

PRINCETON UNIVERSITY  
**WWS582b: Environmental & Natural Resource Economics**

Spring 2006  
Venue: Robertson xxx  
Time: Fridays, 9:00 am – 12 noon

Smita B. Brunnermeier  
Office: 343 Wallace Hall  
Email: [smita@princeton.edu](mailto:smita@princeton.edu)  
Tel: (609)-258-5016  
Office hours: Thurs. 1-3 pm

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**Overview:**

This course introduces students to the use of economics in understanding both the sources of, and the remedies to environmental and resource allocation problems. The course will emphasize the reoccurrence of economic phenomenon like public goods, externalities, market failure, and imperfect information. In addition, students will learn about policy options like property rights, command-and-control, market based incentives, and cost-benefit analysis. These concepts will be illustrated in a variety of applications ranging from the domestic pollution of air, water, and land to international issues such as stratospheric ozone destruction and global warming. The aim is not to memorize facts but to understand the structure of policies, their successes and their failures. In each instance, we will address questions such as: What is the underlying basis of the problem? What is the current policy response and how does it rate in terms of efficiency, equity and enforceability? What are the reform alternatives? How can one identify, quantify, and monetize the related costs and benefits and how are they distributed across different segments of society?

The course will involve a combination of lectures and class discussion and will culminate in the presentation of student research papers. A course website will be available at:

<http://blackboard.princeton.edu/>

**Readings:**

The main textbooks for this course are:

Stavins, Robert N. 2005. Economics of the Environment: Selected Readings. Fifth Edition. Norton Press: New York.

Portney, Paul R. and Robert N. Stavins. 2000. Public Policies for Environmental Protection. 2<sup>nd</sup> Edition. Resources for the Future: Washington DC.

The first text will expose you to influential work by environmental economists while the second text serves as a reference for the major environmental regulatory systems in the US. A copy of both textbooks will be on reserve in the library. The remaining papers on the syllabus (marked with a \*) will be available on the web via the library's electronic reserve service:

<http://infoshare/princeton.edu/reserves/elecres.html>. A userid and access password will be distributed in class. Students may need to download the *DjVu* viewer plug-in to read the e-reserve files. A free copy of the viewer software can be downloaded from <http://www.lizardtech.com>. A link to e-reserves will also be available on the course website.

### **Requirements and Grades:**

Students will be expected to read extensively, synthesize and analyze important issues, and contribute to group learning. Final grades will be based on performance in a final paper (40%), midterm examination (20%), homework assignments (35%) and briefing sessions (5%).

#### *Paper (40%)*

Each student will work on an individual project based on an intensive literature review and/or original research. Examples of past topics include studies of the Clear Skies Initiative, effect of Chinese ozone emissions on US air quality, arsenic in drinking water, California's zero emission vehicles program, drilling in ANWR, genetically modified foods, wetland mitigation banking, market mechanisms to promote renewable energy etc. The relevant deadlines for the final project are:

- ✓ **Proposal** (10%): Prepare a 2-3 page proposal that sets out the (1) objective of the project; (2) outline of the proposed methodology; and (3) proposed literature and data sources. The proposal is due in class on **03/31/06**.
- ✓ **Oral presentation** (10%): Oral presentation of reports will be held on **05/05/06**. Your presentation will be evaluated by your peers on the basis of its organization, depth of analysis, and response to audience questions.
- ✓ **Final report** (20%): A final report of about 15-20 double-spaced pages is due in my mailbox latest by 4:30 p.m. on **05/16/06**. It should incorporate responses to relevant questions raised by the audience during the oral presentation. Late submissions will not be accepted.

#### *Homework Assignments (35%)*

Regular homework assignments will be assigned as the class proceeds. Written responses to the assignments will be due in the next class and will form the basis for part of the class discussion. For this reason, late submission of homework assignments will not be accepted.

#### *Midterm Examination (20%)*

An in-class, three hour, closed book exam will be held on **03/17/06** to test the material covered before the semester break

#### *Briefing Sessions (5%)*

The briefing sessions will involve student led discussions of selected papers. The briefings will enable students to contribute to group learning and to practically apply what they have learned from the lectures. The student leader is expected to briefly summarize the objective, critical assumptions, methodology, and conclusions of the assigned paper. The leader will then engage the audience in a discussion to determine whether the conclusions are justified and to identify policy implications. All students are, therefore, expected to read the pre-assigned papers before coming to class.

Class participation is actively encouraged and will be used to make borderline adjustments to the final grade.

