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October 18-19 and October 24-26, 2018

SPECIAL COURSE

Dynamic Resource Economics

Outline (preliminary)

This course of four four-hour lectures deals with a number of topics in environmental economics, with an emphasis on international environmental problems like climate change. Central themes in the course are the dynamic aspects of environmental policy and the interaction between environmental policy and technological change. The course uses natural resource theory (to study the dynamics of resource use) and growth theory (to study the link with technology and the long-run general equilibrium effects).

We try to answer questions like the following:

What is the optimal carbon tax?

Should green technologies be subsidized?

Should we mainly rely on carbon taxes or on green subsidies?

When are growth and environmental improvement compatible?

Will we grow out of pollution? What drives the Environmental Kuznets Curve?

How can we prevent "carbon leakage"?

At least a modest background in mathematics (including optimization and elementary optimal control) is expected of students.

In the course we will see a mix between "fundamental robust insights" and "new challenges in the literature", so that the course might be interesting both for the student with a general interest in the field and for the student who plans to do (theoretical) research in the field.

The course is limited to 25 participants.

Venue

Leipzig University, room tbd

Registration

Please contact Monika Sprenger, until October 1, 2018 via e-mail: sprenger@wifa.uni-leipzig.de.

Time Schedule

Thursday, 18th

8:30 – 10:00 (2 x 45 min)
Break: 30 min
10:20 – 12:00 (2 x 45 min)
Break: 75 min
13:15 – 14:45 (2 x 45 min)

Friday, 19th

9:30 – 11:00 (2 x 45 min)
Break: 30 min
11:30 – 13:00 (2 x 45 min)
Break: 90 min
14:30 – 16:00 (2 x 45 min)

Wednesday, 24th

9:00 – 10:30 (2 x 45 min) (Room I 411)
Break: 30 min
11:00 – 12:30 (2 x 45 min) (Room I 411)
Break: 60 min
13:30 – 15:00 (2 x 45 min) Tutorial (Seminar room 16)

Thursday, 25th

8:30 – 10:00 (2 x 45 min)
Break: 30 min
10:20 – 12:00 (2 x 45 min)
Break: 75 min
13:15 – 14:45 (2 x 45 min)

Friday, 26th

9:30 – 11:00 (2 x 45 min)
Break: 30 min
11:30 – 13:00 (2 x 45 min)
Break: 90 min
14:30 – 16:00 (2 x 45 min)

Reading list

(*The asterisks indicate main articles)

1. Environmental policy and technology

*Goulder, L. and K. Mathai. 2000. "Optimal CO₂ abatement in the presence of induced technological change", *Journal of Environmental Economics and Management* 39, 1-38.

*Requate, T. and W. Unold (2003) "Environmental policy incentives to adopt advanced abatement technology: Will the true ranking please stand up?" *European Economic Review* 47, 125-146.

*Smulders, Sjak and Corrado Di Maria. 2012. "Endogenous Technological Change and the Cost of Environmental Policy". CESifo working paper.

Reichenbach, Johanna and Till Requate. 2012. "Subsidies for renewable energies in the presence of learning effects and market power". *Resource and Energy Economics*, 34, 236-254.

2. Environment and (limits to) growth

a. Limits to growth

Brock, William A. and M. Scott Taylor (2005) "Economic Growth and the Environment: A review of theory and empirics" in: Philippe Aghion and Steven N. Durlauf (eds) *Handbook of Economic Growth*, Volume 1B. Amsterdam: Elsevier.

Groth, Christian. 2007. "A New-Growth Perspective on Non-renewable Resources" in: Bretschger and Smulders (eds) Sustainable resource use and economic dynamics. Dordrecht: Springer/Kluwer. [available at https://link.springer.com/chapter/10.1007/978-1-4020-6293-3_7]

b. Directed Technical change

*Acemoglu, D., P. Aghion, L. Bursztyn, and D. Hemous. 2012. "The environment and directed technical change." *American Economic Review* 102, 131-166. [available at http://www.anderson.ucla.edu/faculty/leonardo.bursztyn/AABH_AER.pdf]

Di Maria, Corrado, Edwin van der Werf, 2008. „Carbon leakage revisited: unilateral climate policy with directed technical change," *Environmental & Resource Economics*, 39(2), 55-74.

