

Environmental Economics

Department of Economics, National Taiwan University

Spring 2023

Course Instructor : 劉錦添 (Jin-Tan Liu)

Class Hours : Wednesday 10:20-12:10 pm;

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Topics :

1. Environmental Regulation and Informal Regulation
2. Benefit Estimation and Damage Assessment
3. Environmental Pollution and Economic Growth

Course Requirement:

1. Midterm Exam (40%, Take home)
2. Final Exam (40%, Take home)
3. Oral Presentation (20%)

YouTube:

1. Non-Market Valuation: Method and Data
2. Market-based Approach to Environmental Policy
3. Methods Based on Response to Hypothetical Markets
4. Valuation of Ecosystem Services: Classes of Values
5. Measuring Willingness-to-Pay using discrete Choice Experiments

Course outline :

1. Formal Regulation and Informal Regulation

Section 4: Environmental Policy Analysis, in Field and Field (2009).

Command-and Control Strategies: The Case of Standards

Incentive-Based Strategies: Emission Charges and Subsidies

Transferable Discharge Permits

A. Formal Regulation

- Magat and Visusi, “Effectiveness of the EPA’s Regulatory Enforcement: the Case of Industrial Effluent Standards”, *J. of Law and Economics*, October 1990.
- Deily and Gray, “Enforcement of Pollution Regulations in a Declining Industry,” *JEEM*, 1991, 260-274.
- Cohen, “Monitoring and Enforcement of Environmental Policy,” in Folmer and Tietenberg (1999).
- Laplante and Rilstone, “Environmental Inspections and Emissions of the Pulp and Paper Industry in Quebec,” *JEEM*, 1996, 19-36.
- Gray, Wayne B. and Ronald J. Shadbegian (1995), “Pollution Abatement Costs, Regulation, and Plant-Level Productivity,” NBER working paper No. 4994.
- Gray, Wayne B. and Ronald J. Shadbegian (2001), “Plant Vintage, Technology, and Environmental Regulation,” NBER working paper, No. 8480.

B. Informal Regulation

- Pargal and Wheeler, “Informal Regulation of Industrial Pollution in Developing Countries: Evidence from Indonesia,” *JPE*, 1996.
- Pargal, Hettige, Singh, and Wheeler, “Formal and Informal Regulation of Industrial Pollution: Comparative Evidence from Indonesia and the United States” *World Bank Economic Review*, 1997, 433-450.

2. Welfare Measurement (Benefit Estimation) or Damage Assessment

An overview of this section of the course is provided by:

- Freeman, “Methods for Assessing the Benefits of Environmental Programs” in Kneese and Sweeney.

* OECD (1989).

- Freeman, Chapter 2-3.

A. Damage Function

- Ostro (1983), “The Effects of Air Pollution on Work Loss and Morbidity,” *JEEM*, 10, 371-382.
- Zuidema and Nentjes (1997), “Health Damage of Air Pollution: An Estimate of a Dose-Response Relationship for the Netherlands,” *Environmental and Resource Economics*, 9, 291-308.
- Chay and Greenstone (2003), “The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession,” *QJE*, August, 1121-1167.
- Greenstone (2004), “Did the Clean Air Act Cause the Remarkable Decline in Sulfur Dioxide Concentrations?,” *JEEM*, May, 585-611.
- Currie, Neidell, and Schmieder (2008), “Air Pollution and Infant Health: Lessons from New Jersey,” NBER working paper 14196.
- and (2009) *Journal of Health Economics*, 688-703.

- Alberini and Krupnick (2002), “Valuing the Health Effects of Pollution,” in Tietenberg and Folmer ed. *The International Yearbook of Environmental and Resources Economics*, UK: Edward Elgar.

B. Indirect Benefit Measurement

1. Hedonic Models (hedonic price model and hedonic wage model)

- Freeman, Chapter 11,12.
- Johansson, Chapter 7.
- Haab and McConnell (2002), Chapter 9: Hedonic Price Equations
- McConnell, “Indirect Methods for Assessing Natural Resource Damages under CERCLA” in Kopp and Smith, eds. *Natural Resource Damage Assessment*.

* OECD (1989), Chapter 5.

