Waseda University Brussels Office
早稲田大学 ブリュッセルオフィス

Environmental Studies for Carbon Neutrality:

Roles of Carbon Pricing and Social Norm

WORKSHOP SERIES

Tuesday 21 May 2024

This workshop is financially supported by the International Office, Waseda University, Research Institute for Environment Economics and Management at Waseda University (Tokyo, Japan), and JSPS KAKENHI Grant Number 21H04945 (Japan).

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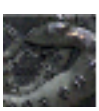
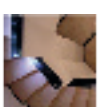
Environmental Studies for Carbon Neutrality: Roles of Carbon Pricing and Social Norm

The aim of the workshop is to address the issue of climate change, particularly the mitigation of CO2 emissions. Economist have been advocating the use of carbon pricing such as carbon tax or emissions trading schemes. Regarding CP, EU has been leading the world by EU ETS, a cap-and-trade program started in 2005. On the demand side, individuals' environmental conservation behaviors such as turning off lights or purchasing energy efficient appliance can be promoted through social norms. However, the role of carbon pricing and social norms may differ between Japan and Europe. In this workshop, we will examine whether the role of social norm is different in Europe and Japan. We will also discuss the difference and similarities of existing carbon pricing policies between Europe and Japan..



SCHEDULE

Tuesday May 21st	
09:30	Registration & welcome coffee
10:00 - 10:10	Opening remarks - Toshi H. ARIMURA (Waseda University)
Session I Carbon Pricing *- Chair: Yasushi KONDO (Waseda University)*	
10:10 - 10:50	Hauke WARD (Leiden University) "Assessing different European Carbon Border Adjustment Mechanism implementations and their impact on trade partners."
10:50 - 11:30	Ranran WANG (Leiden University) "Integrating Indirect Emissions in CBAM: A Multi-Regional Input-Output Approach"
11:30 - 12:10	Toshi H. ARIMURA (Waseda University) "A CGE Analysis of Energy Tax Reform for Carbon Mitigation in Japan."
12:10 - 13:40	Lunch
Session II Individual Behaviors *- Chair: Masashige HAMANO (Waseda University)*	
13:40 - 14:20	Heike WETZEL (University of Kassel) "How does photovoltaics get onto the roofs? Empirical evidence for public support of a solar power mandate for residential buildings in Germany."
14:20 - 15:00	Andreas ZIEGLER (University of Kassel) "Social norms and individual climate protection activities: A survey experiment for Germany"
15:00 - 15:30	Coffee Break
Session III Circular Economy and Green Transformation *- Chair: Toshi ARIMURA (Waseda University)*	
15:30 - 16:10	Yasushi KONDO (Waseda University) "Material footprint of sector groups based on input–output analysis."
16:10 - 16:50	Masashige HAMANO (Waseda University) "Green Transformation and Macroeconomic Dynamics."
16:50 - 17:00	Closing Remarks - Yasushi KONDO (Waseda University)

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Seminar Organizer

Toshi H. Arimura (Waseda University)

Bio

Toshi H. Arimura is a Professor of Political Science and Economics at Waseda University in Tokyo. Before joining Waseda, he was a Professor at Sophia University in Tokyo. He was a visiting scholar with George Mason University and Resources for the Future in the US as an Abe Fellow. His research interests include climate change, energy policies, air pollution regulations, and voluntary environmental actions. He has published his research in academic journals such as Journal Environmental Economics and Management, Journal of Association of Environmental and Resources Economics, Environmental and Resource Economics, Ecological Economics and Energy Policy. He is a coeditor of Carbon Pricing in Japan (Springer) which received the commentary award from the Society for Environmental Economics and Policy Studies (SEEPS: Japanese Association of Environmental Economics and Policy). He holds a Ph.D. in economics from the University of Minnesota, an MSc in environmental sciences from the University of Tsukuba and a BA in history of science from the University of Tokyo. He has served on many Japanese government committees on environmental issues including the committees on carbon pricing under the Ministry of the Environment and chairs the carbon credit committee under the Ministry of Economy, Trade and Industry. He has also been on editorial boards of academic journals such as Review of Environmental Economics and Policy, Economics of Energy and Environmental Policy or Environmental Economics and Policy Studies. He has received several awards including Ichimura Prize in Science against Global Warming for Excellent Achievement and SEEPS Outstanding Publication Award.