Di Maria, C., and S. Smulders. 2004. 'Trade pessimists vs technology optimists: Induced technical change and pollution havens.' *Advances in Economic Analysis and Policy*. 4(2), 7.

c. Pollution-GDP dynamics (and the Environmental Kuznets Curve)

Brock, William A. and M. Scott Taylor. 2010. "The Green Solow Model." *Journal of Economic Growth*.

*Cherniwchan, Jevan. 2012. "Economic Growth, Industrialization, and the Environment", *Resource and Energy Economics* doi:10.1016/j.reseneeco.2012.04.004

Ordas Criado, C., S. Valente, T. Stengos. 2011. "Growth and pollution convergence: Theory and evidence." *Journal of Environmental Economics and Management* 62, 199-214.

d. Climate disasters and growth

Van der Ploeg, R. and A. de Zeeuw. 2014. "Climate Tipping and Economic Growth: Precautionary Saving and the Social Cost of Carbon"

3. Climate policy and depletion: Too much oil?

a. Non-renewable resources

*Heal, G.M. (1976), "The relationship between price and extraction cost for a resource with a backstop technology", *Bell Journal of Economics* 7 (Autumn), 371-378.

*Lin, C. and G. Wagner. 2007. "Steady state growth in a Hotelling model of resource extraction" *Journal of Environmental Economics and Management* 54, 68-83.

Hart, Rob and Daniel Spiro. 2011. "The elephant in Hotelling's room" *Energy Policy* 39, 7834-7838.

Golosov, Mikhail, John Hassler, Per Krusell, Aleh Tsyvinski. 2014. "Optimal Taxes on Fossil Fuel in General Equilibrium" *Econometrica* 82, 41-88.

Andre, F.J. and S. Smulders. 2014. Fueling growth when oil peaks: Directed technological change and the limits to efficiency. *European Economic Review* (forthcoming).

b. The green paradox, announcement effects, and implementation lags.

Sinn, H.-W., 2008. "Public policies against global warming: a supply side approach." *Int Tax Public Finance* 15: 360-394.

*Van der Ploeg, F., and C. Withagen. 2012. "Is there really a green paradox?". *Journal of Environmental Economics and Management* 64, 342-363.

Gerlagh, Reyer. 2010. "Too much oil." *CESifo Economic Studies*, doi:10.1093/cesifo/ifq004

Harstad, Bard. 2012 "Buy Coal! A Case for Supply-Side Environmental Policy" *Journal of Political Economy* 120, 77-115. [also available at <http://www.kellogg.northwestern.edu/faculty/harstad/html/deposits.pdf>]

c. Biofuels and Renewables

Van der Ploeg and Withagen. 2014. "Growth, Renewables and the Optimal Carbon Tax" *International Economic Review* 55 (1) 283-311.

*Hassler, J. and H.-W. Sinn (2012). "Fossile Episode" CEPR discussion paper 9256.

Ujjayant N. Chakravorty, Marie-Helene Hubert and Beyza Ural Marchand, 2012. „Food for Fuel: The Effect of U.S. Energy Policy on Indian Poverty"[available at: <https://works.bepress.com/chakravorty/>]

4. Sustainable development and Green accounting

Chichilnisky, G. 1997. "What is Sustainable Development?" *Land Economics* 73/4, 467-491.

*Cairns, R. and V. Martinet. 2014. "An environmental-economic measure of sustainable development" *European Economic Review* forthcoming.

Van der Ploeg, F. 2010. "Why do many resource-rich countries have negative genuine saving? Anticipation of better times or rapacious rent seeking." *Resource and Energy Economics* 32, 28-44.

*Arrow Kenneth J. Arrow, Partha Dasgupta, Lawrence H. Goulder, Kevin J. Mumford, and Kirsten Oleson. 2012. "Sustainability and the Measurement of Wealth" *Environment and Development* 17, 317-353.