



Foreword

Younes Ben Zaied¹ · Duc Khuong Nguyen²

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According to scientific data, climate change and environmental deterioration have become severe issues threatening human society and sustainability. In particular, the Intergovernmental Panel on Climate Change (IPCC) found carbon emissions from fossil fuels and industry to be the dominant cause of global warming and climate change, accounting for 64% of the global net anthropogenic GHG emissions.¹ Countries worldwide must thus consider achieving carbon neutrality, or zero-carbon targets, as a strategic policy option to ensure sustainable economic growth. In this context, the 2015 Paris Climate Conference (COP21) constituted an essential advancement in tackling concerns related to climate change risks and launching a net-zero carbon global economy. However, it is important to recognize that most countries still need to put more effort into accelerating the transition to clean energy in order to achieve carbon neutrality.

While climate change severely affects the environment, economic activities, welfare, and society, it is undoubtedly not a monotonic phenomenon. The long-term variability of future climate change, as well as necessary commitments and strategic actions involving adaptation and mitigation measures, would typically depend on forecast scenarios and the international coordination framework. This special issue on “Risks, Welfare, and Social Preferences in the Context of Climate Variability: Theory and Empirical Evidence” brings valuable contributions to the related literature as it was aimed at featuring high-quality research papers assessing, *not only at national and international levels but also at*

micro and macro levels, the possible futures based on critical factors, such as economic activities, social structures, technological progress, governance, and institutions. It also prioritizes studies evaluating the impacts of possible climate change scenarios on climate-driven risks, environmental issues, natural resources management, and climate policy.

All papers submitted to the special issue went through the regular vetting and peer-review processes. The eight selected papers mobilize innovative approaches to address the issues mentioned earlier. The approaches used include, among others, simulations, nonlinear econometric techniques, applied operational research methods, and mathematical economic models.

The first paper of this special issue, “Climate Policy and Wealth Distribution” by Dao, [1] develops a model with intergenerational bequest transfers and climate damage on the wealth of heterogeneous households. The author found that the wealth inequality gap between the rich and poor might be widened if a balanced budget climate policy is implemented under credit market imperfections. Climate policy may positively influence households’ wealth, but this impact is asymmetric across households in terms of magnitude and the transmission of gains from a climate policy within households.

The second paper, “The Ecological Footprints of Greenfield FDI and Cross-border M&A Sales” by Doytch and Ashraf, [2] addresses the direct impact of climate change by testing the theory of ecologically unequal exchange through foreign direct investment (FDI) ecological havens and FDI ecological halos. It focuses on the two modes of entry of FDI, greenfield FDI (GFDI) and cross-border mergers and acquisitions (M&A) sales, and examines their impact on national ecological footprints (EF). Using a dynamic panel methodology, the authors documented evidence of more harmful effects from GFDI on ecosystems than from cross-border M&A. Moreover, the hypothesis of ecologically unequal exchange cannot be rejected. For developed countries, the harmful effects of GFDI are associated with increased consumption EF and imports EF. In contrast, foreign activity-related footprints, the imports EF, and export

¹ https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Full_Report.pdf

✉ Duc Khuong Nguyen
d.nguyen@ipag.fr

Younes Ben Zaied
ybenzaied@edcparis.edu

¹ OCRE Lab, EDC Paris Business School, Paris, France

² IPAG Business School, Paris, France

EF generated the GFDI burden in the case of developing countries. Another significant result is that cross-border M&As negatively affect developing countries' ecosystems.

The third paper, "Machine Learning-Based Modeling of the Environmental Degradation, Institutional Quality, and Economic Growth" by Jabeur et al., [3] provides a comprehensive investigation of the determinants of environmental sustainability through forecasting the carbon emission trends in 86 countries. Seven potential factors affecting CO₂ emissions are divided into three categories: economic environment, legislative environment, and environmental awareness. The results show evidence of a positive effect of economic growth and entrepreneurial opportunity on CO₂ emissions. The latter is negatively affected by governance, personnel freedom, education, and pollution.

In the fourth paper "Sustainable Water Demand Management and Incentive Tariff: Evidence from a Quantile-on-Quantile Approach" by Ben Zaied et al., [4] the authors evaluate the sustainability of water demand management policy in Tunisia using quarterly data from 1988 to 2015 and the novel quantile-on-quantile approach. Their results find that the nonlinear tariff negatively affects low-income water consumers more than high-income consumers. Moreover, spatial variability and regional disparity characterize the relationship between water price and consumption for different quantile levels. These findings imply the need for an alternative water management policy and a decentralized water pricing system that is more appropriate to achieve the goal of social equity.

An intertemporal carbon market model is proposed in the fifth paper "On Market Power, Permit Banking Borrowing, and Interactions with the Firm's Production Market" by Huang et al., [5]. This model allows one to explore the intertemporal permit allocation conditions of carbon market efficiency while considering both product market and market power. The obtained results for the compliance phase show evidence of higher welfare in the carbon market with banking and borrowing systems if total emission abatement costs are lower than those in the market without banking and borrowing systems. The environmental impact also influences the conditions of carbon market efficiency. Furthermore, the optimal welfare performance between baseline and hybrid permit allocation policies changes with emission budgets between fringe and dominant firms.

The sixth paper, "Energy Price Jumps, Fat Tails and Climate Policy" by Mason and Wilmot, [6] extends the concept of "option value of waiting" to address the challenges of climate change policies in the presence of fat-tailed behavior (jumps) in commodity price patterns. Indeed, commodity price jumps increase the "investment under uncertainty problem," thus increasing the premium associated with delaying investment in new infrastructure that helps reduce climate change problems (e.g., low-carbon transport infrastructure

and facilities to replace polluted energy sources with cleaner energies). A sound climate policy would have to reduce this "option value of waiting" due to commodity price uncertainties.

The seventh paper, "The Impact of Cross-ownership on the Value of a Clean Technology in the Energy Market" by Benchechroun et al., [7] shifts attention to an analysis of corporate cross-ownership influences on the value of a clean energy substitute. The proposed analytical framework suggests the need for clean energy and reduced gains from investing in the clean energy sector when cross-ownership among polluting firms increases and environmental damages are large enough. Conversely, the value of clean energy becomes larger when environmental harms are small enough as "the welfare loss due to increased cross-ownership outweighs the possible benefits of reduced pollution." These results remain intact under different demand specifications.

The final paper of this special issue, "The Effect of Corporate Board Characteristics on Environmental Innovation" by Farza et al., [8] addresses the impact of board diversity on corporate environmental innovation. Using a sample of 110 most traded stocks on the Frankfurt Stock Exchange (H-DAX index), the authors find a positive effect of board independence and gender diversity on environmental innovation. The presence of independent and female directors promotes environmental R&D and innovation, thus suggesting the important role of CSR committees and regulation policies in incentivizing corporate environmental engagements and innovations.

Overall, the papers included in this special issue provide new insights into climate change risks and policies. Their findings induce crucial implications for scholars, corporate leaders, and policymakers in designing suitable corporate strategies or regulatory guidelines. They also open new horizons for future research in climate-related variability, risks, and solutions.

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