Title

"A CGE Analysis of Energy Tax Reform for Carbon Mitigation in Japan."

Abstract

In recent years, the Effective Carbon Rate (ECR) perspective has gained attention as a means of reducing carbon dioxide emissions in the fight against climate change. This study investigates ways to efficiently reduce carbon dioxide emissions by reforming energy taxation on fossil fuels for the Japanese economy from the perspective of ECR. We used a computable general equilibrium analysis model for this purpose. The analysis results suggest that a uniform taxation amount per ton of carbon in a fuel tax system would effectively reduce CO2 emissions. For instance, a tax of approximately 4,500 (approximately 30 euros) yen per ton of CO2 could maintain current fuel-related tax revenues while potentially increasing GDP. It was found that introducing a tax of approximately 1,000 yen per ton of CO2 after abolishing the existing energy tax would positively impact emission reductions and GDP, even with the introduction of exemptions for energy-intensive industries. These results suggest that fuel tax reform is crucial for the future introduction of carbon pricing in Japan.

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Speaker

Hauke WARD (Leiden University)

Bio

Hauke Ward is an assistant professor of industrial ecology at the Institute of Environmental Sciences (CML) at Leiden University. Before joining Leiden University, he was employed as a postdoc at the Mercator Research Institute on Global Commons and Climate Change (MCC) Berlin. Hauke's expertise connects environmental & energy economics, industrial ecology and climate policy in research and education. His current research predominantly focusses on distributional impacts of more ambitious climate policies, economic competitiveness and the role of industrial technology for current and future emissions. Hauke has an interdisciplinary background, holding a PhD in economics of climate change (TU Berlin) and a M.Sc. in mathematics (Göttingen).

Title

"Assessing different European Carbon Border Adjustment Mechanism implementations and their impact on trade partners."

Abstract

The European Union (EU) will implement a Carbon Border Adjustment Mechanism (CBAM) to reach its climate mitigation targets while avoiding the relocation of its industries to countries with less stringent climate policies (carbon leakage). The exact implementation and possible future extensions of such an EU CBAM are still being debated. Here we apply a throughflow-based accounting method on detailed trade network data to assess the coverage of different implementation options. Using a stylized comprehensive EU CBAM as benchmark, we then quantify how an EU CBAM may affect the EU's trade partners by channeling the EU carbon price to other countries. We find that middle- and low-income countries for which the EU is an important export market would be disproportionally impacted even under conservative implementation options. We finally explore different international revenue recycling schemes to make the EU CBAM inclusive toward vulnerable countries and able to foster global climate cooperation.

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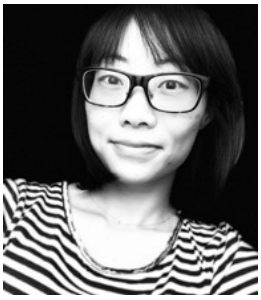

Ranran Wang (Leiden University)

Bio

Dr. Ranran Wang's research is centered on sustainable infrastructure and environmental assessment, with a specialization in Multi-Regional Input-Output (MRIO) analysis. She brings over 15 years of experience in developing and utilizing advanced systems modeling tools to conduct environmental sustainability research across various scales. Originally from China's City of Springs, Dr. Wang initiated her academic journey with a master's thesis on constructed wetlands, later broadening her scope to global water systems during her PhD at Yale University.Currently working as an assistant professor at Leiden University's Institute of Environmental Sciences (CML), Dr. Wang examines the complex interactions between capital goods and the economic-ecological system, furthering research on sustainable infrastructure pathways. Her work, recognized internationally, has been featured in top scientific journals including Nature families, PNAS, and Environmental Science & Technology. It has also influenced policies and practices. Recognizing the importance of integrating technology specifics with global economic-environmental systems in sustainability research, Dr. Wang actively engages in collaborations with international organization, such as the IMF, the OECD, and UNDP. She is also committed to education. Dr. Wang has developed an advanced MRIO course at the master's level at Leiden University and pioneered the first PhD-level MRIO course in Europe.

