GRAD-C8-107: Economics II: Sustainability

Kira Lancker

1. General information

Class time	Tue, 8-10h
Course Format	The Economics II lecture will be taught online, in real time, via the platform Clickmeeting. Small participatory labs will accompany the lecture and will be taught onsite at the Hertie School, or online via the platform Teams, depending upon your location. Online office hours will be available.
Instructor	Kira Lancker
Instructor's office	
Instructor's e-mail	Kira.Lancker@idiv.de
Instructor's phone number	+49 (0) 341 97 33 265
Assistant	Email: adjunctsupport@hertie-school.org
Instructor's Office Hours	Thursdays, 2-4pm. Please drop me an email and make an appointment, so I can send you a virtual meeting link.

Link to Module Handbook **MIA** and **MPP**
Link to **Study, Examination and Admission Rules**

Instructor Information:
Dr. Kira Lancker currently works at the German Centre for Integrative Biodiversity Research (iDiv) in Leipzig and is also affiliated with the Department of Economics at Leipzig University. She holds a PhD in economics and a Master of Science in Economics. Her research interests include the economics of natural resources, renewable energy under learning-by-doing, food security, fisheries and the economic value of biodiversity. She has published in relevant field journals such as Energy economics and Food Policy, and has done fieldwork in several countries including Senegal and Cabo Verde. Kira is currently part of the FOCUS project ("Food security and sustained coastal livelihoods through linking land and ocean"), the CraMoRes project ("Changing risks and mobile common pool resources: Economic analysis of resource-user behavior and policy instruments for sustainability") and the cyanoHABs project ("Spoiling Fish as Food: Harmful Algal Blooms in Lake Victoria"). Prior to her research career, Kira has worked for the Oil & Gas Company RWE Dea for three years. Kira has taught in the fields of Introductory economics, Resource Economics, Environmental Economics, Theories of Distributive Justice and Sustainability. At Hertie, she teaches the course on Economics II – Sustainability as a guest lecturer.

2. Course Contents and Learning Objectives

Course contents:

This course provides an overview of the economics of sustainability, at the intersection of economic growth, resource and environmental economics. The focus will be on understanding classic theoretical models that underlie most economic findings in this area, but where possible, we will also compare the theoretical with empirical results. We will discuss potential efficient and optimal instruments to promote sustainability, where we will limit our focus to an economic discussion of these instruments.

Based on stylized facts, we begin the lecture by characterizing objectives and problems economists and policy-makers face worldwide in order to achieve sustainable development and green growth. We will discuss market imperfections that lead to unsustainable development as well as methods of valuation and accounting. After laying the foundation for policy analysis in a static setting, we will turn to inter-temporal optimization. We will discuss optimal use of non-renewable and renewable resources. We also explore the determinants of growth, including factor accumulation and technological progress. This will enable us to merge the different theories and analyse how resource scarcity and environmental pollution may limit growth in the context of substitution and technical change. Finally, we will look at the interdependence between sustainability policy and present and future inequality, and analyse empirical evidence for this interdependence.

Please note that we will use exemplary problems and resources – such as climate change and forestry – for illustration purposes, but will not cover most of these particular examples in full depth, to the benefit of providing relatively general tools for analysis to the students.

Main learning objectives:
After this course, students should be familiar with different social welfare functions, acquire the analytical tools to analyse environmental and resource economic problems and have basic understanding of dynamic optimization in economics. They should know the main general models that are typically used to study questions of sustainable development and green growth, and should be able to discuss limits to growth and potential remedies and solutions.

Target group:
The course is particularly suited for students who want to complement their general interest in inter-generational justice and sustainable development with an introduction to how economists analyse and solve these problems.

Teaching style:
In addition to the weekly lecture, there is a weekly lab. In the online lecture, the lecturer presents qualitative and mathematical content. We will use 10-15 minutes of each lecture to discuss a central paper or chapter that is part of the readings. The labs are used for a brief repetition, exercises to train the relevant analytical skills, and where possible a brief discussion of current applications.

