black Market for Foreign Exchange</i>	478
22.3.4	<i>BOP Crisis under Over-Valued Pegged Exchange Rate Regime</i>	483
22.3.5	<i>Target Zone</i>	485
22.4	India's BOP Crisis and Its Exchange Rate Policies	486
	<b>Appendix A22</b>	488
I.	<i>Existence, Uniqueness, and Stability in the Foreign Exchange Market under Clean Float</i>	488
II.	<i>The Optimal Under-Invoicing of Exports</i>	489
III.	<i>Allocation of Expenditure and Black Market Dollar Demand</i>	490
<b>CHAPTER 23</b>	<b>BOP Adjustment Policies in a Pegged Exchange Rate Regime</b>	497
23.1	Two Types of Adjustment Policies	498
23.1.1	<i>Expenditure Reducing Policies: Absorption Approach</i>	498
23.1.2	<i>Expenditure Switching Policy: Elasticity Approach</i>	500
23.2	Synthesis Approach	502
23.2.1	<i>Expenditure Reducing Policy</i>	504
23.2.2	<i>Expenditure Switching Policies</i>	505

23.3	Internal and External Balance and the Policy Conflict	509	
23.4	Advanced Topics on Devaluation	512	
23.4.1	<i>The Laursen–Metzler Effect</i>	512	
23.4.2	<i>Non-traded Good, Real Exchange Rate, and Devaluation</i>	513	
	<b>Appendix A23</b>		515
I.	<i>Elasticity Approach</i>	515	
II.	<i>Synthesis Approach: Slopes of <math>Y_i Y_i</math> and <math>TB_i = 0</math> Curves</i>	516	
III.	<i>Devaluation and Trade Balance</i>	517	
IV.	<i>Tariff, National Income, and Trade Balance</i>	517	
V.	<i>Devaluation and the Real Exchange Rate</i>	518	
	<b>CHAPTER 24 Money, Price, and Exchange Rate</b>		523
24.1	The Monetarist Approach to BOP	524	
24.1.1	<i>Hume’s Price-Specie Flow Mechanism</i>	524	
24.1.2	<i>Building Blocks of the Monetarist Model</i>	525	
24.1.3	<i>Monetary Adjustment under Fixed Exchange Rate</i>	527	
24.1.4	<i>Monetary Adjustment under Flexible Exchange Rate</i>	533	
24.2	Monetary Adjustment under Keynesian Assumption	535	
24.2.1	<i>Mundell’s Income-Specie Flow Mechanism</i>	535	
24.2.2	<i>Capital Mobility and Stabilization Policies under Pegged Exchange Rate</i>	537	
24.2.3	<i>Capital Mobility and Stabilization Policies under Clean Float</i>	542	
24.3	Asset Market, Portfolio Choice, and the Exchange Rate	544	
24.4	Purchasing Power Parity and the Exchange Rate	551	
24.4.1	<i>Wage-Price Flexibility and the Long-Run Exchange Rate</i>	551	
24.4.2	<i>The Purchasing Power Parity Puzzle</i>	552	
24.4.3	<i>Exchange Rate Pass-Through</i>	554	
	<b>Appendix A24</b>		556
I.	<i>Price Changes in Monetarist Model under Flexible Exchange Rate</i>	556	
II.	<i>Mundell–Fleming Model under Flexible Exchange Rate: Shift of the IS Curve and the <math>B = 0</math> Locus</i>	557	
	<b>CHAPTER 25 Financial Crises in the Developing World</b>		563
25.1	Latin American Debt Crisis of the 1980s	564	
25.1.1	<i>Austerity measures and management of the Debt Crisis</i>	570	
25.2	Financial Crisis in Asia in late 1990s	574	
25.2.1	<i>Nature, Dimension and Cause of the crisis</i>	574	
25.2.2	<i>Measures to manage the crisis</i>	577	
25.3	Current Scenario: ANOTHER DEBT CRISIS ON THE CARD?	577	
	<b>CHAPTER 26 Currency Regimes Revisited</b>		585
26.1	Policy Targets and Choice of Exchange Rate Regime	585	
26.1.1	<i>Targeting BOP Equilibrium</i>	585	
26.1.2	<i>Insulating the Domestic Economy: Inflation and Output</i>	586	
26.1.3	<i>Uncertainty and Destabilizing Speculative Activity</i>	587	