### Course Schedule

<b>Date</b>	<b>Topic</b>	<b>Deliverables</b>
02/10/06	Introduction	
02/17/06	Analytical Tools	✓ HW 1 due
02/24/06	Benefit and Cost Valuation	✓ HW 2 due
03/03/06	Policy Options	✓ HW 3 due
03/10/06	Air and Water Pollution	✓ HW 4 due
03/17/06	Midterm Examination	
03/31/06	Toxic and Solid Waste	✓ Project proposal due
04/07/06	Global Pollution	✓ HW 5 due
04/14/06	Sustainable Development	✓ HW 6 due
04/21/06	Natural Resource Management	✓ HW 7 due
04/28/06	Trade and the Environment	✓ HW 8 due
05/05/06	Final project	✓ Oral presentations
05/16/06	Final project	✓ Final paper due

## Reading List

### Introduction

Fullerton, Don. How Economists See the Environment. In, Stavins (2005), Chapter 1.

### Analytical Tools

\*Rosen, Harvey. 1999. Public Finance. Fifth Edition. Irvin Press. Chapter 5. Pg. 63-84.

Arrow, Kenneth, et al. Is there a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation? In, Stavins (2005), Chapter 12.

Goulder, Larry and Robert Stavins. An Eye on the Future. In Stavins (2005), Chapter 13.

Kelman, Steven. Cost-Benefit Analysis: An Ethical Critique. In Stavins (2005), Chapter 14.

\*Brealy, Richard, Stewart Meyers and Franklin Allen. 2006. Principles of Corporate Finance. Chapter 5: Why Net Present Value Leads to Better Investment Decisions than Other Criteria. Pg 85-99. Irwin/McGraw-Hill: Boston, MA.

### Cost and Benefit Valuation

Porter, Michael E. and Claas van der Linde. 1995. Towards a New Conception of the Environment-Competitiveness Relationship. In Stavins (2005), Chapter 5.

Palmer Karen, Wallace E. Oates and Paul Portney. 1995. Tightening Environmental Standards: The Benefit-Cost or the No Cost Paradigm. In Stavins (2005), Chapter 6.

\*Brunnermeier, Smita and Mark Cohen. 2003. Determinants of Environmental Innovation in US Manufacturing Industries. Journal of Environmental Economics and Management. Vol. 45. Pg. 278-293.

Hanemann, W. Michael. Valuing the Environment through Contingent Valuation. In Stavins (2005), Chapter 18.

Diamond, Peter and Jerry Hausman. Contingent Valuation: Is Some Number Better than No Number? In Stavins (2005), Chapter 9.

\*Costanza, Robert et al. 1997. The Value of the World's Ecosystem Services and Natural Capital. Nature. Vol. 387. 15 May 1997. Pg. 253-260.

\*Smith, Kerry V. 1997. Mispriced Planet. Regulation. Summer 1997. Pg. 16-17.

### Policy Options

\*Rosen, Harvey. 1999. Public Finance. Fifth Edition. Irvin Press. Chapter 6. Pg. 85-111.

Coase, Ronald. 1993. The Problem of Social Cost. In Stavins (2005), Chapter 3.

Tietenberg, Tom. Economic Instruments for Environmental Regulation. In Stavins (2005), Chapter 15.

Sandel, Michael. It is Immoral to Buy the Right to Pollute. In, Stavins (2005), Chapter 18.

\*Weitzman, Martin. 1974. Prices versus Quantities. Review of Economic Studies. Vol. 41. Pg. 477-491.

\*Khanna, Madhu and Lisa Damon. 1999. EPA's Voluntary 33/50 Program: Impact on Toxic Releases and Economic Performance of Firms. Journal of Environmental Economics and Management. Vol. 37 (1). Pg. 1-25.

### **Air and Water**

Portney, Paul. Air Pollution Policy. In, Portney and Stavins 2000, Chapter 4.

Stavins, Robert. What Can We Learn from the Grand Policy Experiment? Lessons from SO<sub>2</sub> Allowance Trading. In, Stavins (2005), Chapter 17.

\*Chay, Kenneth and Michael Greentone. 2003. The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Induced by a Recession. Quarterly Journal of Economics. Vol. 118 (3). Pg. 1121-67.

\* Gayer, Ted, John Horowitz and John List. 2005. When Economists Dream, They Dream of Clear Skies. The Economists' Voice. Berkley Electronic Press. Vol. 2(2). Article 7.

Freeman, Myrick III. Water Pollution Policy. In, Portney and Stavins 2000, Chapter 6.

\*King, Dennis. Crunch Time for Water Quality Trading. Choices. 1<sup>st</sup> Quarter 2005. Vol. 20 (1). Pg. 71-75.

