

Names of policy session's organizers: Prof. Phoebe Koundouri and Prof. Christian Gollier.

Proposed Title of Policy Session: The Social Discount Rate for Assessing Environmental Policy: From Theory to Policy Implementation.

A short description of the theme and its policy relevance to environmental or natural resource economists:

How should one evaluate public and private investment strategies? The absence of consensus on this question is critical for many important applications involving the future, from the evaluation of environmental policies and projects to the building of new infrastructures in sanitation, energy, transport and telecommunication around the world. Experts and evaluators are well aware that the Social Discount Rate (SDR) is a key parameter to drive the final conclusion of the evaluation for actions having long-lasting impacts.

The discount rate and the market interest rate translate our collective values towards the future into key economic variables. Societies with a low discount rate value the future more than societies with a larger discount rate. Thus, the discounting strategy in the public and private sectors is the key determinant in the allocation of capital. This allocation is in turn a key determinant of competitiveness and economic growth.

The diversity of valuation practices across different countries and sectors is a source of concern from the point of view of economic efficiency. One reason is that the economic and financial literature remains ambiguous in this domain. Debates about discounting have always occupied an important place in environmental policy and economics. Where welfare is Utilitarian, the socially efficient level of investment is attained by investing in projects where the net present value (NPV), determined by discounting costs and benefits at the social discount rate (SDR) over the time horizon, is greater than zero. It follows that the level of the SDR is critical in determining whether an individual public investment or policy will pass a CBA test. Quite separately from arguments over whether the discount rate should be positive or not economists and others have argued at length over which of several potential discount rates should be used as the SDR. Several candidates exist, the most widely recognized of which are the social rate of return on investment and the rate at which society values consumption at different points of time, the Social Rate of Time Preference. The distinction between these discount rates is most important in the second best world in which distortions to the economy, such as corporate and personal taxes or environmental externalities, prevent these rates from being equalized. The choice of SDR is inherently complicated in such situations and is dependent upon a wide variety of factors.

A common criticism of discounting is that it militates against solutions to long-run environmental problems: for example, climate change, biodiversity loss and nuclear waste, which need to be evaluated over a time horizon of several hundred years. The question arises: What is the appropriate procedure for such long time horizons? There is wide agreement that discounting at a constant positive rate in these circumstances is problematic, irrespective of the particular discount rate employed. With a constant rate, the costs and benefits accruing to generations in the distant future appear relatively unimportant in present value terms. Hence, decisions made today on the basis of CBA appear to tyrannize future generations and in extreme cases leave them exposed to potentially catastrophic consequences. Such risks can either result from current actions, where future costs carry no weight, e.g. nuclear decommission, or from current inaction, where the future benefits carry no weight, e.g.

climate change. The intergenerational issues associated with discounting have puzzled generations of economists. Discounting also appears to be contrary to the widely supported goal of ‘sustainability’, which by most definitions implies that policies and investments should contribute to securing sustained increases in per capita welfare for future generations. During the last 20 years an important literature emerged with the proposed solution of using a discount rate, which declines with time, according to some predetermined trajectory, thus raising the weight attached to the welfare of future generations. It is possible that using a declining discount rate (DDR) could make an important contribution towards meeting the goal of sustainable development.

This session aims to inform interested EAERE audience on current policy practices with regards to the short and long run SDRs. The discussion will focus on: (a) the level of integration of the state-of-the-art of the relevant academic literature into policy, (b) the effect of this integration, on the assessment of country-specific and international environmental and energy projects/programs/policies, (c) sources of concerns and the way forward.

For this session we have gathered experts who are leading the SDR academic literature described above (with numerous seminal contributions), but also play a leading role in government consultations on revising SDR policies. The session will start with a roundtable among these experts (listed below), who will present how SDR academic work has been integrated in SDR policy revision, and discuss the strong and weak point of these revisions:

Christian Gollier will present the French experience. (Christian Gollier was the key expert in revising the French SDR Government Guidelines)

Aart de Zeeuw and Rob Aalber will present the Dutch experience (Aart de Zeeuw and Rob Aalber were key experts in revising the Dutch SDR Government Guidelines)

Ben Groom will present the UK experience. (Ben Groom and Phoebe Koundouri were the key experts in revising the UK SDR Government Guidelines)

