



Syllabus
 Summer Term

Environmental and Resource Economics (ERE)

How to deal with environmental pollution and overuse of natural resources, like climate change, declining fish stocks or fossil fuel reserves? This course develops an economic perspective on the analysis of and ways to deal with external effects and intertemporal trade-offs – being the root of many public good and open access problems centered around emissions of pollutants and extraction of renewable or non-renewable resources. The course covers a now established literature stemming from an originally neoclassical approach to sustainability problems, and integrates it with complementary approaches, in particular from institutional economics (e.g. the work of Elinor Ostrom), and from systems science.

Participating students follow lectures and discuss topics in seminars on the basic theory, combined with method training in dynamic optimization, game theory and institutional analysis. They team-up in groups to conduct a study on governing a particular self-selected environmental or resource problem.

Analytical overview of covered topics

Foundations:	Systems, dealing with time, dynamic optimization		
Topics:	Emissions	Non-renewable resources	Renewable resources
Social optimum:	Samuelson rule (Environmental valuation)	<u>Hotelling</u> rule	Golden rule
Unregulated case:	Non-cooperative solution	Non-cooperative solution	Non-cooperative solution
Policy instruments:	Command & control, price instruments, quantity instruments with trade, <u>Coasian</u> bargaining, liability law		
Further institutions:	International environmental agreements	Governing the Commons, SES Framework	
Group work / case studies:	Comparative institutional analysis to study institutional arrangements to deal with environmental / resource problems		

Teaching objectives

- Obtaining deeper knowledge on selected real world ERE problems
- Acquiring knowledge of basic concepts and theories from ERE
- Consolidating basic economics, expanding methodological portfolio
- Getting experience with applying analytical tools from ERE to assess and design policy instruments
- Reading and searching scientific literature
- Training of writing and presentation skills
- Additional for PhD students: identifying research gaps on ERE problems from the literature; organizing group work.

Tasks and examination

- Main tasks: self-study, active participation in seminars, study written and presented (6 ECTS, 4SWS = 2 contact hours plus recorded lectures)
- Group work: study on a social dilemma related to the environment / natural resources
- Grading by written exam
- Additional assignment for PhD students: heading a working group, additional literature review section in group work report (current research gaps on the topic)

Pre-requisites

- Basic knowledge in economics and game theory (as from, e.g., a course in micro-economics or institutional economics)
- A first idea about the Institutional Analysis and Development Framework (IAD), e.g. from other courses or online sources
- Knowledge in differential calculus and optimization
- Willingness to contribute in an economics course with an international and interdisciplinary group of students
- Interest in ERE issues

References

Main text books

Perman, Ma, McGilvray, Common: Natural Resource and Environmental Economics, Pearson, Essex. (various editions)

Ostrom (1990) Governing the Commons, Cambridge University Press.

Ostrom, Gardner, Walker (1994) Rules, Games, and Common-Pool Resources Elinor Ostrom, University of Michigan Press.

Vatn (2005) Institutions and the Environment, Edgar Elgar.

Influential or helpful papers/chapters/books (more in the lecture)

- Barrett, S. (1994) Self-Enforcing International Environmental Agreements. *Oxford Economic Papers* 46: 878–94.
- Baumol, W. J. (1972) On Taxation and the Control of Externalities. *American Economic Review* 62 (3): 307–22.
- Bretschger, L. and K. Pittel (2020) Twenty Key Challenges in Environmental and Resource Economics, *Environmental and Resource Economics* 77: 725-750.
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- Cropper, M. L., and W. E. Oates (1992) Environmental Economics: A Survey. *Journal of Economic Literature* 30 (2): 675–740.
- Dales, J. (1968) *Pollution, Property and Prices*, University of Toronto Press.
- Dasgupta, P. and G. M. Heal (1995) *Economic Theory and Exhaustible Resources*. Reprinted. Cambridge University Press.
- Hotelling, H. (1931) The Economics of Exhaustible Resources. *Journal of Political Economy* 39 (2): 137–75.
- McGinnis, M.D., and E. Ostrom (2014) Social-Ecological System Framework: Initial Changes and Continuing Challenges. *Ecology and Society* 19 (2).
- McGlade, C. and P. Ekins (2015) The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2°C. *Nature* 517: 187–93.
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- Ostrom, E. (2007) A Diagnostic Approach for Going beyond Panaceas. *Proceedings of the National Academy of Sciences* 104 (39): 15181–87.
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- Ostrom, E., and X. Basurto (2011) Crafting Analytical Tools to Study Institutional Change. *Journal of Institutional Economics* 7 (03): 317–43.
- Pigou, C. A. (1920) Divergences Between Marginal Social net Product and Marginal Private net Product, in: *The Economics of Welfare, Part II, Chapter IX*.
- Steffen, W., K. Richardson, J. Rockström, S.E. Cornell, I. Fetzer, E.M. Bennett, R. Biggs, et al. (2015) Planetary Boundaries: Guiding Human Development on a Changing Planet. *Science* 347 (6223).
- Weitzman, M. L. (1974) Prices vs. Quantities. *Review of Economic Studies* 41 (4): 477–91.