Title

"Integrating Indirect Emissions in CBAM: A Multi-Regional Input-Output Approach"

Abstract

I leverage the analytical strengths of Multi-Regional Input-Output (MRIO) analysis to address two questions relevant to the EU Carbon Border Adjustment Mechanism (CBAM). The MRIO method allows detailed exploration of global supply chains, offering insights that Computable General Equilibrium (CGE) models, which focus primarily on dynamic modeling, might overlook. Firstly, I examine the benefits of expanding CBAM's regulatory scope to include both direct (Scope 1) and indirect emissions (Scope 2) associated with the energy-intensive materials sectors. Secondly, I assess the extent to which CBAM's reporting and taxing requirements should be applied along the global supply chain to effectively mitigate downstream leakage, such as the importation shifts from raw materials like steel and aluminum to finished products like vehicles.

My findings suggest that including Scope 2 emissions leads to only a moderate increase in emission coverage – about 26%, partly due to the significant use of hydropower in aluminum production. In contrast, measures to prevent downstream leakage by accounting for emissions embodied in downstream products could quadruple emission coverage. Additionally, significant emissions are evident at higher stages of supply chains, especially the fifth or sixth layers, for products such as vehicles and electronics. I will present a Sankey diagram that maps these emissions across supply chains, providing visual insights into the potential impacts of future CBAM policies that consider more than direct material emissions. I will also discuss the methodological and data limitations of the MRIO approach, crucial for effectively utilizing this global approach to inform global emissions reduction efforts.

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Speaker

Heike Wetzel (University of Kassel)

Bio

Prof. Dr. Heike Wetzel is Professor for Microeconomics and Empirical Energy Economics at the University of Kassel. She studied Business Administration at the Leuphana University of Lüneburg and received her doctorate in Economics there in 2008. From 2009 to 2014, she worked as a postdoctoral researcher at the Chair of Energy Economics and as an affiliated researcher at the Institute of Energy Economics at the University of Cologne. From 2014 to 2016, she was the scientific director of the department 'Decentralized Energy Markets' at the IdE Institute for Decentralized Energy Technologies in Kassel. Her research interests include applied energy and regulatory economics as well as empirical efficiency and productivity analysis.

Title

"How does photovoltaics get onto the roofs? Empirical evidence for public support of a solar power mandate for residential buildings in Germany."

Abstract

This study evaluates whether a residential solar mandate in the case of roof renovation is a useful complement to economic incentives for further photovoltaics (PV) adoption. Analyzing determinants affecting PV ownership and installation intentions among single-family homeowners, as well as factors influencing support for a solar mandate and perceptions of its effectiveness, our empirical results, based on a survey of German utility customers, show that a residential solar mandate is a rather unpopular policy measure among homeowners. However, a solar mandate addresses two important factors which, according to our results, increase the willingness to install PV: firstly, the perception that the personal environment expects more PV, and secondly, an upcoming roof renovation. Both social desirability and a favorable time window can be institutionalized through a solar mandate. In terms of support for a solar mandate, we find that the perceived effectiveness of such a mandate has a strong influence on homeowner support. Perceived effectiveness, in turn, is closely related to perceived cost savings and perceived environmental benefits of PV. Based on these results, we conclude that an active information policy regarding the environmental and cost implications of PV expansion is essential to increase the acceptance of a solar mandate.

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Speaker

Andreas Ziegler (University of Kassel)

Bio

Andreas Ziegler has been Professor of Empirical Economic Research at the University of Kassel since 2011, where he is currently also managing director of the Institute of Economics. Further-more, he is also research associate at ZEW – Leibniz Centre for European Economic Research in Mannheim. His research focuses on empirical and particularly microeconometric and experimental studies in the fields of climate and energy policy, environmental and behavioral economics, sustainable investments, and corporate social responsibility (CSR). He has published about 50 articles in international peer-reviewed journals such as Journal of Environmental Economics and Management, Journal of Economic Behavior and Organization, European Economic Review, Journal of Banking and Finance, Energy Economics, Environmental and Resource Economics, or Ecological Economics. He has managed several projects on climate and energy economics, especially funded by federal ministries. As part of these projects, he is also heavily involved in initiatives that promote knowledge exchange and cooperation between economists and different stakeholders such NGO, industry, public authorities, and policymakers.

