

#### Natural Resource and Environmental Economics

Visit the *Natural Resource and Environmental Economics*, Fourth Edition Companion Website at <a href="https://www.pearsoned.co.uk/perman">www.pearsoned.co.uk/perman</a> to find valuable <a href="https://www.pearsoned.co.uk/perman">student</a> learning material including:

- Additional materials to enhance your knowledge
- Excel files that use simulations techniques to explore environmental issues, problems and policies
- Maple examples and spreadsheet exercises to practise and test your understanding
- Appendices

# Natural Resource and Environmental Economics

### **Table of Contents**

^	`	$\overline{}$	٠,	$\sim$	v
ı	,	( )	v	H	ı

Natural Resource and Environmental Economics

Contents

Preface to the Fourth Edition

Acknowledgements

**Notation** 

Introduction

### Part I Foundations

An Introduction to Natural Resource and Environmental Economics

Learning Objectives

Introduction

**Three Themes** 

The Emergence of Resource and Environmental Economics

Fundamental Issues in the Economic Approach to Resource and Environmental Issues

Readers Guide

Summary

Further Reading

### The Origins of the Sustainability Problem

Learning Objectives

Introduction

Economyenvironment Interdependence

The Drivers of Environmental Impact

Poverty and Inequality

Limits to Growth?



The Pursuit of Sustainable Development

Summary

Further Reading

**Discussion Questions** 

**Problems** 

#### Ethics, Economics and the Environment

Learning Objectives

Introduction

Naturalist Moral Philosophies

Libertarian Moral Philosophy

Utilitarianism

Criticisms of Utilitarianism

Intertemporal Distribution

Summary

**Further Reading** 

**Discussion Questions** 

**Problems** 

#### Welfare Economics and the Environment

Learning Objectives

Introduction

Part I Efficiency and Optimality

**Economic Efficiency** 

An Efficient Allocation of Resources Is Not Unique

The Social Welfare Function and Optimality

Compensation Tests

Part li Allocation in a Market Economy

Efficiency Given Ideal Conditions

Partial Equilibrium Analysis of Market Efficiency

Market Allocations Are Not Necessarily Equitable

Part lii Market Failure, Public Policy and the Environment

The Existence of Markets for Environmental Services

Public Goods



Externalities

The Second-best Problem

Imperfect Information

Public Choice Theory Explaining Government Failure

Summary

Further Reading

Discussion Questions

**Problems** 

#### Part II Environmental Pollution

**Pollution Control: Targets** 

Learning Objectives

Introduction

Modelling Frameworks

Modelling Pollution Within an Economic Efficiency Framework

Pollution Flows, Pollution Stocks and Pollution Damage

The Efficient Level of Pollution

A Static Model of Efficient Flow Pollution

Efficient Levels of Emission of Stock Pollutants

Pollution Control Where Damages Depend on Location of the Emissions

**Ambient Pollution Standards** 

Intertemporal Analysis of Stock Pollution

Variable Decay

Departures from Convexity or Concavity in Damage and Abatement Cost (or Pollution Benefit) Functions

no Regrets Policies and Rebound Effects

The Double Dividend Hypothesis

Objectives of Pollution Policy

Summary

Further Reading

**Discussion Questions** 

**Problems** 

Pollution Control: Instruments



Learning Objectives

Introduction

Criteria for Choice of Pollution Control Instruments

Cost Efficiency and Cost-effective Pollution Abatement Instruments

Instruments for Achieving Pollution Abatement Targets

Economic Incentive (quasi-market) Instruments

Pollution Control Where Damages Depend on Location of the Emissions

A Comparison of the Relative Advantages of Command and Control, Emissions Tax, Emission Abatement Subsidy and Marketable Permit Instruments

Summary

Further Reading

**Discussion Questions** 

**Problems** 

### Pollution Policy with Imperfect Information

Learning Objectives

Introduction

Difficulties in Identifying Pollution Targets in the Context of Limited Information and Uncertainty

Sustainability-based Approaches to Target Setting and the Precautionary Principle

The Relative Merits of Pollution Control Instruments Under Conditions of Uncertainty

Transactions Costs and Environmental Regulation

Summary

Further Reading

Discussion Question

**Problems** 

### **Economy-wide Modelling**

Learning Objectives

Introduction

Inputoutput Analysis

**Environmental Inputoutput Analysis** 

Costs and Prices

Computable General Equilibrium Models



Summary

**Further Reading** 

**Discussion Questions** 

**Problems** 

#### International Environmental Problems

Learning Objectives

Introduction

Game Theory Analysis3

International Environmental Agreements

Other Factors Conducive to International Environmental Cooperation

Stratospheric Ozone Depletion

Global Climate Change

**Learning Outcomes** 

**Further Reading** 

**Discussion Questions** 

**Problems** 

#### Trade and the Environment

Learning Objectives

Introduction

An Environmental Extension to Traditional Trade Theory

Does Free Trade Harm the Environment? a Partial Equilibrium Analysis

General Equilibrium Models of Trade and the Environment

Do Governments Have an Incentive to Manipulate Environmental Standards for Trade Purposes?