26.1.4	<i>Internal Balance and Effectiveness of Domestic Stabilizing Policies</i>	588
26.1.5	<i>Autonomy of Domestic Monetary Policy</i>	589
26.2	Capital Flows, Money Supply, and Exchange Rate: The <i>Impossible Trinity</i>	591
26.3	Optimum Currency Area	593
	<i>Glossary of International Agencies</i>	599
	<i>Index</i>	603
	<i>About the Author</i>	609



# Tables, Figures, and Boxes

## TABLES

1.1	Bilateral Trade between China and India in 2004	4
1.2	India's Revealed Comparative Advantage in Merchandise Exports	16
7.1	Wage Inequality in Different Regions	146
8.1	Intra-industry Trade	160
8.2	SITC Classification of Products at Two-Digit and Four-Digit Levels	176
8.3	GL Index of Intra-industry Trade	177
9.1	Nominal and Effective Rates of Protection	209
9.2	Tariff Escalation in Developing and Industrial Countries, 1994–2000	210
14.1	Composition of RTAs by Type	302
15.1	Correlation between the Growth Rate and High-Technology Exports (HTX)	327
16.1	Sector Composition of India's FDI	353
16.2	Import Intensity of Exports and International Backward Linkage	360
17.1	Net Exports of Services by Japan to the World (million USD)	371
A19.1	Reduced Tariff Rates under the Swiss Formula for a Coefficient of 20	415
20.1	India's Balance of Payments: 2019–20 P (USD million)	426
25.1	Highly Indebted Developing Countries in 1980s	565



**FIGURES**

1.1	Cross-Country Pre-trade Relative Price Differential	5
1.2	Demand and Supply Biases and Pattern of Trade	7
1.3	Environmental Standards and Comparative Advantage	11
2.1	Pre-trade and Post-trade Equilibrium in the Home Country	23
2.2	Gains from Trade for the Home Country	27
2.3	Decomposition of Gains from Trade	30
2.4	Substitution Possibilities and Magnitude of GFT	32
2.5	Welfare Deteriorating Trade	33
2.6	GFT under Weak and Strong IRS	37
3.1	Compensating and Equivalent Measures of Welfare Change	45
3.2	Measuring the GFT by CV	46
3.3	Measuring the GFT by EV	47
4.1	Export Offer and Import Demand by the Home Country	54
4.2	Home Offer Curve	54
4.3	Backward Bending Home Offer Curve	56
4.4	Offer Curve under Constant Opportunity Cost	58
4.5	Equilibrium TOT	58
4.6	Multiple Equilibria and Instability	60
4.7	Welfare levels at free trade equilibrium	61
A4.1	Backward Bending Home Offer Curve	63
A4.2	Unique and Multiple Equilibria	64
A4.3	Trade Indifference Curves and Offer Curve	65
A4.4	Net Barter TOT Index for Selected Developed Countries (Base Year 2000 = 100)	66
A4.5	Barter TOT Index for Selected Developing Countries (Base Year 2000 = 100)	67
5.1	Autarchic Equilibrium	75
5.2	Complete Specialization and GFT in Ricardian Model	77
5.3	Country Size and Terms of Trade	78
5.4	Post-trade World Equilibrium	80
5.5	Pattern of Specialization with Continuum of Goods	83
5.6	World Production Possibility Frontier	84
5.7	A Four-Country Example	85
5.8	World PPF after Technology Transfer	87
6.1	CRS Production Function and Least-Cost Choice of Techniques	97
6.2	PPC in the HOS Model	101
6.3	Relative Supply Curve for Textiles in Home Country	101
6.4	Endowment Difference and Relative Production	102
6.5	Supply Bias and Pattern of Trade	103
6.6	Factor Price Frontiers and Price Magnification Effect	107
6.7	Correspondence between Commodity and Factor Prices	110

