Course Overview -- Natural Resource Economics -- Winter term 2021/22

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Learning objectives

After taking this course, you should be able to...

...recall and describe facts and mechanisms central to natural resource economics, such as the implications of scarcity on extraction and price paths or the role of property rights on extraction decisions.

...set-up, solve, and interpret dynamic mathematical models to analyze current policy questions related to natural resources.

...read, paraphrase, and critically evaluate empirical or theoretical arguments for or against a given policy proposal in relation to natural resource management.

...competently advice policy makers, write well-founded opinion pieces, and make use of key concepts from natural resource economics in your own academic work, such as a master's thesis

Learning outcome

This course will be successful (that is, learning objectives are met) if students and teacher take responsibility in doing their respective tasks and jointly monitor progress. The teacher will provide an overview over the field of natural resource economics, present selected models and articles that highlight core topics in the field, and show the students how to solve, interpret, and critically evaluate these models and articles. Students will invest the necessary time and energy to understand the course material, actively raise open questions, and participate in class discussions.

Assessment

Achievement of learning objectives will be assessed by a final exam. For both the "Ersttermin" and a potential "Zweittermin", the exam will have the form of an online "take-home" exam. That is, the exam questions will be made available to the students on the exam date (either published on moodle and/or sent by e-mail) and answers have to be turned in electronically 24h later (the questions will be so that they can be answered in 3 hours).

The exam will contain these three parts: First, there will be a part where students have to apply a model from the course to a new topical question, thereby demonstrating their ability to solve a dynamic resource model and interpret the results. Second, there will be a part where students have to discuss a scientific article about natural resource management, thereby demonstrating their ability to read, understand, and critically evaluate economic arguments. Third, there will be a part where students reflect on a current political question involving natural resource economics, thereby demonstrating their ability to formulate their opinion, based on facts and mechanisms that they have learned in class.

Requirements and prerequisites

- Students must be familiar with constrained optimization (i.e. using Lagrange multipliers) and have sufficient statistical knowledge to evaluate econometric analyses (e.g. be familiar with concepts like "instrumental variable regression", "treatment effects", "causal identification", "threats to valid inference")

- Students must be willing to invest the time necessary to learn dynamic optimization methods.
- Students must be motivated to read (and understand) ten to twelve scientific articles.
- Students are asked to write essays (for the final exam and problem sets) and to critically reflect on models, articles and current issues of natural resource economics.
- Students are asked to formulate their own questions on current issues of natural resource economics.

Structure

There are two main elements on which this course is based, models and articles.

Models are simplified representations of reality, often in mathematical form, that are used to analyze specific mechanisms or the outcomes that result from a specific set of assumptions. Models will be presented by the teacher using video-taped lectures.

Articles are almost always based on models (sometimes very simple models) that frame or describe a research question but go beyond that: They place their research question in the context of what is already known, and they provide some form of evidence for the empirical relevance of their research question (ranging from simple stylized facts or plausible arguments to elaborate statistical analyses of large data sets). Articles will be prepared by the students and discussed in class/online.

In addition, there will be video-taped synthesis lectures, three problem sets, and in class or live online meetings. The problem sets will be similar to the final exam. They serve as exercises (no credits for turning in) so that students will be familiar with what is expected of them in the final exam.

Course material

There is no specific textbook associated with this course. Background reading (in addition to the mandatory articles) will be referred to during the lectures. As a general text that covers many (but not all) issues in this course, you can read the introductory part and chapters 14, 15, and 17 of the following book: *Perman et al: Natural Resource and Environmental Economics, Addison Wesley, Pearson, 3rd edition, 2003*, which is available in the library (where they also have the 4th edition from 2011), or on the web [here].

Schedule

The following list presents the topics that are being covered in this course (organized in one introductory and three thematic blocks). To facilitate asynchronous learning, the video-taped lectures will be made available at the beginning of each thematic block. In addition, there will be class meetings (room 215 Bergheimer Str 20) at the specified times, in order to discuss the models covered in the lectures, the assigned articles, and the problem sets.

Introduction and Methods *(Most materials are online on Oct 19, 2021 or earlier)*

- Meeting, Oct 19, 2021 (09:00-10:00) to introduce the course (content and organization)
- Video-taped lecture 1: Introduction to dynamic optimization
- Three exercises on dynamic optimization
- Solutions to the three exercises on dynamic optimization
- Class meeting, Nov 2, 2021 (09:00-11:00) to discuss solutions to exercises and any open questions

Block A -- Non-renewable resources *(Most materials are online on Nov 3, 2021 or earlier)*

- Video-taped lecture A-1: The basic Hotelling model of non-renewable resource extraction
- Video-taped lecture A-2: Costly non-renewable resource extraction
- Video-taped lecture A-3: Market power
- Video-taped lecture A-4: Taxation of non-renewable resource extraction
- Problem set 1 and solutions
- Meeting, Nov 16, 2021 (09:00-11:00) to discuss questions from video lectures A-1 and A-2
- Meeting, Nov 30, 2021 (09:00-11:00) to discuss questions from video lectures A-3 and A-4 and solutions to problem set 1
- Meeting, Dec 7, 2021 (09:00-11:00) to discuss and any open questions

Block B -- Renewable resources *(Most materials are online on Dec 8, 2021 or earlier)*

- Video-taped lecture B-1: Introduction to renewable resources
- Video-taped lecture B-2: Optimal management of renewable resources and the effect of open access
- Video-taped lecture B-3: Policy instrument for renewable resource management
- Video-taped lecture B-4: Marine Reserves
- Video-taped lecture B-5: Forestry resources and the Faustmann model
- Problem set 2 and solutions
- Meeting, Dec 14, 2021 (09:00-11:00) to discuss questions from video lectures B-1 to B-3
- Meeting, Jan 11, 2022 (09:00-12:00) to discuss Smith and Wilen 2003, problem set 2, and open questions from video lectures B-3 and B-4

Block C -- Political Economy *(Most materials are online on Jan 12, 2022 or earlier)*

- Video-taped lecture: Conservation and institutions (Harstad-Mideksa model)
- Video-taped lecture: Trade and renewable resources (Brander-Taylor model)
- Problem set 3 and solutions
- Meeting, Jan 25, 2022 (09:00-11:00) to discuss open questions from lecture B-5 and Harstad-Mideksa model
- Meeting, Feb 1, 2022 (09:00-11:00) to discuss Brunnschweiler and Bulte 2008, vd Ploeg and Poelhekke 2010, and open questions from Brander-Taylor model
- Meeting, Feb 8, 2022 (09:00-12:00) discuss problem set 3, course synopsis and last questions

Exam *(Most likely on Feb 15, 2022 or week thereafter)*