

# Environmental Economics

---

August 7, 2018 – August 13, 2018

Lecturer: Prof. Stephan Kroll, Colorado State University ([stephan.kroll@colostate.edu](mailto:stephan.kroll@colostate.edu))

Course website: <https://sites.google.com/site/environmentaleconbochum2018>

## Course objectives

By the end of the course students should be able to

- understand how the core principles of economics apply to environmental issues
- comprehend the virtues and limitations of markets and allocations through prices
- appreciate the role of benefits and costs in (environmental) decision-making processes of individuals and societies
- understand that many environmental problems are due to wrongly set incentives

## Course content

This course examines how environmental problems and their solutions can be modelled with microeconomic tools. We will talk about market failures, market solutions, and the incentives humans and societies face when making their decisions to degrade or to protect the environment, in particular air, water, climate and biodiversity. We will survey a) how to calculate the benefits and costs of environmental problems and policies, b) how benefit-cost analysis determines the optimal level of environmental quality (and why markets left to themselves usually do not generate that optimal level), and c) the economic principles behind different environmental policies such as command-and-control, green taxation, cap-and-trade, information programs and negotiations. Throughout the module we will use economic experiments to highlight the role of incentives and institutions.

## Prerequisites

Students must be at least in the second year of their bachelor studies and must have taken “Grundlagen der Mikroökonomik”

## Instructional methods

Lecture, plus daily economic experiments

### Reading list

Optional textbook for background reading (will be available at the Lehrstuhl of Prof. Roos as „Kopiervorlage“): Charles D. Kolstad, *Environmental Economics*, 2nd edition. Oxford University Press. 9780199732647. The first edition is available for sale on the internet and much cheaper. A tentative list of other readings is listed below.

### Time schedule

6 hours of teaching per day (an hour lasts 45 minutes).

*Example:*

Lecture from 08.30 to 10.00; break from 10.00 to 10.15, and another lecture 10.15-11.45.

Lunch break: 12.00-13.00.

Afternoon: Lecture from 13.00 to 14.30.

### Assessment

40% Paper (in groups of 2 students; due Friday, August 17, 17h, via email)

40% Final exam (on Wednesday, August 15, time TBD)

10% Participation in class, including experiments and other class activities

10% Short quizzes and focus questions

### Writing Assignment

For this Writing Assignment, please summarize an academic ENR economics article in a style that would fit into the magazine *Resources* (<http://www.rff.org/research/resources-magazine>), which is published by the environmental think tank Resources for the Future, based in Washington D.C. (<http://www.rff.org/about>).

Choose a technical article or, better yet, a series of articles and summarize it/them in a non-technical yet sophisticated way. The typical reader of a *Resources* article is an intelligent non-economist with strong interests in environmental and natural resource topics.

The original article(s) you choose can be from academic peer-reviewed journals such as

- Journal of Environmental Economics and Management (<http://www.sciencedirect.com/science/journal/00950696>)
- Environmental and Resource Economics (<http://link.springer.com/journal/volumesAndIssues/10640>)
- Journal of the Association of Environmental and Resource Economists (<http://www.journals.uchicago.edu/toc/jaere/current>)
- Ecological Economics (<http://www.sciencedirect.com/science/journal/09218009>)

or other related journals.

The original article(s) should be recent (published in the last three years), technical (using either theoretical models or data analyses or both), original research (not an overview or survey article in itself) and broadly related to topics we cover in the class, but not an article from the reading assignments in class. You can use articles you use for your papers in other classes.

Your summary should be non-technical (for example, very few equations, if any, and any equations that are used and their variables should be explained carefully) and not use too much economics lingo, yet not written on a 5<sup>th</sup>-grade level either. The length should be around 1400 words, plus minus 300. You are encouraged to use graphs, which would not be counted toward the word limit. Please visit the *Resources* webpage and read several of their articles as inspiration. Relating the article to material,

textbook chapters and other readings from class is desirable. Two groups cannot choose the same articles.

### **TOPICS AND TENTATIVE SCHEDULE**

All papers (other than the book chapters) are available on  
<https://sites.google.com/site/environmentaleconbochum2018/1-readings>.

<sup>+</sup> readings for daily Focus Questions

<sup>C</sup> other readings covered in class

\* denotes reading primarily for Master students

This looks like a lot of readings, but many papers are either short or only optional/for Master students only.

- Before each day make sure to read the papers for the daily Focus Questions (marked with <sup>+</sup>) and skim the relevant chapters from the Kolstad book.
- If you still have time before the course or between classes read the abstracts and look at the Figures of the other papers covered in class (marked with <sup>C</sup>).
- The papers primarily for Master students (marked with \*) will help them study for their final exam and are optional for Bachelor students.

