

# CONTENTS

## PREFACE

XI

## 1 INTRODUCTION: THE FACTS OF ECONOMIC GROWTH

I

- 1.1 THE DATA OF GROWTH AND DEVELOPMENT 3
- 1.2 OTHER "STYLIZED FACTS" 12
- 1.3 THE REMAINDER OF THIS BOOK 16

## 2

## THE SOLOW MODEL

18

- 2.1 THE BASIC SOLOW MODEL 20
  - 2.1.1 The Solow Diagram 24
  - 2.1.2 Comparative Statics 26
  - 2.1.3 Properties of the Steady State 28
  - 2.1.4 Economic Growth in the Simple Model 30
- 2.2 TECHNOLOGY AND THE SOLOW MODEL 32
  - 2.2.1 The Solow Diagram with Technology 34
  - 2.2.2 Solving for the Steady State 36
- 2.3 EVALUATING THE SOLOW MODEL 39



- 2.4 GROWTH ACCOUNTING AND THE PRODUCTIVITY SLOWDOWN 41  
EXERCISES 45

### 3

#### EMPIRICAL APPLICATIONS OF NEOCLASSICAL GROWTH MODELS

47

- 3.1 THE SOLOW MODEL WITH HUMAN CAPITAL 47  
3.2 CONVERGENCE AND EXPLAINING DIFFERENCES IN GROWTH RATES 56  
3.3 THE EVOLUTION OF THE INCOME DISTRIBUTION 64  
EXERCISES 68

### 4

#### THE ECONOMICS OF IDEAS

71

- 4.1 WHAT IS TECHNOLOGY? 72  
4.2 THE ECONOMICS OF IDEAS 73  
4.3 INTELLECTUAL PROPERTY RIGHTS AND THE INDUSTRIAL REVOLUTION 79  
4.4 DATA ON IDEAS 83  
4.5 SUMMARY 86  
EXERCISES 87

### 5

#### THE ENGINE OF GROWTH

88

- 5.1 THE BASIC ELEMENTS OF THE MODEL 89  
5.1.1 Growth in the Romer Model 93  
5.1.2 Growth Effects versus Level Effects 97  
5.1.3 Comparative Statics: A Permanent Increase in the R&D Share 98  
5.2 THE ECONOMICS OF THE MODEL 101  
5.2.1 The Final-Goods Sector 102  
5.2.2 The Intermediate-Goods Sector 104



5.2.3	The Research Sector	106
5.2.4	Solving the Model	107
5.3	OPTIMAL R&D	109
5.4	SUMMARY	111
	APPENDIX: SOLVING FOR THE R&D SHARE	113
	EXERCISES	114

## 6

## A SIMPLE MODEL OF GROWTH AND DEVELOPMENT 115

6.1	THE BASIC MODEL	115
6.2	STEADY-STATE ANALYSIS	118
6.3	TECHNOLOGY TRANSFER	122
6.4	UNDERSTANDING DIFFERENCES IN GROWTH RATES	123
	EXERCISES	125

## 7

## INFRASTRUCTURE AND LONG-RUN ECONOMIC PERFORMANCE 127

7.1	A BUSINESS INVESTMENT PROBLEM	128
7.2	DETERMINANTS OF $F$	129
7.3	DETERMINANTS OF $\Pi$	131
7.4	WHICH INVESTMENTS TO MAKE?	133
7.5	EMPIRICAL EVIDENCE	134
7.6	THE CHOICE OF INFRASTRUCTURE	138
7.7	GROWTH MIRACLES AND DISASTERS	140
7.8	SUMMARY	144
	EXERCISES	145

## 8

## ALTERNATIVE THEORIES OF ENDOGENOUS GROWTH 147

8.1	A SIMPLE ENDOGENOUS GROWTH MODEL: THE "AK" MODEL	148
8.2	INTUITION AND OTHER GROWTH MODELS	151
8.3	EXTERNALITIES AND AK MODELS	152



8.4	EVALUATING ENDOGENOUS GROWTH MODELS	155
8.5	WHAT IS ENDOGENOUS GROWTH?	157
	EXERCISES	158

## 9

### UNDERSTANDING ECONOMIC GROWTH

160

9.1	WHY ARE WE SO RICH AND THEY SO POOR?	161
9.2	WHAT IS THE ENGINE OF ECONOMIC GROWTH?	162
9.3	HOW DO WE UNDERSTAND GROWTH MIRACLES?	162
9.4	CONCLUSION	163

## APPENDIX A MATHEMATICAL REVIEW

165

A.1	DERIVATIVES	165
A.1.1	What Does $\dot{K}$ Mean?	165
A.1.2	What Is a Growth Rate?	166
A.1.3	Growth Rates and Natural Logs	167
A.1.4	"Take Logs and Derivatives"	168
A.1.5	Ratios and Growth Rates	168
A.1.6	$\Delta$ Log versus Percentage Change	169
A.2	INTEGRATION	170
A.2.1	An Important Rule of Integration	171
A.3	SIMPLE DIFFERENTIAL EQUATIONS	171
A.3.1	Compound Interest	174
A.4	MAXIMIZATION OF A FUNCTION	175
	EXERCISES	177

## APPENDIX B DATA ON ECONOMIC GROWTH

179

## BIBLIOGRAPHY

185

## INDEX

191