

Environmental Economics

Fall 2025

Syllabus

Instructors :

Mireille Chiroleu-Assouline (m.chiroleu-assouline@psemail.eu)

Matthew Gordon (matthew.gordon@psemail.eu)

Hélène Ollivier (helene.ollivier@psemail.eu)

1. Course Overview

This is a Master-level field course at the intersection between Environmental Economics and Applied Microeconomics. This course provides a brief review of the theory of externalities followed by an in-depth survey of the design of environmental regulations, under perfect information as well as asymmetric information, while exploring various policy tools (Pigouvian taxes, tradable permits, standards or subsidies, eco-labels, etc). The course combines the theory behind the design of environmental regulation with the current research landscape that explores how regulation works in practice. The course will also explore some rationales behind the oft-observed difficulties to regulate environmental externalities, such as the global nature of greenhouse gases, the disconnect between location of pollution and location of consumption through trade. Finally, the course will cover different types of environmental hazards and the question of measuring damages, as well as the potential endogenous response from exposed individuals.

2. Course structure

The grading breakdown for the course is:

- 50% for the part related to Mireille Chiroleu-Assouline's classes
- 50% for the part related to Matthew Gordon and Hélène Ollivier's classes

The grading associated with Mireille Chiroleu-Assouline's classes is decomposed into:

- 20% on the best grade from two short in-class written tests (taken at the beginning of Lecture 3 and 6)
- 80% on the first part of the final exam, with half of the grade on a short essay and the other half on an analytical problem

The grading associated with Matthew Gordon and Hélène Ollivier's classes is decomposed into:

- 10% on class participation -- students are expected to show up to class having read the assigned papers and be ready to discuss their strengths and weaknesses
- 90% on the second part of the final exam, with a discussion of empirical strategies and questions on topics covered in the course

3. Course schedule

We've organized the course into a succession of topics following the order indicated below. To indicate the name of the professor in charge of each lecture, we use initials: hence, MCA stands for Mireille Chiroleu-Assouline, MG for Matthew Gordon, and HO for H  l  ne Ollivier.

Lectures:

1) **Environmental regulation without uncertainty 1/2** (MCA)

Topics covered: externalities and theorems of welfare economics, optimal pollution and internalization of the externalities, comparison between instruments (efficiency/dynamic efficiency/distributive effects), distributive effects of carbon pricing

2) **Environmental regulation without uncertainty 2/2** (MCA)

3) **Environmental regulation in an uncertain world** (MCA)

Topics covered: Choice between price vs quantity instruments under uncertainty, precautionary principle

4) **Environmental regulation under ex ante asymmetric information 1/2** (MCA)

Topics covered: firms' incentives to hide information about abatement costs, adverse selection and green products (ecolabels), contract theory, alternative mechanisms

5) **Environmental regulation under ex ante asymmetric information 2/2** (MCA)

6) **Environmental risk regulation under ex post asymmetric information** (MCA)

Topics covered: non-point source pollution, risk regulation: liability rules, compliance, monitoring and incentives

7) **Market imperfections and environmental regulation** (HO)

Topics covered: models of environmental regulation in second best settings, with a focus on the EU ETS

8) **Trade and the environment** (HO)

Topics covered: models of international trade with pollution as a negative externality and with heterogeneous firms

9) **Climate change and disasters in a globalized world** (HO)

Topics covered: global externality, measurement of damages from climate change and disasters, and interlinkages through trade

10) Air Pollution: Welfare and Distribution (MG)

Topics covered: estimating effects of air pollution when people and firms sort across space. How can we consider the costs of protection and adaptation to air pollution? What are the distributional effects of policies to address air pollution?

11) Risk, Insurance, and Natural Disasters (MG)

Topics covered: How do individuals and communities insure against environmental risks like natural disasters? What kind of policies encourage adaptation (or maladaptation)?

12) Climate change (MG)

Topics covered: What are (some of) the effects of climate change? How can we use estimates of the damages of climate change to inform policy?

4. Readings

Textbooks

Tietenberg T., Lewis L. [2023], *Environmental and Natural Resource Economics*, 12th Edition, Routledge.

Kolstad C. [2010], *Environmental Economics*, 2nd Edition, Oxford University Press.

Hanley N., Shogren J.F., White B. [1997], *Environmental Economics in Theory and Practice*, Oxford University Press, Oxford.

