

## Syllabus of Economics 536

Environmental Economics

Spring 2009

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**Course goals and course description:** This course aims at equipping students with economic methods and tools to analyze environmental issues. This course combines theoretical analysis with discussions on specific environmental policies as applied to water, air pollution, energy, climate change and human health issues. Within these examples, particular topics that will be covered are the microeconomic analysis of environmental regulation, the problem of social cost, policy instrument choice, and estimating benefits of environmental improvements. Student participation is key to the course. By going through the recent theoretical and applied literature, students are expected to critically present articles, partially re-estimate results of existing empirical work and summarize findings in short student papers.

### Class Sessions

There will be two meetings per week, each lasting one hour and twenty minutes, Mondays and Wednesdays from 3:30pm to 4:50pm in Mary Gates Hall, room number 228. Each class session will involve a lecture and a discussion section.

Students are expected to do the suggested readings before the class. A part of the exams may be “open book”, it is suggested that you bring the respective reading material to class. Active participation in the class is strongly encouraged.

### Office Hours:

My weekly office hours are Tuesday 3:30pm to 5:00pm, Condon 422. If this time window systematically conflicts with your time schedule, please let me know, so that we can find a different time. Also, feel free to email me at [hqwolff@u.washington.edu](mailto:hqwolff@u.washington.edu) for any research or course related questions.

### Short Student Paper

Students are required to write a short, **less** than 10 page paper (excluding appendix), on a specific **empirical** environmental issue. The basis for the paper can either be your own research idea (ENCOURAGED) or come from either a recent journal article in today's top field journal in environmental economics, *The Journal of Environmental Economics and Management* or one of the *general interest* journals in economics (*American Economic Review*, *Quarterly Economic Review*, *Journal of Political Economy*, *Econometrica* etc.). If you choose an article from a different journal, please ask. The student paper should then critically elaborate on the following four points

- (i) what does the article contribute to the literature
- (ii) why is it important?
- (iii) what are the advantages and what or the disadvantages of the papers approach (theoretical model/empirical model/data collection). What alternatives do you have in mind? How could one improve the paper? How robust are the results, including re-estimation of the results. Section (iii) is the most important section and should take most of the space of your paper.

- (iv) what lessons can we learn from the economics analysis (i.e. what are the policy recommendations or what are the new insights for the business world etc.).

In class we will go over specific examples that exemplify this student paper project in more detail. The main text should be double-spaced. Do not use a font smaller than 11 pt or larger than 12 pt.

The following deadlines apply to this short student paper:

- (a) April 15, 2008: Choice of article (on which the paper is based on) or own research hypothesis and sentence blurb on each of the above mentioned four points (i) to (iv)
- (b) May 4 to May 28, 2008: Students present their draft papers.
- (c) June 6: Final paper due.

It is your own research idea, I don't expect a polished finished paper by the end of the quarter. However, data should have been collected (that mostly takes the LONGEST time). If for some reason, not all data have been collected, at least the "feasibility" of the data collection should be demonstrated (i.e. a written promise by an agency that data will be provided by date XY), the hypothesis, identification must be clearly shown, the contribution to the literature etc.

#### **Problem Sets:**

- (a) During the quarter you will go over several problem sets which will require you to apply the topics we discuss in class and in the readings.
- (b) You are encouraged that you work in small groups of 2 to 4 people together on the problem sets. You are required, however, to write your solutions individually. Still, you should write all the names of those students that participated in your study/problem set working group on each of the problem sets.

#### **Assessment & Evaluation**

Student Paper: 40%

Student Presentation: 20%

Midterm: 20%

Final: 20%

#### **Location**

The location of Art Building can be viewed here:

<http://www.washington.edu/home/maps/northcentral.html?105.86.680.528>

## Course outline

The tentative outline of the course is as follows:

### Introduction:

What is "Environmental Economics"?

Why is it important?

Difference between Resource and Environmental Economics

A first simple model on the "Economy and the Environment"

(a) Required:

- a. Hanley, Shogren, White et al. Chapter 1 (in particular Figure 1.1 and Ch.1.3)

(b) Optional

- a. Field and Field, chapter 1 and 2

What is Ecological Economics?

Types of Pollutants and simple policy implications

Individual Preferences regarding Environmental Protection (Biocentrism, Sustainability, Anthropocentrism, Utilitarian Approach → SWF, Arrow Impossibility Theorem)

### Readings:

(a) Required:

- a. Kolstad, chapter 3, pp.30-40

(b) Optional:

- a. Kolstad chapter 1-4.

### Empirical Modeling:

What is Science, Empirical Environmental Economics and Causation?

Structural Approach versus reduced Form

Empirical strategies to estimate causal relationships

An application to the theory to Energy Conservation (The U.S. Daylight Time policy)

### Readings:

(a) Required:

- a. Holland, Paul W. "Statistics and Causal Inference." *Journal of the American Statistical Association* 81 (December 1986): 945-960.
- b. Meyer, B. (1995): Natural and Quasi-Experiments in Economics, *Journal of Business & Economic Statistics* 13, 151-161.
- c. Wolff, H. and R. Kellogg: [Daylight Time and Energy](#). Forthcoming at *The Journal of Environmental Economics and Management*.
- d. Matthew J. Kotchen, Laura E. Grant: Does Daylight Saving Time Save Energy? Evidence from a Natural Experiment in Indiana. Working Paper at UC Santa Barbara, February 5, 2008

(b) Optional:

Cook, R. Dennis. "Smoking and Lung Cancer." In *R. A. Fisher: An Appreciation*. Edited by S. Fienberg and D. Hinkley. New York, NY: Springer-Verlag, 1980, pp. 182-191. ISBN: 038790476X.