\*Sigman, Hilary. Transboundary Spillovers and Decentralization of Environmental Policies. Journal of Environmental Economics and Management. Forthcoming.

### **Toxic and Solid Waste**

Macauley, Molly and Margaret Walls. Solid Waste Policy. In, Portney and Stavins 2000, Chapter 8.

Sigman, Hilary. Hazardous Waste and Toxic Substance Policy. In, Portney and Stavins 2000, Chapter 7.

\*Sigman, Hilary. 1998. Midnight Dumping: Public Policies and Illegal Disposal of Used Oil. Rand Journal of Economics. Vol. 29 (1). Pp. 157-178.

\*Sigman, Hilary. 2001. The Pace of Progress at Superfund Sites: Policy Goals and Interest Group Influence. Journal of Law and Economics. Vol. 44 (1). Pg. 315-344.

\*Hamilton, James, H. 1995. Testing for Environmental Racism: Prejudice, Profits and Political Power. Journal of Policy Analysis and Management. Vol. 14. Pg. 107-132.

### **Global Pollution**

Nordhaus, William D. 1993. Reflections on the Economics of Climate Change. In, Stavins (2005), Chapter 22.

Jacoby, Henry, Ronald Prinn, and Richard Schmalensee. 1998. Kyoto's Unfinished Business. In Stavins (2005), Chapter 24.

McKibbin, Warwick and Peter Wilcoxon. The Role of Economics in Climate Change. In Stavins (2005), Chapter 25.

\*Nordhaus, William D. 1992. An Optimal Transition Path for Controlling Greenhouse Gases. Science. Vol. 258. Pg. 1315-1319.

\*Barrett, Scott. 1998. Political Economy of the Kyoto Protocol. Oxford Review of Economic Policy. Vol. 14 (4). Winter 1998. Pg. 20-39.

\*Nordhaus, William D. 2001. Global Warming Economics. Science. Vol. 294. Pg. 1283-1284.

\*Pacala, Steven and Robert Socolow. 2004. Stabilization Wedges: Solving the Climate Change Problem for the Next 50 Years with Current Technologies. Science. 13 August 2004. Vol. 305. Pg. 968-972.

### **Sustainable Development**

Dasgupta, Susmita, Benoit Laplante and David Wheeler. 2002. Confronting the Environmental Kuznets Curve. In Stavins (2005), Chapter 20.

Hilton, F. G. H. and Arik Levinson. 1997. Factoring the Environmental Kuznets Curve: Evidence from Automotive Lead Emissions. Journal of Environmental Economics and Management. Vol. 35 (2). Pg. 126-141.

\*Arrow, K., B. Bolin, R. Costanza, P. Dasgupta, C. Folke, C. Holling, B. Jansson, S. Levin, K. Maler, C. Perrings, and D. Pimentel. 1995. Economic Growth, Carrying Capacity and the Environment. Science. April 28 1995. Vol. 268. Pg. 520-521.

Solow, Robert. Sustainability: An Economist's Perspective. In, Stavins (2005), Chapter 26.

\*Pacala, S. E. Bulte, J. List and S Levin. 2003. False Alarm over Environmental False Alarms? Science. 29 August 2003. Vol. 301. Pg. 1187-1188.

### **Natural Resource Management**

Harding, Garrett. Tragedy of the Commons. In Stavins (2005), Chapter 2.

\*Bardhan, Pranabh. 1993. Symposium on the Management of Local Commons. Journal of Environmental Perspectives. Vol. 7(4). Pg. 87-92.

\*Barbier, Edward. 1998. Economic Aspects of Tropical Deforestation in Southeast Asia. In, The Economics of Environment and Development: Selected Essays. Edward Elgar Press.

Metrick and Weitzman. Conflicts and Choices in Biodiversity Preservation. In Stavins (2005), Chapter 28.

### **Trade and Environment**

\*Bhagwati, Jagdish and Herman Daly. 1993. Debate: Does Free Trade Harm the Environment? Scientific American. November 1993. Pg. 41-57.

Frankel, Jeffery. The Environment and Globalization. In Stavins (2005), Chapter 19.

\*Barbier, Edward. 1998. Elephant Ivory and Tropical Timber: The Role of Trade Interventions in Sustainable Management. In, The Economics of Environment and Development: Selected Essays. Edward Elgar Press.

\*Brunnermeier, Smita and Arik Levinson. 2004. Examining the Evidence on Environmental Regulations and Industry Location. Journal of Environment and Development. Vol. 13(1). Pg. 6 - 41.