6.8	FPE Theorem	110
6.9	Factor Endowment and Equilibrium Factor Prices	112
6.10	Factor Endowment, Incomplete Specialization, and FPE	113
6.11	Factor Intensity Reversal and the FPE Theorem	114
A6.1	PPF with Fixed Coefficient Production Technology	122
A6.2	Relative Supply of Textiles under Fixed Coefficient	123
7.1	Labour Productivity and the Leontief Paradox	130
7.2	Full Employment in the SF Model	134
7.3	Labour Allocation and Wages	137
7.4	Non-traded Market	140
7.5	Local Market for the Non-traded Good	143
7.6	Local and Global Factor Intensity and Wage Inequality	146
7.7	Cone of Diversification and Production Specialization	149
8.1	Types of Intra-industry Trade and Alternative Theories	160
8.2	Market in India, Reciprocal Dumping, and IIT	162
8.3	Circular City and Distribution of Preferences	167
8.4	Profit-maximizing Selection of Quality	171
8.5	Equilibrium Export Quality	172
A8.1	Transport Cost and Gains from Intra-industry Trade	182
A8.2	Effect of Trade on Real Wage and Consumption	183
9.1	Economic Effects of an Import Tariff	194
9.2	Taxes on International Trade (Per cent of Tax Revenue)	197
9.3	Revenue Maximizing Tariff Rate	198
9.4	Effect of Tariff on Production and Consumption	199
9.4a	Tariff and Welfare of a Small Country	200
9.5	Import Tariff and TOT	201
9.6	Optimum Import Tariff	202
9.7	Tariff and Change in Welfare of a Large and a Small Country	203
9.8	Optimum Tariff for a Small Country	204
9.9	Tariff Retaliation and National Welfare	206
9.10	Ad-valorem Subsidy on Textile Exports	214
9.11	Export Subsidy and Welfare	215
A9.1	Home Welfare Reaction Curve	221
10.1	Quota on Import of Computers	230
10.2	Tariff, Quota, and TOT	233
10.3	Economic Effects of VER in the Exporting Country	234
10.4	Equivalence between Quota and VER	236
11.1	Trade, Domestic Monopoly, and Gains	242
11.2	Protection of a Domestic Monopoly	244
11.3	Foreign Monopoly Supplier and Protection	245

11.4	International Dumping	248
11.5	Export Subsidy and Market Share Rivalry	250
11.6	Domestic Monopoly and Pareto Sub-optimality	253
12.1	Welfare Loss from the Rent-Seeking Lobby	262
12.2	Rent-Seeking Equilibrium	262
12.3	Political Support and Choice of Trade Protection	266
12.4	Monopoly Seeking Lobby	268
12.5	Lobbying Competition	269
A12.1	Profit of a Domestic Monopoly	270
13.1	Foreign Distortion	278
13.2	Production Distortion and Sub-optimality	281
13.3	Consumption Distortion and Sub-optimality	283
13.4	Efficient Resource Allocation	284
13.5	Wage Differential and Production Distortion	285
13.6	Foreign Distortion and Optimum Tariff	288
13.7	Wage Differential and Optimal Policy	289
14.1	Evolution of European Integration	298
14.2	Distribution of FTAs	303
14.3	Gains from FTA for Large Partners	304
14.4	Gains from Labour Migration under Common Market	307
14.5	RTA and Politically Optimum Tariff	310
14.6	MTN and the Juggernaut Effect	313
15.1	Per Capita GDP Growth: Post-1980 Globalizers vs Non-globalizers	326
15.2	Deterioration of TOT of the Primary Good	329
15.3	Immiserizing Growth in a Large Open Economy	331
16.1	Capital Inflow and Factor Prices	347
16.2	Foreign Capital Inflow and Welfare of Host Country	348
16.3	Foreign Capital Inflow under Tariff	350
16.4	Foreign Capital Inflow and Employment	351
16.5	Share of FDI Inflow of Country Groups	352
16.6	Market Shares under Exports and FDI Strategies	356
16.7	Tariff Jumping FDI	357
16.8	Fragmented Production Technology and IRS	358
17.1	Percentage Share of Services Exports in Total Trade	369
17.2	Share in World Service Exports	370
17.3	Gains from Mode IV Services Trade	376
18.1	Binding Minimum Quality Restriction and Distortion	387