Perman R., Ma Y., Common M., Maddison D., McGillvray J. [2011], *Natural Resources and Environmental Economics*, 4th Edition, Addison-Wesley.

Pearce D.W. et Turner R.K. [1990], *Economics of Natural Resources and the Environment*, Harvester Wheatsheaf.

Other recommended readings

Note that a reference that starts with * indicates that this is an assigned paper that students must read before the class

Lectures 1 & 2

Coase R.H. (1960), The problem of social cost. *The Journal of Law and Economics*, Vol. III, 1960, pp. 1–44.

Fullerton D. (2001), A framework to compare environmental policies (No. w8420). National Bureau of Economic Research.

Goulder, L. H. (1995), Environmental taxation and the double dividend: a reader's guide. *International Tax and Public Finance*, 2(2), 157-183.

Stiglitz, J. E. (2019). Addressing Climate Change through Price and Non-Price Interventions. *European Economic Review*, 119, 594-612.

Lecture 3

- Gollier C., Jullien B. & N. Treich (2000). Scientific progress and irreversibility: an economic interpretation of the 'Precautionary Principle'. *Journal of Public Economics*, 75(2), 229-253.
- Weitzman M.L. (1974), Prices vs. quantities. *The Review of Economic Studies*, 477-491.
- Roberts, M. J., & Spence, M. (1976), Effluent charges and licenses under uncertainty. *Journal of Public Economics*, 5(3), 193-208.
- Williams, R. (2002), Prices vs. quantities vs. tradable quantities (No. w9283). National Bureau of Economic Research.
- Christiansen, V., & Smith, S. (2015), Emissions Taxes and Abatement Regulation Under Uncertainty. *Environmental and Resource Economics*, 60(1), 17-35.

Lectures 4 & 5

- Bottega, L., & De Freitas, J. (2009). Public, private and nonprofit regulation for environmental quality. *Journal of Economics & Management Strategy*, 18(1), 105-123.
- Ben Youssef, A., & Lahmandi-Ayed, R. (2008). Eco-labelling, competition and environment: Endogenization of labelling criteria. *Environmental and Resource Economics*, 41(2), 133-154.
- Fischer, C., & Lyon, T. P. (2014). Competing environmental labels. *Journal of Economics & Management Strategy*, 23(3), 692-716.
- Brécard, D. (2014). Consumer confusion over the profusion of eco-labels: Lessons from a double differentiation model. *Resource and Energy Economics*, 37, 64-84.
- Baron D. P. (1985). Regulation of prices and pollution under incomplete information. *Journal of Public Economics*, 28(2), 211-231.
- Arguedas, C., & van Soest, D. P. (2009). On reducing the windfall profits in environmental subsidy programs. *Journal of Environmental Economics and Management*, 58(2), 192-205.
- Lewis T. R. (1996). Protecting the environment when costs and benefits are privately known. *The RAND Journal of Economics*, 819-8.
- Collinge R. A. & Oates, W. E. (1982). Efficiency in pollution control in the short and long runs: A system of rental emission permits. *Canadian Journal of Economics*, 346-354.
- McKittrick R. (1999). A Cournot mechanism for pollution control under asymmetric information. *Environmental and Resource Economics*, 14(3), 353-363.

Lecture 6

- Segerson K. (1988). Uncertainty and incentives for nonpoint pollution control. *Journal of Environmental Economics and Management*, 15(1), 87-98.
- Hiriart, Y., Martimort, D., & Pouyet, J. (2011). Weak enforcement of environmental policies: a tale of limited commitment and limited fines. *Annals of Economics and Statistics/Annales d'Économie et de Statistique*, 25-42.
- Heyes A. G. (1996). Optimal taxation of flow pollutants when firms may also inflict catastrophic environmental damage. *Environmental and Resource Economics*, 7(1), 1-14.
- Strand J. (1999). Efficient environmental taxation under moral hazard. *European Journal of Political Economy*, 15(1), 73-88.
- Arguedas, C. (2008). To comply or not to comply? Pollution standard setting under costly monitoring and sanctioning. *Environmental and Resource Economics*, 41, 155-168.
- Bontems, P., & Rotillon, G. (2000). Honesty in environmental compliance games. *European Journal of Law and Economics*, 10(1), 31-41.

Ozanne, A., Hogan, T., & Colman, D. (2001). Moral hazard, risk aversion and compliance monitoring in agri-environmental policy. *European review of agricultural economics*, 28(3), 329-348.