Cook, Thomas D., and Donald T. Campbell. "Causal Inference and the Language of Experimentation." Chapter 1 in *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. Boston, MA: Houghton Mifflin, 1979, pp. 1-36. ISBN: 0395307902.

Freedman, David A. "Statistical Models and Shoe Leather." *Sociological Methodology* 21 (1991): 291-313.

Angrist, Joshua, and Alan Krueger. "Empirical Strategies in Labor Economics." Chapter 23 in *The Handbook of Labor Economics*. Edited by O. Ashenfelter and D. Card. Vol. 3. North Holland, Netherlands: Elsevier Science Pub Co, 1999. ISBN: 0444501894.

Woodbury, Stephen A., and Robert G. Spiegelman. "Bonuses to Workers and Employers to Reduce Unemployment: Randomized Trials in Illinois." *American Economic Review* 77, no. 4 (1987): 513-530.

## **Sources of Market Failure**

Incomplete Markets

Externalities

Non-Exclusion & the Commons

Non-rivalry & Public Goods

Non-Convexities

Asymmetric Information

*Readings:*

Required:

Hanley, Shogren, White, Chapter 2

## **Pollution Damages and Economic Instruments**

Criteria for Evaluating Environmental Policies

Kolstad Chapter 4, Section III & IV (pp. 62-74)

Incentive Based Strategies

*Readings:*

(a) Required:

a. Kolstad Ch. 7, Ch. 8, Ch. 10

- b. [Prices vs. Quantities](#), Martin L. Weitzman, *The Review of Economic Studies*, Vol. 41, No. 4. (Oct., 1974), pp. 477-491.

(b) Optional:

- a. Hanley, Shogren, White et al. Chapter 3 to 5
- b. [Prices vs. Quantities Revisited: The Case of Climate Change](#), William A. Pizer, Resources for the Future Discussion Paper 98-02. downloadable from the RFF website at <http://www.rff.org/documents/RFF-DP-98-02.pdf>

Decentralized Policies (Liability Laws, Property Rights)

(c) Required:

- a. Kolstad Ch. 6 (Property Rights), Ch. 12 (Liability)

(d) Optional

- a. Coase Ronald H. (1960): "The Problem of Social Cost". *The Journal of Law and Economics* 3, pp.1-44.

Command & Control Strategies

## Evidence on Economic Instruments

Water Pollution

Energy Use

Air Pollution

- (a) Chay et al. JPE [Does Air Quality Matter? Evidence from the Housing Market](#), with Michael Greenstone, *Journal of Political Economy*, April 2005, 376-424. downloadable at: [http://elsa.berkeley.edu/~kenchay/ftp/binresp/publish/jpe\\_housing.pdf](http://elsa.berkeley.edu/~kenchay/ftp/binresp/publish/jpe_housing.pdf)

Climate Change

Statistical Value of Life

## Methods in Environmental Economics

Stated Preferences (Contingent Valuation, Willingness to Pay)

Hanley, Shogren, White et al. Chapter 12 and 13

Willingness to Pay and Willingness to Accept: How Much Can They Differ? W. Michael Hanemann, *The American Economic Review*, Vol. 81, No. 3, (Jun., 1991), pp. 635-647

Amiran, Edoh Y. and Hagen, Daniel A. "Willingness To Pay and Willingness To Accept: How Much Can They Differ? Comment." *American Economic Review*, March 2003, 93(1), pp. 458-63.

Willingness to Pay and Willingness to Accept: How Much Can They Differ? Reply: W. Michael Hanemann, *The American Economic Review*, March 2003, 93(1), pp. 458-63

Revealed Preferences

Bockstael, McConnell

Hedonics for Heterogenous Goods

Bockstael, McConnell, Chapter 6

Hedonics for Wage Analysis

Bockstael, McConnell, Chapter 7

Travel Cost Method

Kolstad, Ch 17 (in particular section II)

Bockstael, McConnell, Chapter 5.6

### **Controversies in Public Policy Design and other “Hot Topics”**

Profits vs. Environment

Environmental Justice

The Economic Development and the Environment

The Economics of Climate Change

Ethics

International Environmental Agreements

### **Reading and Textbooks**

Much of the reading will consist of journal articles, that summarize key advances in the theoretical literature or provide recent empirical examples of evaluating environmental policies.

A text book, where I will at least cover 2 to 3 chapter is: Bockstael, McConnell: (2007): Environmental and Resource Valuation with Revealed Preferences, Springer.

Also, I will draw some of the material from:

Charles Kolstad: “Environmental Economics”, Oxford University Press, 2000.

Nick Hanley, Jason F. Shogren and Ben White: “Environmental Economics, In Theory and Practice”, 1997