#### **Tuesday, August 7**

##### **How Economists See the Environment**

Short Background Readings: Oates (2006<sup>+</sup>), Fullerton and Stavins (1998<sup>+</sup>)  
Kolstad: chapters 1, 2

##### **Market Experiments**

##### **Basic Supply-Demand Model of Externalities and Policies**

Journal Article: Plott (1983<sup>C</sup>)  
Short Background Reading: Sedjo (1994<sup>C</sup>)  
Kolstad: chapters 3, 4

##### **Distributional Effects of Environmental Policies**

Short Background Reading: Fullerton (2011<sup>C</sup>)

#### **Wednesday, August 8**

##### **Public-Good Experiments**

##### **The Public-Good Model of Environmental Problems and Policies**

Journal Articles: Fischbacher et al. (2001<sup>+</sup>), Kroll et al. (2007\*)  
Kolstad: Chapter 5

##### **Social Discounting**

##### **Valuation Experiments**

##### **Valuation of Environmental Improvement: Cost-Benefit Analysis, and WTP vs WTA**

Journal Article: Shogren et al. (1994<sup>+</sup>)

Background Reading on Environmental Justice: Banzhaf (2012<sup>C</sup>)  
Kolstad: chapters 6, 7

**Valuation Methods: Hedonics**  
Kolstad: chapter 8

**Thursday, August 9**

**Valuation Methods: CVM**

Short Background Reading: Carson (2000<sup>+</sup>)  
Journal Articles: Loomis et al. (2000<sup>C</sup>), Kling et al. (2012\*)  
Kolstad: chapter 10

**Policies: Standards and Voluntary Measures**  
Kolstad: chapter 11

**Policies: Taxation**  
Journal Articles: Parry and Small (2005<sup>+</sup>), Kallbekken et al. (2011\*)  
Short Background Reading: Gillingham et al. (2013<sup>C</sup>)  
Kolstad: chapter 12

**Numerical Coase Example**

**Bargaining Experiments**

**Policies: Coase Bargaining**  
Kolstad: chapter 13, Part I

**Friday, August 10**

**Tradable Permit and Climate Change Experiments**

**Policies: Tradable Permits**  
Background Reading: Schmalensee and Stavins (2013<sup>C</sup>)  
Kolstad: chapter 13, Part II

**Policies: Comparison, Uncertainty and Double Dividend**  
Short Background Readings: Harrington and Morgenstern (2004<sup>+</sup>), Parry (2007<sup>C</sup>)  
Journal Article: Zhou and Segerson (2012\*)  
Kolstad: chapter 15

**Climate Treaty Negotiations**  
Background Reading: Olmstead and Stavins (2012<sup>C</sup>)  
Short Background Reading: Newell et al. (2014<sup>C</sup>)

**Monday, August 13**

**Climate Treaty Negotiations**  
Journal Article: Barrett (2013\*)  
Kolstad: chapter 19  
Plus, academic paper about Paris 2015 negotiations. Paper TBD.

### **Biodiversity/Ecosystem Services**

Journal Article: Metrick and Weitzman (1998<sup>+</sup>), Ferraro et al. (2012<sup>C</sup>)  
Ferraro and Simpson (2002\*), Busch (2013\*), Polasky et al. (2014\*)

Catch- and Wrap-Up, talk about the paper and the exam

### **Wednesday, August 15**

#### **Exam**

### **Friday, August 17**

#### **Paper due**

#### **LITERATURE:**

During the summer school, there will be relatively little time to prepare and recap the lectures. It is therefore essential to come prepared to the summer school by having read most of the reading in advance.

At the beginning of each class there will be a short set of “Focus Questions” about one of the day’s readings (those denoted with <sup>+</sup>); at the end of each class there will be a short quiz with a few easy multiple-choice questions about that day’s material

#### **Readings for the Focus Questions (<sup>+</sup>):**

**Oates, Wallace (2006).** An Economic Perspective on Environmental and Resource Management: An Introduction. In: Oates WE (Ed). The RFF reader in environmental and resource policy. Washington, DC: Resources for the Future, xv-xx.

**Fullerton, Don and Robert Stavins (1998).** How Economists See the Environment. *Nature* 395, 6701, 433-434.

**Fischbacher, Urs, Simon Gächter and Ernst Fehr (2001).** Are People Conditionally Cooperative? Evidence from a Public Goods Experiment. *Economics Letters* 71, 397-404.