Prerequisites:
Economics I, basic math skills

Diversity Statement:
In my lectures, I strive to support inclusivity and diversity, and to build a culture where difference is valued, discussed, and finally spurs innovation and learning. I appreciate feedback on these issues, and would be honoured if you would address to me any issues you experience with discrimination, offensive speech or related issues during lecture or labs.

3. Grading and Assignments

Composition of Final Grade:

Assignment 1: Policy memo	at any time until one week after the final session	Submit via Email.	15%
Assignment 2: Mid-term exam	During mid-term exam week		40%
Assignment 3: Final exam	During final exam week		45%

Assignment Details

Topics covered in the lecture and labs are relevant for exams. Labs start in the first week. There is a mid-term and a final exam of 90 min each. The exams will include both qualitative and mathematical questions. The mid-term exam covers the first half of the class; the final exam covers the full class.

In addition to exams, students will hand in a policy memo of 1-3 pages in which they discuss policy implications of 1 session of their own choice. This memo should be clearly structured, easy to read for non-economists and include a brief discussion of what our session's results mean for policy. Students should clearly formulate a policy question at the beginning and give a clear answer at the end. Whether students pick a particular policy issue in a particular country or whether they discuss policy implications in general is left to their discretion. Students may hand in this assignment at any time until one week after the final session.

Late submission of assignments: For each day the assignment is turned in late, the grade will be reduced by 10% (e.g. submission two days after the deadline would result in 20% grade deduction).

Attendance: Students are expected to be present and prepared for every class session. Active participation during lectures and seminar discussions is essential. If unavoidable circumstances arise which prevent attendance or preparation, the instructor should be advised by email with as much advance notice as possible. Please note that students cannot miss more than two out of 12 course sessions. For further information please consult the Examination Rules §10.

Academic Integrity: The Hertie School is committed to the standards of good academic and ethical conduct. Any violation of these standards shall be subject to disciplinary action. Plagiarism, deceitful actions as well as free-riding in group work are not tolerated. See Examination Rules §16.

Compensation for Disadvantages: If a student furnishes evidence that he or she is not able to take an examination as required in whole or in part due to disability or permanent illness, the Examination Committee may upon written request approve learning accommodation(s). In this respect, the submission of adequate certificates may be required. See Examination Rules §14.

Extenuating circumstances: An extension can be granted due to extenuating circumstances (i.e., for reasons like illness, personal loss or hardship, or caring duties). In such cases, please contact the course instructors and the Examination Office *in advance* of the deadline.

4. General Readings:

The following books can provide a useful and easy to read overview:

- Phaneuf & Requate (2017), A course in environmental economics, Cambridge University Press.

- Perman, R., Y. Ma, J. McGilvray, and M. Common (2011): Natural Resource and Environmental Economics, Prentice Hall.

The following books can help with growth theory (earlier or later versions are usually also fine):

- Acemoglu (2007), Introduction to Modern Economic Growth. Princeton University Press, Princeton.

- Weil (2013): Economic growth, Routledge, 3rd edition

- Barro & Sala-i-Martin 2004: Economic Growth. 2nd edition, McGraw-Hill, New York, 2004

5. Session Overview

Session	Session Date	Session Title
1	09.02.2021	Social welfare and sustainability challenges
2	16.02.2021	Environmental economics
3	23.02.2021	Resource economics
4	02.03.2021	Accumulating pollutants
5	09.03.2021	Solow model
6	16.03.2021	Ramsey model and discounting
Mid-term Exam Week: 22 – 26.03.2021 – no class		
7	30.03.2021	Sustainability and substitution
8	06.04.2021	Sustainable development facing scarce resources
9	13.04.2021	Environmental valuation and sustainability accounting
10	20.04.2021	The role of abatement
11	27.04.2021	The environment and inequality
12	04.05.2021	Application: Climate policy and future challenges
Final Exam Week: 17 – 21.05.2021 – no class		

6. Course Sessions and Readings

All required readings will be accessible via Moodle or the library. In cases where content is not available as pdf or ebook, alternative readings are listed.