Phoebe Koundouri will present the Cyprus, Ukraine and Moldova Experience. (Phoebe Koundouri was the key expert in revising the Cypriot, Ukraine and Moldova SDR Government Guidelines)

The session will proceed with a 15 minutes presentation of the paper: “The Climate Beta” by Simon Dietz, Christian Gollier and Louise Kessler. This paper focuses on the Consumption based Capital Asset Pricing “Climate Beta”, which effectively is the elasticity of climate damages with respect to a change in aggregate consumption. This elasticity is one of the components of the SDR that should be used to value climate-mitigation projects. The paper concludes on a large positive climate “beta”, which the authors argue is not bad news for those who care about climate change – although it implies a relatively higher discount rate on the benefits of climate-mitigation projects, the paper identifies the conditions under which it also raises the expected (undiscounted) benefits of mitigation.

Below the abstract of the paper, while the actual paper is attached:

“Mitigation reduces the expected future damages from climate change, but how does it affect the aggregate risk borne by future generations? This raises the question of the ‘climate beta’, i.e., the elasticity of climate damages with respect to a change in aggregate consumption. In this paper we show that the climate beta is positive if the main source of uncertainty is

exogenous, emissions-neutral technological progress, implying that mitigation has no hedging value. But these results are reversed if the main source of uncertainty is related to the carbon-climate-response and the damage intensity of warming. We then show that in the DICE integrated assessment model the climate beta is positive and close to unity. In estimating the social cost of carbon, this would justify using a relatively high rate to discount expected climate damages. However, the stream of undiscounted expected climate damages is also increasing in the climate beta. We show that this dominates the discounting effect, so that the social cost of carbon is in fact larger than when discounting expected damages at the risk-free rate.”

The session will conclude with a discussion on sources of concern about current SDR practices and the way forward, towards a global agreement on the method of calculation of the short and long-run SDRs for the assessment of Environmental projects/programs/policies.

Below Brief Bios of speakers. (Note: As mentioned above, all of the session speakers are leading figures in the SDR academic literature, with numerous seminal publications on both the theoretical and applied aspects of the problem, and have consulted various governments all over the world on the appropriate SDR for Government Projects:

1. **Professor Phoebe Koundouri** (<http://www.icre8.eu/founder-scientific-director>) holds a PhD, MPhil and MSc in Economics from the University of Cambridge (UK). She is a highly cited academic author ranked in the top 1.5% of all female economists in the world. She is Professor in Economic Theory and Econometrics at the School of Economics, Athens University of Economics and Business (Greece), Scientific Director ICRE8: International Center for Research on the Environment and the Economy (www.icre8.eu) and Senior Research Fellow at the Grantham Research Institute on Climate Change and the Environment, London School of Economics (UK). She is the Vice President of the European Association of Environmental and Resource Economists. She has published 14 edited books and monographs, and more than 250 articles in edited volumes and highly ranked academic journals. She is co-editor of the official journal of the European Association of Environmental and Resource Economists, as well as associate editor and editorial board member in 23 academic journals, including Review of Environmental Economics and Policy, Economics-ejournal, Environmental Science and Technology, Journal of Environmental Economics and Policy, Water Resources and Economics. She has coordinated and/or participated, in more than 50 research projects on natural resources management issues funded by the European Commission, the World Bank, OECD, European Bank of Reconstruction and Development, UN, NATO, WHO, as well as many other international and national organizations and governments of developed and developing countries. Over the last two decades she has given keynote and public lectures all over the world, and received scholarships and prizes for academic excellence from various academic institutions and foundations. In 2009 she received the best Paper Award of the official journal of the European Association of Agricultural Economists and in 2015 she received the European Association of Agricultural Economics Quality of Policy Contribution Award.

2. **Professor Christian Gollier** is Director of the Toulouse School of Economics. He has developed in-depth contacts and research partnerships with various industries in France and around the world, in particular with insurance companies, banks and the energy sector. His current fields of interest extend from Decision Theory under Uncertainty to Environmental Economics through Finance, Investment, Consumption Theory, Insurance Economics and Cost-Benefit Analysis, with a special interest for long term (sustainable) effects. He is also a board member of La Mondiale, one of top-ten French life insurance companies, and chairman of the Advisory Council of the Observatory of European Saving (OEE). Christian Gollier has published over 100 articles in top-tier economic journals. He has also published 7 books on risk including “The Economics of Risk and Time”, MIT Press, winner of the 2001 Paul A. Samuelson Award. In October 2012, Princeton UP has published his book entitled "Pricing the Planet's Future: The Economics of Discounting in an Uncertain World”.

