

Economics of Sustainability

Prof Dr Linus Mattauch, supported by Till Armbruster

Sommersemester 2024

Module content

The lecture course develops a set of economic ideas from economic theory that can be used to develop pragmatic, yet ethically grounded recommendations for the environmental crises the world faces today. A particular focus is on the economic theory of sustainability as a concept and its implications for assessing sustainable development across different geographies.

Primary topics of the course include: an economic analysis of the sustainable development goals and economic theories of sustainability, decision-making for situations of (environmental) catastrophes and existential risk, applying theories of justice to assessing the urgency of environmental problems, the use of behavioural economics to understand whether economic growth is desirable, economic analysis of critiques of consumerism, difficulties with valuing biodiversity and the role of fiscal policy for environmental protection. The course covers a selection of policy examples from around the world.

Prerequisites

A graduate-level understanding of microeconomics is a prerequisite. Knowledge of economic growth theory and public economics are an advantage. The format is a set of weekly lectures that are complemented with weekly exercise classes taking various formats, including mathematical problem sheets and a writing tutorial.

This course is complementary to “Economics of Climate Change” by Ottmar Edenhofer at TU Berlin, which develops somewhat similar methods and ideas.

Module structure

The module will be organized in three phases.

PHASE I (week 1-3) – Introduction and Methods. We aim to provide, as non-experts, an overview of the current state of the environmental crisis before thinking about which concepts from economics are appropriate. Revision of undergraduate environmental economics. Introduction to applied dynamic optimization.

PHASE II (week 4-9) – Normative perspectives on sustainability and the environment. We develop the economic theory of sustainability and illustrate its quantitative and policy implications. We discuss uncertainty and existential risks.

PHASE III (week 10-13) – Inequality and Welfare. We discuss public economics perspectives on environmental policy which suggest how the state should intervene into the economy to

achieve environmental protection. A focus of this module is on behavioural perspectives on pricing- and non-pricing interventions to protect the environment and on perspectives about inequality and justice.

Where, when, who

Lecture: Monday, 2.15 pm in room FH 301, starts **April 15**

Exercise class: Thursday, 2.15 pm in room FH 303, starts **April 18**

Examination for MSc students

Combined exam ("Portfolioprüfung"). Written exam ("schriftlicher Test", 75%) by default in the last week of term (date subject to confirmation.) Three sets of graded homework (25%).

Examination for PhD Students from BSoE

Combined exam ("Portfolioprüfung"). Written exam ("schriftlicher Test", 50%), three sets of graded homework (25%) and an extra task for each homework (25%). For the first and third homework, this consists of writing a reviewer report of an academic paper. For the second homework, a paper that is connected to the essay's topic has to be presented in class (for example: [Fabio Antoniou, Roland Strausz \(2017\): Feed-in Subsidies, Taxation, and Inefficient Entry, Environmental and Resource Economics, Volume 67, pp. 925-940](#)).

Module Outline

Syllabus preliminary (this version: March, 26, 2024) and subject to change, as the module is running in a different format this semester.

Week	Description
Week 1 April 15 April 18	<p>Lecture: Logistics of the module. The State of the Environment The session provides an overview of the global environmental crisis as they are in 2024. IPCC AR6 WG3</p> <p>Exercise class: Logistics Q&A, calculate a Pigou tax.</p>
Week 2 April 22 April 25	<p>Lecture: Revision of undergraduate environmental economics</p> <p>Exercise class: Dynamic Optimization</p>
Week 3 April 29 May 2	<p>Lecture: The economics Nobel Prize 2018 in context: Short review of Integrated Assessment, valuation and biodiversity</p> <p>Exercise class: Dynamic optimization, part II</p>
Week 4 May 6	<p>Lecture: Sustainability: Sustainable Development Goals, weak vs. strong sustainability, DHSS model Part I</p> <p>No exercise class (public holiday).</p>
Week 5 May 13 May 16	<p>Lecture: DHSS model part II, Hartwick rule, application to carbon budget.</p> <p>Exercise class: DHSS-Model + Rawlsian social welfare function.</p> <p>Graded homework 1: Problem Sheet on Sustainability, to be handed in by May 30.</p>
Week 6	<p>No lecture (public holiday); no exercise class</p>
Week 7 May 27 May 30	<p>Lecture: Green accounting, Henry George Theorem, weak sustainability policy implications</p> <p>Exercise class: Exercises on sustainability policy (Hartwick + Henry George)</p>
Week 8 June 3 June 6	<p>Lecture: Decision under uncertainty in environmental policy context. Dismal Theorem</p> <p>Exercise class: Solutions to graded homework 1 (worked out example in expected utility theory)</p>
Week 9 June 10 June 13	<p>Lecture: "Longtermism", existential risk and the connection to sustainability</p> <p>Exercise class: Introduction to essay writing.</p> <p>Graded homework 2: Essay on Growth, Sustainability and Existential Risks (max. 1500 words), to be handed in June 20.</p>

Week 10 June 17 June 20	Lecture: Behavioural environmental economics – is economic growth desirable? Status consumption and happiness science Exercise class: Is growth possible? A pedestrian approach
Week 11 June 24 June 27	Lecture: Is growth desirable? (contd.) Inequality and environmental policy: Intro Exercise class: Policy applications of behavioural environmental economics. Graded homework 3: Formal model of behavioural-environmental economics, to be handed in July 4.
Week 12 July 1 July 4	Lecture: Inequality and environmental policy Exercise class: tbd
Week 13 July 8 July 11	Lecture: Just transition (Franziska Funke) Exercise class: Solutions to graded homework 3, Q&A on exam
Week 14 July 15 Jan 18	Lecture: Revision, Q&A. Exam provisionally: July 18, 2.15 pm

Readings: Recommended general references

- Aldred, J. *The Skeptical Economist*. New York & London: Routledge, 2009
- Bowles, S. (2016). *The moral economy*. Yale University Press
- Dasgupta, P. (2021). *The economics of biodiversity: the Dasgupta review*. Hm Treasury.
- Fleurbaey, M., & Blanchet, D. (2013). *Beyond GDP: Measuring welfare and assessing sustainability*. Oxford University Press.
- Haensel, M. C., Drupp, M. A., Johansson, D. J., Nesje, F., Azar, C., Freeman, M. C., Groom, B. & Sterner, T. (2020). Climate economics support for the UN climate targets. *Nature Climate Change*, 10(8), 781-789
- Hamilton, K., Hepburn, C. (2017). *National Wealth: What is Missing, Why it Matters*. Oxford University Press.
- IPCC. (2022). *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.
- Layard, R. (2006). *Happiness and public policy: A challenge to the profession*. *The Economic Journal*, 116: C24-C33
- MacAskill, W. (2022) *What we owe the future*. New York: Basic Books.

Perman, R., Y. Ma, M. Common, D. Maddison, and J. Mcgilvray. Natural Resources and Environmental Economics, 3rd Edition. Pearson 2003.

More specific literature to be communicated for individual sessions and exercise classes.