Required readings are to be read and analysed thoroughly. Optional readings are intended to broaden your knowledge in the respective area and it is highly recommended to at least skim them. In the case that there is a change in readings, students will be notified by email.

Session 1: Social welfare and sustainability challenges	
Learning Objective	definitions, sustainable development goals, social welfare functions, Rawls criterion, veil of ignorance between generations
Required Readings	Discussion: Rawls (1971): A theory of justice, Harvard University Press, ## 24 & 44, Weil, ch. 1, Perman, ch. 2+3
Optional Readings	Perman, ch. 4, Roemer (1998): Theories of Distributive Justice, Harvard University Press, p. 13-26, Baumgärtner & Quaas (2010)

Session 2: Environmental economics	
Learning Objective	Environmental problems and policy, public goods, externalities, Pigouvian tax, Coase theorem, cost effectiveness and optimality, policy solutions
Required Readings	Discussion: IPBES Summary for policy makers (2020), pp. 10-47 Perman, ch. 5.8-5.10 OR Phaneuf & Requate, ch. 1, 3 (2018)
Optional Readings	Phaneuf & Requate, ch. 2 (2018)

Session 3: Resource economics	
Learning Objective	Dynamic optimization, Hotelling rule, optimal intertemporal use of resources
Required Readings	Discussion: Orstrom et al. (1999), Revisiting the Commons: Local Lessons, Global Challenges, Science 284, pp. 278-282. Perman (2011), ch. 14-5-14.7
Optional Readings	Dasgupta, P. and G. Heal (1974). The Optimal Depletion of Exhaustible Resources. Review of Economic Studies, 41: 3–28. Phaneuf & Requate (2017), ch. 13

Session 4: Accumulating pollutants	
Learning Objective	renewable resources, dynamic pollution problems, stock versus flow problems, steady state, phase diagrams, dynamic optimal policy, green paradox
Required Readings	Discussion: Svenn Jensen, Kristina Mohlin, Karen Pittel, Thomas Sterner, An Introduction to the Green Paradox: The Unintended Consequences of Climate Policies, Review of Environmental Economics and Policy 9 (2), 246-265. Perman (2011), ch. 16 OR Phaneuf & Requate (2017), ch. 13

Optional Readings	Tahvonen, O. and J. Kuuluvainen (1993). Economic Growth, Pollution, and Renewable Resources. Journal of Environmental Economics and Management, 24: 101–118.

Session 5: Solow model	
Learning Objective	GDP and its problems, Solow model, capital accumulation, convergence, Green Solow model
Required Readings	Discussion: Economist (2018): Understand little Acemoglu, ch. 2-3, Brock & Taylor (2005), pp. 1772-1776 (Handbook of Economic Growth, ch. 28)
Optional Readings	Economist (2006): Growth theories, Barro & Sala-i-Martin (2004), 1.1-1.2, 10.1, Weil, ch. 3 Brock and Taylor (2010): "The Green Solow model". Journal of Economic Growth, 15, pp. 127-153.

Session 6: Ramsey model and discounting	
Learning Objective	Ramsey-Cass-Koopmans Model of Optimal Investments and Growth, Ramsey discounting rule
Required Readings	Discussion: Drupp, Moritz A., Mark C. Freeman, Ben Groom, and Frikk Nesje. 2018. "Discounting Disentangled." American Economic Journal: Economic Policy, 10 (4): 109-34. Barro & Sala-i-Martin (2004), 2 – 2.4
Optional Readings	