Title

"Social norms and individual climate protection activities: A survey experiment for Germany "

Abstract

Based on the well-known observation that social norms can guide individual behavior, this paper empirically examines the causal effect of related information interventions on revealed climate protection activities, measured through incentivized donations. In our experimental setting, we differentiate between descriptive social norms by providing information about in-dividual climate protection activities in Germany, injunctive social norms by providing infor-mation about what people in Germany think about the need for climate protection activities, and a combination of both social norms. Based on representative survey data for more than 1,600 individuals in Germany, our econometric analysis shows some weak evidence that in-formation about both descriptive and injunctive social norms increases donations for climate protection. The decomposition of this estimated average treatment effect reveals that the cor-responding treatment particularly has a significantly positive effect at the extensive margin, i.e. on the probability to donate for climate protection. These results suggest that a combined information intervention referring to both descriptive and injunctive social norms is at least able to stimulate the general willingness for climate protection. In addition, our analysis of heterogeneous treatment effects reveals that strong social preferences (in terms of altruism and trust) and high environmental attitudes (in terms of environmental awareness and ecolog-ical policy identification) induce significantly positive information treatment effects on dona-tions for climate protection. This result suggests that individuals in Germany with a strong environmental and social orientation do not only behave directly more climate-friendly, but can also be better stimulated by information about descriptive and/or injunctive social norms.

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Speaker

Yasushi Kondo (Waseda University)

Bio

Yasushi Kondo is a professor at Faculty of Political Science and Economics, Waseda University, Tokyo, Japan. He received his PhD in Economics from University of Tsukuba, Japan in 2000. Before joining the faculty at Waseda in 2002, he was an associate professor at Faculty of Economics, Toyama University, Japan. Yasushi has worked on input-output analysis of material cycles and waste management for more than twenty years. His recent research interest includes advancing metal scrap recycling with explicit consideration of alloy elements and improving resource efficiency indicators for enhancing circular economy. His works were published in Journal of Industrial Ecology, Environmental Science & Technology, Economic Systems Research, and Nature Communications, to name a few. Yasushi has served for academic societies as the chair of the 11th International Conference on EcoBalance in 2014, an associate editor of Journal of Material Cycles and Waste Management, and an editorial board member of Resource, Conservation and Recycling.

Title

"Material footprint of sector groups based on input–output analysis"

Abstract

There is an increasing interest in material footprint and resource productivity. According to the United Nations Sustainable Development Goals (SDGs), material footprint is an SDG indicator related not just to the improvement of global resource efficiency in consumption and production but also the decoupling of economic growth from environmental degradation. In industrial ecology, input-output (IO) analysis is widely used to quantify material footprint alongside other environmental footprints. The standard IO model, in which final demand drives production at sectors, is suitable to quantifying the material footprint of final products such as machinery and buildings. However, when analyzing the material footprint of intermediate products such as machine parts and construction materials, the application of the standard IO model is not straightforward. While the Szyrmer total flow approach, which dates to the early 90s in literature, can be used to quantify the material footprint of a single sector, to the best of my knowledge, methods suitable for simultaneously analyzing multiple sectors are not known. To fill this research gap, therefore, this study proposes a method to analyze the material footprint of sector groups by using a time series of global multi-regional IO tables and material flow data. We found that the proposed method provided reasonable results, whereas a naive application of the standard IO model led to an under-estimation. Moreover, the Szyrmer approach led to an over-estimation when the results of individual sectors are aggregated into sector groups. Detailed empirical results will be presented at the workshop.

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Speaker

Masashige Hamano (Waseda University)

Bio

Masashige Hamano is a professor at the School of Political Science, Waseda University in Tokyo. He also serves as a research fellow at the University of Luxembourg. He holds a Master's in International Economics from the University of Paris 1 and a Ph.D. in Economics from the University of Rennes 1. He works on issues related to international finance, international macroeconomics, and international trade. He also serves as an associate editor at Macroeconomic Dynamics..

Title

"Green transformation and macroeconomic dynamics" (with Yuki MURAKAMI)

Abstract

We explore the economic transition towards environmental sustainability using a newly developed Dynamic Stochastic General Equilibrium (DSGE) model with heterogeneous firms categorized as green and brown. Green firms actively engage in greenhouse gas emission abatement, while brown firms do not. Inspired by Nordhaus (2008), emissions damage productivity, an effect not internalized in the competitive equilibrium. In response, the government implements a tax to encourage abatement activities among firms. Using data from the United States, we analyze the impact of improvements in abatement technology on promoting environmentally sustainable practices.

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