**Shogren, Jason F., Seung Y. Shin, Dermot J. Hayes, and James B. Kliebenstein (1994).** Resolving Difference in Willingness to Pay and Willingness to Accept. *American Economic Review* 84/1, 255-270.

**Carson, Richard T. (2000).** Contingent Valuation: A User’s Guide. *Environmental Science and Technology* 34, 1413-1418.

**Harrington, Winston and Richard D. Morgenstern (2004).** Economic Incentives versus Command-and-Control. *Resources* 152, 13-17.

**Metrick, Andrew and Martin L. Weitzman (1998).** Conflicts and Choices in Biodiversity Preservation. *Journal of Economic Perspectives* 12/3, 21-34.

#### **Other Readings Covered in Class (<sup>C</sup>):**

**Plott, Charles (1983).** Externalities and Corrective Policies in Experimental Markets. *Economic Journal* 93, 106-127.

**Sedjo, Roger A. (1994).** The Global Environmental Effects of Local Logging Cutbacks. *Resources* 117.

**Fullerton, Don (2011).** Perspective: Six Distributional Effects of Environmental Policy. *Risk Analysis* 31/6, 923-929.

**Banzhaf, Spencer (2012).** Environmental Justice: The Experience of the United States. *Encyclopedia of Energy, Natural Resource and Environmental Economics*, Elsevier Publisher.

**Loomis, John, Paula Kent, Liz Strange, Kurt Fausch and Alan Covich (2000).** Measuring the Total Economic Value of Restoring Ecosystem Services in an Impaired River Basin: Results from a Contingent Valuation Survey. *Ecological Economics* 33, 103-117.

**Parry, Ian W.H. and Kenneth A. Small (2005).** Does Britain or the United States Have the Right Gasoline Tax? *American Economic Review* 95/4, 1276-1289.

**Gillingham, Kenneth, Matthew Kotchen, David S. Rapson and Gernot Wagner (2013).** The Rebound Effect is Overplayed. *Nature* 493, 475-476.

**Schmalensee, Richard and Robert N. Stavins (2013).** The SO<sub>2</sub> Allowance Trading System: The Ironic History of a Grand Policy Experiment. *Journal of Economic Perspectives* 27/1, 103-122.

**Parry, Ian W.H. (2007).** Should We Abandon Cap and Trade in Favor of a CO<sub>2</sub> Tax? *Resources* Summer 2007, 166, 6-13.

**Olmstead, Sheila M. and Robert N. Stavins (2012).** Three Key Elements of a Post-2012 International Climate Policy Architecture. *Review of Environmental Economics and Policy* 6/1, 65-85.

**Newell, Richard, William Pizer and Daniel Raimi (2014).** Carbon Market Lessons and Global Policy Outlook. *Science* 343, 1316-17.

**Ferraro, Paul J., Kathleen Lawlor, Katrina Mullan, and Subhrendu K. Pattanayak (2012).** Forest Figures: Ecosystem Services Valuation and Policy Evaluation in Developing Countries. *Review of Environmental Economics and Policy* 6/1, 20-44.

**Readings primarily for Master Students (\*):**

**Kroll, Stephan, Todd Cherry and Jason F. Shogren (2007).** Voting, Punishment and Public Goods. *Economic Inquiry* 45/3, 557-570.

**Kling, Catherine L., Daniel J. Phaneuf and Jinhua Zhao (2012).** From Exxon to BP: Has Some Number Become Better than No Number? *Journal of Economic Perspectives* 26/4, 3-26.

**Kallbekken, Steffen, Todd L. Cherry and Stephan Kroll (2011).** Do You Not Like Pigou, or Do You Not Understand Him? Tax Aversion and Revenue Recycling in the Lab. *Journal of Environmental Economics and Management* 2011, 62/1, 53-64.

**Zhou, Rong and Kathleen Segerson (2012).** Are Green Taxes a Good Way to Help Solve State Budget Deficits. *Sustainability* 4, 1329-1353.

**Barrett, Scott (2013).** Climate Treaties and Approaching Catastrophies. *Journal of Environmental Economics and Management* 66/2, 236-250.

**Busch, Jonah (2013).** Supplementing REDD+ with Biodiversity Payments: The Paradox of Paying for Multiple Ecosystem Services. *Land Economics* 89/4, 655-675.

**Ferraro, Paul J. and R. David Simpson (2002).** The Cost-Effectiveness of Conservation Payments. *Land Economics* 78(3), 339-353.

**Polasky, Stephen, David J. Lewis, Andrew J. Plantinga, and Erik Nelson (2014).** Implementing the Optimal Provision of Ecosystem Services. *Proceedings of the National Academy of Sciences* 111/17, 6248-6253.