20.1	Classification of International Transactions in BOP	424
21.1	Simultaneous Determination of National Income and Trade Balance	440
21.2	Increase in Exports, National Income, and Trade Balance	443
21.3	Increase in Imports, National Income, and Trade Balance	444
21.4	Increase in Aggregate Spending, National Income, and Trade Balance	445
21.5	Simultaneous Determination of National Incomes	447
21.6	International Transmission and Foreign Trade Multiplier	448
22.1	Different Currency Systems and Exchange Rate Regimes	467
22.2	Equilibrium Spot Exchange Rate under Clean Float	472
22.3	Equilibrium Exchange Rate for Inelastic Import	473
22.4	Intervention under Managed Float	475
22.5	Over-Valued Pegged Exchange Rate Regime	477
22.6	Current Account Balance of China (Million USD)	478
22.7	Exchange Control	479
22.8	Black Market Premium on Dollar	482
22.9	Target Zone	485
A22.1	Black Market Dollar Demand	491
23.1	Expenditure Reducing Policy	499
23.2	Simultaneous Determination of TOT and National Income	504
23.3	Expenditure Reducing Policy in Synthesis Approach	505
23.4	Devaluation, Income Expansion, and Trade Balance	506
23.5	Tariffs and Trade Balance	508
23.6	Policy Conflict in Swan Diagram	510
23.7	Policy Sectors	512
24.1	Short-Run Equilibrium	530
24.2	Devaluation in the Monetarist Model	532
24.3	BOP Adjustment under Clean Float	534
24.4	Income-Specie Flow Mechanism	537
24.5	BOP Equilibrium Locus under Capital Mobility	538
24.6	Monetary Policy under Perfect Capital Mobility	539
24.7	Fiscal Policy under Perfect Capital Mobility	540
24.8	Fiscal Policy under Imperfect Capital Mobility	542
24.9	Monetary Policy under Clean Float	543
24.10	Fiscal Policy under Clean Float	544
24.11	Monetary and Fiscal Policy under Clean Float and High Capital Mobility	545
24.12	Money, Assets, and Exchange Rate	548
24.13	Output Changes and Exchange Rate	549
24.14	Monetary Policies under Pegged Exchange Rate Regime	550

25.1a	External Debt (% of Gross National Income)	565
25.1b	Total Debt Service (% of Gross National Income)	566
25.2	ToT deterioration for some indebted Latin American countries (Index Base Year: 2000)	567
26.1	Clean Float as Stabilizer of Real Sector Shocks	589
26.2	Autonomy of Monetary Policy under Clean Float	590
26.3	Asymmetric Shock in a Common Currency Area	595
<b>BOXES</b>		
1.1	Regulations on Arbitrage and Trade	8
1.2	Doctrine of Comparative Cost Advantage	9
1.3	Comparative versus Absolute Advantage	10
1.4	Innovation and Posner's Technology Gap Theory	12
2.1	Walras' Law	24
2.2	Gains from Trade and Pareto Improvement	26
2.3	Trade Triangle	30
2.4	GFT in Commodity-Endowment and Factor-Endowment Models	33
4.1	Other Elasticities Measured along an Offer Curve	57
5.1	Relative Demand and Supply curves, Size of Countries and the Post Trade equilibrium	79
5.2	Many Goods and Chain of Comparative Advantage	82
5.3	Trade-Related Intellectual Property Rights (TRIPS) and Innovation	89
6.1	Price Definition of Factor Abundance	98
6.2	Output magnification effect and the HO theorem	105
7.1	The Dutch Disease	142
7.2	Asymmetric Changes in Relative Wages across Different Skills	147
8.1	Linder Hypothesis: Demand Similarity	161
8.2	Innovation, Imitation, and the Product Life-Cycle Theory	169
9.1	Trade Protection and Dead-Weight Losses in the Indian Manufacturing Sector	195
9.2	Trade Taxes as a Source of Government Revenue	197
9.3	Optimum Tariff for a Small Country	204
9.4	Infant Industry Protection in History	208
9.5	Export Subsidies	215
10.1	Import Restrictions through Licenses in India	231
10.2	Binding Import quota and Domestic Price	231

