Journal of
Economic and Social Thought
econsciences.com
Volume 12 March 2025 Issue 1

Introduction to Environmental Economics and Policy in Japan. By Toshi H. Arimura & Akira Hibiki, Springer 2024

By Takaharu SUZUKI †

Abstract. This open-access textbook provides an accessible introduction to the theoretical foundations of environmental economics, uniquely grounding it with Japan's extensive policy experience. The book is structured into two main parts. Part I: Environmental Economics Theory, examines core concepts such as market failure, negative externalities, and the social optimum. It offers a comparative analysis of policy instruments, demonstrating why market-based solutions—like Pigouvian taxes, emission trading systems (ETS), and property rights (Coase Theorem)—are often preferable to command-and-control regulations. New theoretical sections delve into optimal waste management, policy choice under uncertainty (Weitzman's 'prices versus quantities' analysis), and liability rules for environmental accidents. Part II: Environmental Policy in Japan, applies this theory to the country's policies, thereby contextualizing the content for readers in Asia and developing economies. It details Japan's sophisticated recycling system (e.g., the Container and Packaging Recycling Law) and its approach to emerging issues like microplastic pollution and illegal dumping. Crucially, the book covers the economic analysis of Japan's air pollution control measures and its evolving climate policy, ranging from the Kyoto Protocol's Clean Development Mechanism (CDM) to domestic carbon pricing instruments, including the Green Transformation (GX) initiative. Designed without advanced calculus, this volume serves as an essential resource for students and policymakers interested in the practical application of environmental economics.
Keywords. Environmental Economics; Carbon Pricing; Market Failure / Negative Externality; Recycling Policy; Emission Trading Systems (ETS).
JEL. P16, Q50; Q53; Q54; Q58; O53.

Book Review

Introduction to Environmental Economics and Policy in Japan, authored by Toshi H. Arimura and Akira Hibiki, is a timely and significant contribution to the field of environmental economics. Published as an open-access volume, the book uniquely distinguishes itself by seamlessly integrating fundamental economic theory with a detailed, empirically grounded analysis of environmental policy derived from Japan's distinct historical experience. It explicitly aims to overcome the North American and European-centric bias found in many standard textbooks, making it an invaluable resource for students and policymakers in Asia and developing economies—regions grappling with environmental challenges often analogous to those faced by Japan during its rapid industrialization. The book achieves its pedagogical goal by deliberately avoiding calculus and complex algebra, thereby extending its accessibility to a broader audience, including non-economics majors, government officials, and corporate environmental officers.

† Central University of Haryana, India.

Part I: The Theoretical Foundation of Environmental Policy

Part I (Chapters 1–6) meticulously constructs the theoretical framework necessary for understanding the economic dimensions of environmental problems. The core argument begins in Chapter 1 by identifying environmental issues such as pollution and climate change as classic examples of negative externalities and market failure. The authors introduce the concept of the social optimum, where social welfare is maximized, and introduce the Pigouvian tax as the primary market-based mechanism for internalizing external costs and achieving this optimum. This foundational discussion ensures that subsequent policy evaluations are grounded in the economically rational concept of "optimal pollution," moving beyond the simplistic ideal of zero pollution.

A key strength of the theoretical section is its comparative analysis of environmental policy instruments. Chapter 2 directly addresses the trade-offs between market-based instruments (like taxes) and command-and-control regulations (like technology standards). The authors follow the established economic consensus by demonstrating that market mechanisms, particularly environmental taxation, are preferable in the long run because they minimize aggregate abatement costs and encourage a desirable structural adjustment of industry (i.e., the exit of less profitable polluting firms). Subsidies are shown to be less likely to achieve this effect permanently. This comparison is essential for policymakers seeking cost-effective abatement strategies.

The review extends to advanced topics rarely covered in introductory texts:

1. Property Rights and Emissions Trading: Chapter 3 offers a clear exposition of the Coase Theorem and the role of property rights in resolving externalities when transaction costs are negligible. It then uses this framework to explain the mechanics and significance of Emission Trading Systems (ETS), highlighting their emergence as a practical implementation of the Coase solution. The chapter effectively differentiates the Pigouvian tax (a price mechanism) and the ETS (a quantity mechanism).
2. Uncertainty and Policy Choice: Chapter 4 delves into the critical topic of policy choice under uncertainty, building on Weitzman's seminal "prices versus quantities" paper. This is highly relevant in the context of climate change, where both marginal benefits (the cost of carbon damage) and marginal costs (abatement costs) are uncertain. The analysis shows that the choice between a carbon tax (price) and an ETS (quantity) depends on the relative slopes of the marginal external cost (MEC) curve and the abatement cost curve—a sophisticated topic explained with pedagogical clarity.
3. Advanced Micro-Policy: Chapters 5 and 6 address specific, contemporary policy challenges such as waste management and liability rules. The waste management discussion examines optimal disposal fees and the complex issue of intertemporal landfill use, where economic principles are applied to finite resources. Chapter 6, covering liability rules for environmental accidents, focuses on ensuring that firms reach the socially optimal level of precaution, even considering the potential complications of the "proof of causation" problem.

Part II: Environmental Policy in Japan: A Case Study for Developing Economies

The second part of the book (Chapters 7–9) shifts from abstract theory to applied policy, using Japan as a rich case study. This section is the defining feature of the book, offering practical lessons that resonate globally, particularly in developing economies that face pollution and resource constraints similar to those of Japan's post-war era.

- Recycling and the Circular Economy (Chapter 7): This chapter provides an in-depth examination of Japan's multilayered recycling system, covering six major acts, including the Container and Packaging Recycling Law and the Home Appliance Recycling Law. This assessment goes beyond mere description, analyzing the effectiveness and associated problems of these laws. Crucially, it addresses the contemporary issue of microplastic pollution and Japan's regulatory response to it. Furthermore, the discussion of Deposit-Refund Systems and penal regulations as a deterrent against illegal dumping offers actionable insights for waste management policy.
- Air Pollution Control (Chapter 8): Japan's experience with severe air pollution during the 1960s and 70s is historically significant. The authors detail the policy responses, including sulfur charges for point sources and vehicle type regulations for mobile sources. A particularly valuable section is the Economic Analysis of Air Pollution Regulations, which quantifies the costs and benefits of the vehicle type regulation (Automobile NOx/PM Act). This analysis shows the policy yielded a substantial net benefit to society (estimated at JPY 681.2 billion) while also acknowledging the theoretical inefficiency of such a command-and-control mechanism compared to market-based alternatives. The chapter broadens the scope to air pollution in developing countries and the persistent problem of household air pollution, highlighting the book's focus on Asian and emerging markets.
- Climate Change and Carbon Pricing (Chapter 9): The final chapter provides a masterclass on climate policy, tracing Japan's international collaboration from the Kyoto Protocol (CDM) to the Paris Agreement (JCM). The heart of the chapter is dedicated to Carbon Pricing in Japan. It critically assesses the current Global Warming Countermeasure Tax, noting its current low rate (JPY 289/tCO2 as of 2021) and insufficient incentive for deep emissions reductions. The authors then analyze the emerging policy landscape, detailing sub-national ETSs (e.g., Tokyo's system) and the voluntary J-Credit Scheme. The discussion culminates with the new Green Transformation (GX) initiative, Japan's approach to achieving carbon neutrality by issuing transition bonds to finance R&D and innovation—the revenue of which will eventually be redeemed by revenue from a new GX-ETS and GX-Surcharge. This analysis of a policy mix (tax, subsidies, and trading) offers a complex yet realistic model for other nations to consider. The chapter also smartly addresses critical design considerations for carbon pricing, such as carbon leakage, regressivity, and the double dividend hypothesis.

Pedagogical and Analytical Assessment

The greatest strength of *Introduction to Environmental Economics and Policy in Japan* lies in its successful blend of rigorous microeconomic theory with real-world policy case studies. Authors Arimura and Hibiki leverage their extensive expertise, including their roles in Japanese government committees, to offer a unique perspective on how policy is designed, implemented, and evaluated. The explicit commitment to simplicity (the absence of calculus) makes the complex field of environmental economics accessible without sacrificing the intellectual depth of concepts like social surplus, marginal external costs, and the Weitzman trade-off.

The book's focus on Japan is not parochial; it uses Japan's journey from a heavily polluted industrial nation to a leader in advanced environmental management as a scalable model. This contextualization is a vital pedagogical tool for Asian and developing economies whose environmental trajectories often mirror Japan's past more closely than those of Europe or North America.

In conclusion, this textbook is far more than an introduction to environmental economics; it is a meticulously crafted framework for understanding and tackling global environmental crises through an economic lens, with a profoundly practical focus. It is an essential, highly recommended resource that effectively bridges the gap between academic theory and actionable public policy for the next generation of global environmental leaders.