Mid-term Exam Week: 22 – 26.03.2021 – no class

Session 7: Sustainability and substitution	
Learning Objective	substitution, weak and strong sustainability, empirical evidence, Dasgupta-Heal-Solow-Stiglitz-Model, limits to growth
Required Readings	Discussion: Hoel, M. and T. Sterner (2007), Discounting and relative prices, Climatic Change 84: 265–280. Perman (2011), ch. 14.4
Optional Readings	Dasgupta, P. S. and G. M. Heal (1979). Economic Theory and Exhaustible Resources. Cambridge University Press, Cambridge. Solow, R. M. (1974). Intergenerational Equity and Exhaustible Resources. Review of Economic Studies, 41: 29–45. Stiglitz, J. (1974a). Growth with Exhaustible Natural Resources: Efficient and Optimal Growth Paths. Review of Economic Studies, 41: 123–137.

| | Stiglitz, J. (1974b). Growth with Exhaustible Natural Resources: The Competitive Economy. Review of Economic Studies, 41: 139–152. |
| | Drupp, Moritz A. (2016) Limits to substitution between ecosystem services and manufactured goods and implications for social discounting. Environmental and Resource Economics 69, 135-158. |

Session 8: Sustainable development facing scarce resources	
Learning Objective	DHSS model, green growth, balanced growth path, genuine savings, Hartwick rule
Required Readings	Discussion: No reading, but please revise social welfare functions discussed in session 1.
Optional Readings	See session 7. Hartwick, J. M. (1977). Intergenerational Equity and the Investment of Rents from Exhaustible Resources. American Economic Review, 67: 972–974.

Session 9: Environmental valuation and sustainability accounting	
Learning Objective	valuation of non-marketed goods, benefit transfer, sustainability and wealth accounting
Required Readings	Discussion: Jones & Klenow (AER, 2016): Beyond GDP? Welfare across Countries and Time Perman (2011), ch. 12.3-12.5
Optional Readings	Arrow et al. (2004), Kahneman et al. (2004); Perman et al. (2012), ch. 19, Phaneuf & Requate (2017), Part III

Session 10: The role of abatement and technology	
Learning Objective	Environmental Kuznets curve, determinants of pollution growth, balanced growth path, growth drag, relevance of technical progress, directed technical change
Required Readings	Discussion: Economist (2013): The long view Brock & Taylor (2005), pp. 1778-1787 (Handbook of Economic Growth, ch. 28) Weil (2013), ch. 8.1, 16.3
Optional Readings	Kuznets, S. (1955) Economic growth and income inequality. American Economic Review 49, 1–28.

	Stern, D.I., Common, M. and Barbier, E.B. (1996) Economic growth and environmental degradation: the environmental Kuznets curve and sustainable development. World Development 24, 1151–1160.
	Aghion & Howitt (2009): The economics of growth (ch. 2)

Session 11: The environment and inequality	
Learning Objective	poverty, policy incidence within and between countries, Pareto-optimality of regulations, redistribution of environmental policy revenues
Required Readings	Discussion: Working paper: Sager (2020): The Global Consumer Incidence of Carbon Pricing: Evidence from Trade
	Perman, 7.6.4, Economist (2014): Inequality
Optional Readings	Weil (2013), ch. 13,
	Samuelson, P. A., 1974. Is the rent-collector worthy of his full hire? Eastern Economic Journal 1 (3)

Session 12: Application: Climate policy and future challenges	
Learning Objective	Climate change as a sustainability challenge, global warming, climate impacts on biological systems and agriculture, Integrated assessment models, the social cost of carbon, geoengineering, future challenges
Required Readings	Discussion: Bretschger & Pittel (ERE, 2020), Twenty Key Challenges in Environmental and Resource Economics
	Wikipedia: Climate engineering
	Wikipedia: Stern review
	Tol (2006): The Stern Review of the Economics of Climate Change: A Comment, Energy & Environment 17(6): 977-981.
Optional Readings	van den Bijgaart, Gerlagh & Liski, A simple formula for the social cost of carbon, Journal of Environmental Economics and Management, Volume 77, 2016,pp. 75-94.
	Golosov, M., Hassler, J., Krusell, P. and Tsyvinski, A. (2014), Optimal Taxes on Fossil Fuel in General Equilibrium. Econometrica, 82: 41-88.

Final Exam Week: 17 – 21.05.2021 – no class