10.3	Tariffication of QRs in India	233
10.4	QRs and Balance of Payments Objective	234
11.1	Rules for Anti-dumping in Practice	249
11.2	Anti-dumping Duties	250
11.3	Evidence on Tariff Protection as Export Promotion	253
12.1	Voting and Policy Decision	265
12.2	Ethno-linguistic Fractionalization and Government Spending	265
13.1	The Market versus the State	275
13.2	State Intervention versus Market Solution	287
14.1	Empirical Estimate of Gains from FTAs	306
14.2	Reciprocity Duties Act	308
14.3	Political–Economic Factors in the Formation of the EU	311
14.4	The Doha Development Round	312
15.1	Total Factor Productivity Growth in India	328
15.2	Supply Management of Primary Exports	329
15.3	Unionized Wages and Secular Deterioration in TOT	330
15.4	Inequality and Growth	333
15.5	Income Inequality and the Trickle Down Effect of Growth	333
15.6	Evidence on Trade and Poverty	334
16.1	Inward FDI in India	353
16.2	Mergers and Acquisitions	355
16.3	Import Intensity Measure of GVC Participation	360
16.4	EPZs as Engine of Growth in China	362
17.1	India’s Service Exports	370
17.2	The General Agreement of Trade in Services (GATS)	372
17.3	India’s Comparative Advantage in Services	374
17.4	Jobless Growth in India	377
18.1	Search and Experience Goods	387
18.2	Quality Uncertainty and Akerlof’s Lemons Problem	388
18.3	Core Labour Standards	389
18.4	Magnitude of Child Labour	390
18.5	Incidence of child labour: supply side and demand side explanations	391
18.6	Trans-boundary Pollution	394
19.1	Dispute Settlement Mechanism at WTO	402
19.2	Dispute Settlement: Complaint by India against the Customs Bond Directive of the United States	403

19.3	Seattle Ministerial Conference	404
19.4	Special Safeguards for Developing Countries	407
19.5	Price Support Estimate as an Alternative Measure of Domestic Support	408
19.6	Agreements on TBT and SPS	409
19.7	Copyright Protection	411
19.8	Indian Patent Act (1999), Mailbox Facility, and Compulsory Licensing	412
19.9	Goods in Transit versus Patent Infringement: India versus the EU	413
20.1	IMF Classifications	425
21.1	War Reparations	450
22.1	Special Drawing Rights (SDR)	466
22.2	The Euro	468
22.3	Spot and Forward Exchange Rates	473
22.4	Depreciation of Indian Rupee, Currency Speculation and RBI Intervention	476
22.5	Pegged Renminbi, BoP surpluses and Supply Management in China	478
22.6	FERA and FEMA in India	480
22.7	Under-Invoiced Trade in Bangladesh, China, India, and Sri Lanka	481
22.8	Devaluation and Black Market Premium (BMP)	484
22.9	Liberalized Exchange Rate Management System (LERMS)	488
23.1	The J-Curve Phenomenon	502
23.2	Assignment Problem and the Principle of Effective Market Classification	513
24.1	Mercantilism and International Trade Policy	525
24.2	Uncovered and Covered Interest Parity	546
24.3	Uncovered Interest Parity and Perfect Assets Substitutability	547
24.4	Sterilization and the Autonomy of Monetary Policy	551
24.5	Incomplete Pass-Through in the US Import Price	555
25.1	Definitions of Different Dimensions of Crises	564
25.2	Why did not the Asian Countries experience the debt problem in 1980s?	569
25.3	Free-rider problem and gains from concerted lending	572
25.4	Financing debt versus forgiving debt or debt relief	573
25.5	Bailouts and moral-hazards problems	578
25.6	HIPC Initiative and MDRI	579
26.1	Foreign Exchange Reserves and Sterilization in China	592
26.2	Monetary Cooperation, Monetary Integration and Monetary Union	593
26.3	Keynesian Critique of a Currency Area	596

# 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.

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# 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 Ricardo 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

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## **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.