Lecture 7

Fowlie, M. (2010) "Emissions trading, electricity industry restructuring, and investment in pollution control" *AER* 100(3).

* Fowlie, M. (2009) "Incomplete environmental regulation, imperfect competition, and emissions leakage", *AEJ: Economic Policy* 1(2).

Fowlie, M., Reguant M., Ryan S. (2016) "Market-based emissions regulation and industry dynamics", *JPE* 124(1).

Joltreau, E., Sommerfeld K. (2019) "Why does emissions trading under the EU Emissions Trading Scheme (ETS) not affect firms' competitiveness? Empirical findings from the literature", *Climate Policy* 19(4).

Barrows, G., Calel R., Jégard M., Ollivier H. (2023) "Estimating treatment effects of incomplete regulation: A new method with application to the EU ETS", mimeo.

Dechezleprêtre, A., Nachtigall D., Venmans F. (2023) "The joint impact of the European Union emissions trading system on carbon emissions and economic performance", *JEEM* 118.

Lecture 8

* Chernichwan, J., Copeland B., Taylor S. (2017) "Trade and the environment: New methods, measurements, and results", *Annual Review of Economics*.

* Shapiro, J., Walker, R. (2018) "Why is pollution from US manufacturing declining? The roles of environmental regulation, productivity, and trade" *AER* 108(12).

Barrows, G., Ollivier, H. (2021) "Foreign demand, developing country exports, and CO2 emissions: Firm-level evidence from India", *JDE*.

Cherniwchan, J. (2017) "Trade liberalization and the environment: Evidence from NAFTA and US manufacturing", *JIE* 105.

Lecture 9

* Carvalho, N., Nirei, Saito, Tahbaz-Salehi (2020) "Supply chain disruptions: Evidence from the Great East Japan Earthquake", *QJE*.

* Costinot, A., Donaldson D., Smith C. (2016) "Evolving comparative advantage and the impact of climate change in agricultural markets: Evidence from 1.7 million fields around the world", *JPE* 124(1).

Gouel, C., Laborde D. (2021) "The crucial role of domestic and international market-mediated adaptation to climate change", *JEEM* 106.

Lecture 10

* Greenstone et al - Can Pollution Markets Work in Developing Countries? Experimental Evidence from India - Working Paper

* Hernandez-Cortes and Meng - Do Environmental Markets Cause Environmental Injustice? Evidence from California's Carbon Market - *JPubE* - 2022

Deryugina et al - The Mortality and Medical Costs of Air Pollution: Evidence from Changes in Wind Direction - AER 2019

Chay and Greenstone - Does Air Quality Matter? Evidence from the Housing Market - JPE 2005

Jack et al - Money (Not) to Burn: Payments for Ecosystem Services to Reduce Crop Residue Burning - Working Paper

Lecture 11

* Wagner - Adaptation and Adverse Selection in Markets for Natural Disaster Insurance - AEJ: EP 2021

* Hsiao - Sea Level Rise and Urban adaptation in Jakarta - Working Paper

Munshi and Rosenzweig - Networks and Misallocation: Insurance, Migration and the Rural-Urban Wage Gap - AER 2016

Meghir et al - Migration and Informal Insurance - Restud 2020

Deryugina, Kawano and Levitt - The Economic Impact of Hurricane Katrina on Its Victims: Evidence from Individual Tax Returns - AEJ: Applied 2018

Fried - Seawalls and Stilts: A Quantitative Macro Study of Climate Adaptation - Restud 2021

Shrader, Bakkenson, Lemoine: Fatal Errors: The Mortality Value of Accurate Weather Forecasts - Working Paper

Lecture 12

* Carleton et al - Valuing the Global Mortality Consequences of Climate Change Accounting for Adaptation Costs and Benefits - QJE 2022

* Nath - Climate Change, The Food Problem, and the Challenge of Adaptation through Sectoral Reallocation - Working Paper

Barreca et al - Adapting to Climate Change: The Remarkable Decline in the US Temperature-Mortality Relationship over the Twentieth Century - JPE 2016

Annan and Schlenker - Federal Crop Insurance and the Disincentive to Adapt to Extreme Heat - AER 2015

McGuirk and Nunn - Transhuman Pastoralism, Climate Change and Conflict in Africa - Restud Forthcoming

Cruz and Rossi Hansberg - The Economic Geography of Global Warming - Restud Forthcoming