- Palmquist, “Hedonic Methods” in Braden and Kolstad, ed, *Measuring the Demand for Environmental Improvement*. North-Holland, 1990.
- Palmquist, “Welfare Measurement in the Hedonic Model: The Case of Nonparametric Marginal Prices”, *JEEM*, Sept. 1988.
- Rosen, “Hedonic Prices and Implicit Markets” *JPE*, 1974.
- Gamble and Downing (1982), “Effects of Nuclear Power Plants on Residential Property Values,” *J. of Regional Science*, 22(4), 457-478.

Value of Life and Value of Injury, Value of Health:

- Visusi and Aldy, “The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World,” NBER working paper 9487, 2003, *Journal of Risk and Uncertainty*, 27(1), August 2003.
- Bellavance, F. G. Dionne, and M. Lebeau (2009), ‘The Value of a Statistical Life : A Meta-analysis with a Mixed Effects Regression Model,’ *Journal of Health Economics*, 28, 444-464.

2. Recreation Demand Models: Travel Cost Method

- Freeman, Chapter 13.
- Haab and McConnell (2002),
 - Chapter 6: Modeling the Demand for Recreation
 - Chapter 7: Single Site Demand Estimation
 - Chapter 8: Site Choice Models
- Bockstael, Hanemann, and Kling, “Estimating the Value of Water Quality Improvements in a Recreational Demand Framework” *WRR*, May 1987.
- Bockstael, McConnell, and Strand, “Recreation” in Braden and Kolstad, eds., *Measuring the Demand for Environmental Improvement*, North-Holland, 1990.
- Brown and Mendelsohn, “The Hedonic Travel Cost Method” *REStat*, August 1984.
- McConnell, “The Economics of Outdoor Recreation” in the Kneese and Sweeney.
- Smith, “Travel Cost Recreation Demand Methods: Theory and Implementation”.

3. Household Production Models

- Bockstael and McConnell, “Welfare Measurement in the Household Production Framework” *AER*, Sept. 1983.
- Deaton and Muellbauer, Chapter 10.
- Smith, “Household Production Functions and Environmental Benefit Measurement” in Braden and Kolstad, eds., *Measuring the Demand for Environmental Improvement*, North-Holland, 1990.

C. Contingent Valuation Method (CVM)

- Freeman, Chapter 6.
- Haab and McConnell (2002):
 - Chapter 2: Parametric Models for Contingent Valuation;
 - Chapter 4: The Distribution of Willingness to Pay
 - Chapter 5: Topics in Discrete Choice Contingent Valuation
 -
- V. Kerry Smith (2004), “Fifty Years of Contingent Valuation” in Tietenberg and Folmer edited, *The International Yearbook of Environmental and Resource Economics 2004/2005*, Edward Elgar Co.
- Boyle and Bishop, “Welfare Measures Using Contingent Valuation: A Comparison of Techniques” *AJAE*, Feb. 1988.
- Camerson, “A New Paradigm for Valuing Non-market Goods using Referendum Data” *JEEM*, Sept. 1988.
- Carson, “Constructed Markets” in Braden and Kolsted, eds., *Measuring the Demand for Environmental Improvement*, North-Holland, 1990.
- Hanemann, “Welfare Evaluations in Contingent Valuation Experiments with Discrete Responses” *AJAE*, Aug. 1984.
- Hanemann, Loomis, and Kanninen, “Statistical Efficiency of Double-Bounded Dichotomous Choice Contingent Valuation, *AJAE*, 1991.
- Jahansson (1987), Chapter 7.
- McConnell, “Models for Referendum Data: The Structure of Discrete Choice Models for Contingent Valuation” *JEEM*, Jan. 1990.
- Jessup, Amber, et al (2003), Valuation of Morbidity Losses: Meta-Analysis of Willingness-to-Pay and Health Status Measures, Final Report, RTI Project number 08184-002.

* OECD (1989) , Chapter 4.

4. Valuation of Environmental Risks

- Freeman, Chapter 8.