**Table 1.1** Bilateral Trade between China and India in 2004

<i>Share of Commodity in Total Exports from India to China</i>	
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
<i>Share of Commodity in Total Exports from China to India</i>	
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

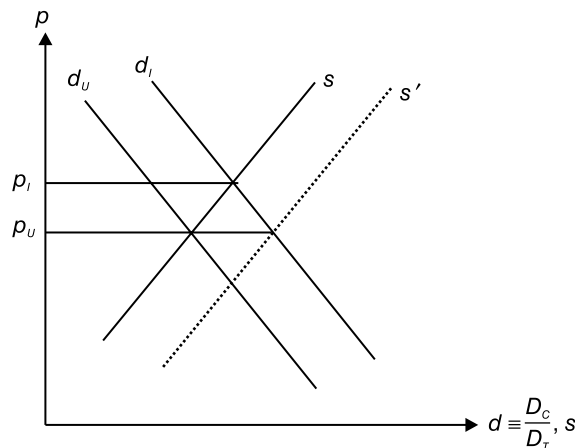
Arbitrage—*buying cheap and selling dear*—is the basic force behind most of the trade or exchange that takes place, whether spatial or across time. When arbitrage takes place across different geographical or national boundaries, it is known as international trade. Arbitrage (and hence trade) is possible 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,  $\left(d = \frac{D_c}{D_r}\right)$ , 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,  $\frac{S_c}{S_r}$ , 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



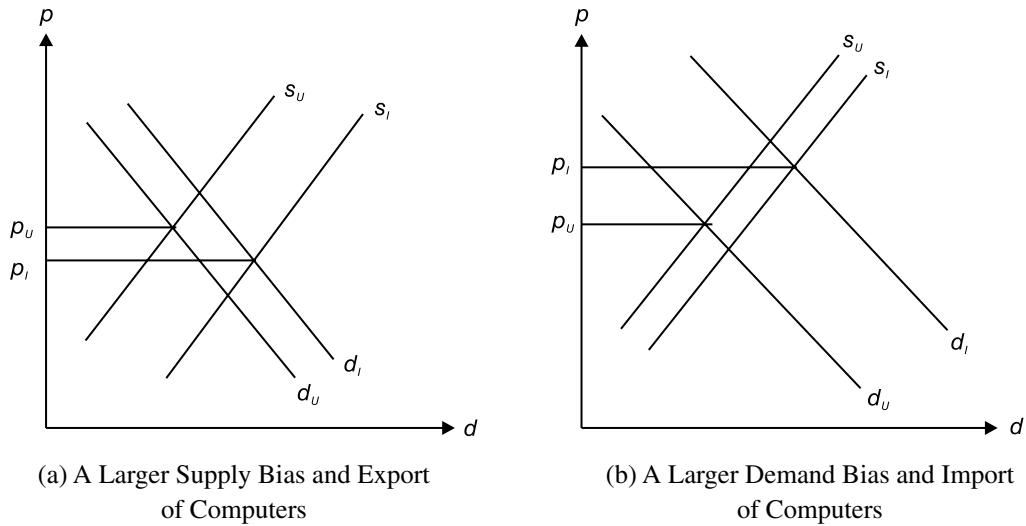
course, as mentioned earlier, this pattern of trade will take place as long as transport costs do not erode the profits that the traders can realize through buying cheap and selling dear.

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  $p_C$ . 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



**Figure 1.2** Demand and Supply Biases and Pattern of Trade

regardless of the per capita income levels of countries.<sup>1</sup> 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

<sup>1</sup> 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.<sup>2</sup> 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

<sup>2</sup> 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.