Environmental Policy and Competition Between Jurisdictions for Mobile Capital

Banning Trade in Endangered Species

The General Agreement on Tariffs and Trade and the World Trade Organisation

The Empirical Evidence on Environmental Regulations and the Pattern of Trade

Summary

Further Reading

**Discussion Questions** 



### Part III Project Appraisal

### Costbenefit Analysis

Learning Objectives

Introduction

Intertemporal Welfare Economics

Project Appraisal

Costbenefit Analysis and the Environment

Summary

Further Reading

**Discussion Questions** 

**Problems** 

### Valuing the Environment

Learning Objectives

Introduction

Categories of Environmental Benefits

The Theory of Environmental Valuation

Contingent Valuation

Choice Experiments

The Travel Cost Method

**Hedonic Pricing** 

Production Function-based Techniques

Summary

Further Reading

**Discussion Questions** 

**Problems** 

### Irreversibility, Risk and Uncertainty

Learning Objectives

Introduction

Individual Decision Making in the Face of Risk

Option Price and Option Value

Risk and Irreversibility



Environmental Costbenefit Analysis Revisited

Decision Theory: Choices Under Uncertainty

A Safe Minimum Standard of Conservation

Summary

**Further Reading** 

**Discussion Questions** 

**Problems** 

### Part IV Natural Resource Exploitation

### The Efficient and Optimal Use of Natural Resources

Learning Objectives

Introduction

Part I a Simple Optimal Resource Depletion Model

The Economy and Its Production Function

Is the Natural Resource Essential?

What Is the Elasticity of Substitution Between K and R?

Resource Substitutability and the Consequences of Increasing Resource Scarcity

The Social Welfare Function and an Optimal Allocation of Natural Resources

Part li Extending the Model to Incorporate Extraction Costs and Renewable Resources

The Optimal Solution to the Resource Depletion Model Incorporating Extraction Costs

Generalisation to Renewable Resources

Complications

A Numerical Application: Oil Extraction and Global Optimal Consumption

Summary

Further Reading

**Discussion Questions** 

**Problems** 

The Theory of Optimal Resource Extraction: Non-renewable Resources

Learning Objectives

Introduction



A Non-renewable Resource Two-period Model

A Non-renewable Resource Multi-period Model

Non-renewable Resource Extraction in Perfectly Competitive Markets

Resource Extraction in a Monopolistic Market

A Comparison of Competitive and Monopolistic Extraction Programmes

Extensions of the Multi-period Model of Non-renewable Resource Depletion

The Introduction of Taxation/subsidies

The Resource Depletion Model: Some Extensions and Further Issues

Do Resource Prices Actually Follow the Hotelling Rule?

Natural Resource Scarcity

Summary

**Further Reading** 

**Discussion Questions** 

**Problems** 

#### Stock Pollution Problems

Learning Objectives

Introduction

An Aggregate Dynamic Model of Pollution

A Complication: Variable Decay of the Pollution Stock

Steady-state Outcomes

A Model of Waste Accumulation and Disposal

Summary

**Further Reading** 

Discussion Question

Problem

#### Renewable Resources

Learning Objectives

Introduction

**Biological Growth Processes** 

Steady-state Harvests

An Open-access Fishery

The Dynamics of Renewable Resource Harvesting



Should One Use a Continuous-time Model or a Discrete-time Model of the Open-access Fishery?

Alternative Forms of Biological Growth Function in Which There Is a Positive Minimum Viable Population Size

Stochastic Fishery Models

The Private-property Fishery

Dynamics in the Pv-maximising Fishery

Encompassing the Open-access, Static Private-property and Pvmaximising Fishery Models in a Single Framework

Socially Efficient Resource Harvesting

A Safe Minimum Standard of Conservation

Resource Harvesting, Population Collapses and the Extinction of Species

Renewable Resources Policy

Summary

Further Reading

**Discussion Questions** 

**Problems** 

#### Forest Resources

Learning Objectives

Introduction

The Current State of World Forest Resources

Characteristics of Forest Resources

Commercial Plantation Forestry

Multiple-use Forestry

Socially and Privately Optimal Multiple-use Plantation Forestry

Natural Forests and Deforestation

Government and Forest Resources

Summary

Further Reading

**Discussion Questions** 

**Problems** 

Accounting for the Environment



Learning Objectives

Introduction

Environmental Indicators and State of the Environment Reporting

Environmental Accounting: Theory
Environmental Accounting: Practice

Wealth and Genuine Saving

Sustainable Development Indicators

Concluding Remarks

Summary

Further Reading

**Discussion Questions** 

**Problems** 

References

Names Index

Subject Index