3. **Professor Simon Dietz** is Professor of Environmental Policy in the Department of Geography and Environment. He is also one of the founders and is a current Co-Director of the Grantham Research Institute on Climate Change and the Environment <<http://www.lse.ac.uk/GranthamInstitute/>>, and Director of the ESRC Centre for Climate Change Economics and Policy <<http://www.cccep.ac.uk/>>. Simon is an environmental economist with diverse interests, from climate change to biodiversity and from decision theory to growth theory, however he is probably best known for his work on the social cost of carbon emissions and its relationship with issues in welfare economics such as discounting, and risk and uncertainty aversion. As an undergraduate he studied Environmental Science at UEA Norwich and ETH Zürich, before completing an MSc and PhD at LSE in environmental policy and economics. In 2006-7 he was an analyst at the UK Treasury on the Stern Review on the Economics of Climate Change, and played a leading role in the Review’s modelling of the ‘cost of inaction’. He currently sits on the editorial board of the Journal of the Association of Environmental and Resource Economists and from 2011 to 2015 he was on the editorial board of the Journal of Environmental Economics and Management. He also works as a Principal for the consultancy Vivid Economics.

4. **Ben Groom** is Associate Professor of Environment and Development Economics at London School of Economics (Department of Geography and Environment). He joined the Department in 2012 from the University of London’s School of Oriental and African Studies (SOAS), where he was a Senior Lecturer in Economics. He studied Economics at Sheffield University, Environmental and Resource Economics at UCL, and completed his PhD in Economics at UCL in 2005 on empirical and theoretical aspects of social discounting for distant time horizons. Ben has served as a Consultant for numerous international organisations, including the World Bank, the Asian Development Bank and the WWF. He has also advised government in the UK, USA, China and Pakistan on various aspects of environmental policy.

5. **Aart de Zeeuw** studied mathematics at the University of Groningen and received his PhD in economics at Tilburg University, both in the Netherlands. He has been professor in quantitative economics from 1989 until 1993 and since then professor of environmental economics at Tilburg University. From 2006 until 2009 he has been co-director of the Beijer Institute of Ecological Economics in Stockholm, Sweden. Aart de Zeeuw served as president of the European Association of Environmental and Resource Economists from 1998 until 2000, and as co-editor of the Journal of Environmental Economics and Management from 2004 until 2008. At Tilburg University he held a number of other positions such as dean of the Faculty of Economics from 1992 until 1994, director of graduate studies from 1998 until

2001, scientific director of CentER from 2005 until 2007, and scientific director of the Tilburg Sustainability Center from 2009 until 2013. He has been a member of the Netherlands Advisory Council for Research on Nature and Environment and an advisor to the Netherlands Environmental Assessment Agency. Aart de Zeeuw published in a wide range of scientific economic journals. His current research interests focus on international environmental agreements and the economics of dynamical ecological systems.

6. **Rob Aalber** is programme leader Environment at the Netherlands Bureau for Economic Policy Analysis. His research focuses on discounting and the interplay between climate and innovation policy. In 2015 he was a member of the Working Group Discount Rate and advised the Dutch Ministry of Finance on the new guidelines for discounting, which will be implemented as of February 2016. Recently, he also contributed to the development of an integrated set of energy, carbon and clean air prices in the new Dutch scenario study Welvaart and Leefomgeving (Welfare and Habitat). These prices are, together with the discount rates, mandatorily prescribed for cost-benefit analysis in the Netherlands. He publishes on a regular basis in peer-reviewed journals, including Energy Economics, Resource and Environmental Economics and Energy Policy.

7. **Louise Kessler** holds a Master's degree from HEC Paris, as well as an MSc in Environmental and Energy Economics from Ecole des Mines de Paris. In addition, she has worked as a financial analyst in the Natural Resources team at Macquarie in London, and as an investment officer at CDC Climat in Paris, where she was focusing on issues related to energy efficiency, carbon funds and voluntary compensation.