- Jones-Lee, *The Economics of Safety and Physical Risk*, Basil Blackwell, 1989, Chapter 2, 3.
- Slovic, “Perception of Risk” *Science*, April 17, 1987, 280-285.
- Smith, “Environmental Risk Perception and Valuation: Conventional versus Prospective Reference Theory” in *The Social Response to Risk: Policy Formation in an Age of Uncertainty*, D. Bromley and K. Segerson, Editors (Kluwer, 1992).
- Smith, et al., “Can Public Information Programs Affect Risk Perceptions?” *Journal of Policy Analysis and Management*, Winter 1990.
- Viscusi and O’Connor, “Adoptive Responses to Chemical Labelling: Are Workers Bayesian Decision Makers?”, *AER*, 1984, 942-956.
- Smith and Desvousges, “Risk Communication and the Value of Information: Randon as a Case Study,” *REstat*, 1990, 137-142.
- Viscusi, “A Bayesian Perspective on Biases in Risk Perception” *Economics Letters*, 1985.
- Viscusi, *Fatal Tradeoffs: Public and Private Responsibilities for Risk*, New York: Oxford University Press, Chapter 6-8.
- Viscusi and Evans, “Utility Functions that Depend on Health Status: Estimates and Economic Implications” *AER*, June 1990.

5. Pollution and Economic Growth

- *Environment and Development Economics*: Special Issue: The Environmental Kuznets Curve. Oct. 1997.
- Barbier, “Introduction to the Environmental Kuznets Curve”.

De Bruyn, Sander M. and Roebijn J. Heintz (1999), “The Environmental Kuznets Curve Hypothesis,” in Jereon C. J. M. and van Den Bergh, *Handbook of Environmental and Resource Economics*.
- Grossman and Krueger, “Economic Growth and the Environment” *QJE*, May 1995, 353-377.
- Harbaugh, W., A. Levinson and D. Wilson, “Re-examining the Empirical Evidence for an Environmental Kuznets Curve,” NBER working paper, No. 7711. May 2000; *Review of Economics and Statistics*, 84(3), 541-551, 2002.

Web Sites :

1. www.rff.org (Resources for the Future)
2. www.epa.gov/economics (U.S. EPA Economy and Environment)
3. www.worldbank.org/nipr (NIPR, Environmental Economics and Indicators)
4. www.nber.org (National Bureau of Economic Research)
5. www.oecd.org (OECD)

6. www.damagevaluation.com (Environmental Valuation & Cost Benefit website)
7. www.evri.ec.gc.ca (Environmental Valuation Reference Inventory)
8. www.msu.edu/course/prm/320 (Professor Eileen van Ravenswaay website)
9. www.sscnet.ucla.edu/ssc/labs/cameron (Professor Trudy Ann Cameron website)
10. <http://ase.tufts.edu/gdae> (Global Development and Environment Institute at Tufts University)
11. www.unfccc.de (Home page for the United Nations Framework Convention on Climate Change).
12. <http://wri.org/climate> (World Resource Institute's web site on climate and atmosphere).
13. <http://www.env-econ.net> (Environmental Economics)
14. <http://www.rfe.org> (Economists on the Internet)
15. <http://marginalrevolution.org> (marginal revolution), (marginal revolution university)
16. <http://www.voxeu.org> (Vox Eu)

Textbooks and references :

- Baumol and Oates (1988), *Theory of Environmental Policy*, 2nd edition, New York: Cambridge University Press.
- Braden, J.B. and C. D. Kolstad (1991), *Measuring the Demand for Environmental Improvement*, North Holland.
- Callan and Thomas (2004), *Environmental Economics and Management*, Irwin, (滄海書局代理，02-27090781).
- Cornes and Sandler (1986), *The Theory of Externalities, Public Goods, and Club Goods*, New York: Cambridge University Press. (HB846.3. C67, 1986).
- Cummings, Brookshire and Schulze (ed.) (1986), *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*, NJ: Rowman and Allenheld.
- Field, Barry C. (2000), *Natural Resource Economics: An Introduction*, New York: McGraw-Hill Co.
- Field, Barry C. and Martha K. Field, (2009), *Environmental Economics*, 5th edition, McGraw Hill.
- Fisher, Anthony (1981), *Resource and Environmental Economics*, Cambridge University Press. (HC59. F558).
- Folmer, Henk and Tom Tietenberg (1999), *The International Yearbook of Environmental and Resource Economics*, Edward Elgar.
- Folmer, Henk and Tom Tietenberg (2003), *The International Yearbook of Environmental and Resource Economics 2003/2004*, Edward Elgar.
- Freeman, A. Myrick (1979), *Benefits of Environmental Improvement*, Johns Hopkins University Press. (HC79. E5. F7).
- Freeman, A. Myrick (1993), *The Measurement of Environmental and Resource Value: Theory and Methods*, Resources for the Future.
- Haab and McConnell (2002), *Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation*, Edward Elgar.
- Halvorsen and Ruby (1981), *Benefit-Cost Analysis of Air Pollution Control*, Mass:

- Lexington Books. (TD883. H35).
- Hanley, Nick, Jason F. Shogren and Ben White (1997), *Environmental Economics in Theory and Practice*, England, Macmillan Ltd.
 - Jeroen, C. J. M. and van den Bergh (1999), *Handbook of Environmental and Resource Economics*, Edward Elgar.
 - Johansson (1987), *The Economic Theory and Measurement of Environmental Benefits*, Cambridge: Cambridge University Press.
 - Johansson (1991), *Introduction to Modern Welfare Economics*, Cambridge: Cambridge University Press.
 - Johansson (1993), *Cost-Benefit Analysis of Environmental Change*, Cambridge: Cambridge University Press.
 - Just, et al. (1982), *Applied Welfare Economics*, N.J.: Prentice-Hall. (HB846. J87).
 - Kahn, James R. (1995), *The Economic Approach to Environmental and Natural Resources*, Dryden Press.
 - Kemien and Schwartz (1981), *Dynamic Optimization*, North Holland. (QA402.5. K32).
 - Kneese and Sweeney (1985), *Handbook of Natural Resource and Energy Economics*, volumes 1 and 2, North-Holland Publisher. (HD9502. A2. H257, 1985).
 - Kopp, Raymond J. and V. Keng Smith eds. (1993), *Valuing National Assets: The Economics of Natural Resource Damagement Assessment*, Washington, D.C.: Resources for the Future.
 - Maureen L. Cropper and Wallace E. Oates (1992), "Environmental Economics: A Survey", *Journal of Economic Literature*, June, 675-740.
 - Mendelsohn, Robert and Daigee shaw ed. (1997), *The Economics of Pollution Control in the Asia Pacific*, UK: Edward Elgar.
 - Mitchell and Carson (1989), *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Washington, D.C.: Resources for the Future.
 - Nishimura, H. (1989), *How to Conquer Air Pollution: A Japanese Experience*, New York: Elsevier.
 - O'Connor, Martin (1998), *Valuation and the Environment: Theory, Method and Practice*, Edward Elgar.
 - OECD (1989), *Environmental Policy Benefits: Monetary Valuation*, Paris: OECD. (HC79. E5. E57856).
 - OECD (1991), *Environmental Policy: How to Apply Economic Instruments*, Paris: OECD.
 - Panayotou, Theodore (1993), *Green Markets: The Economics of Sustainable Development*, San Francisco: ICS Press.
 - Pearce and Turner (1990), *Economics of Natural Resources and the Environment*, Johns Hopkins University Press.
 - Portney (1982), *Current Issues in Natural Resource Policy*, Johns Hopkins University Press (HC103.7. C87).
 - Portney (1990), *Public Policies for Environmental Protection, Resources for the Future*.
 - Smith, ed. (1984), *Environmental Policy under Regan's Executive Order*, Chapel

Hill: University of North Carolina Press.

- Stanley and Jarrell (1989), “Meta-Regression Analysis: A Quantitative Method of Literature Surveys,” *J. of Econ. Surveys*, 3(2), 161-170.
- Tietenberg (1985), *Emission Trading, an Exercise in Reforming Pollution Policy*, Johns Hopkins University. (HC110. A4 T54).
- Tietenberg (1988), *Environmental and Natural Resource Economics*, ILL: Scott, Foresman. (333.7. T564. E61).
- Tietenberg and Folmer (2002), *The International Yearbook of Environmental and Resource Economics 2002/2003*, Edward Elgar.
- Tietenberg and Folmer (2004), *The International Yearbook of Environmental and Resource Economics 2004/2005: A Survey of Current Issues*, Edward Elgar.
- Tolley, George, Donald Kenkel, and Robert Fabian eds. (1994), *Valuing Health for Policy*, Chicago: University of Chicago Press.
- Wooldrige, J. M. (2003), *Introductory Econometrics*, Ohio: Thomson.
- Wooldrige, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, Cambridge: MIT Press.
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- 中文書：黃宗煌 等人譯 (1988)，*環境經濟學與政策*，聯經出版社。