

# Exploring the link between greenhouse gas emissions and the functional income distribution

Abstract for the Momentum Kongress 2023

Theresa Lagemann\*

April 2023

Greenhouse gas (GHG) emissions are typically measured production- or consumption-based. However, this two-part distinction misses intranational distributional effects of GHG emissions, such as economic benefits from income generated by polluting production processes. This paper therefore investigates the link between GHG emissions and the functional income distribution which measures shifts in the income shares of wages and profits. It thus aims to link post-Keynesian and ecological economics, which as Huwe and Rehm (2022) argue is a promising area of approach.

Most researchers studying inequality and the climate crisis focus on personal income distribution and the question of who is responsible for emissions. Previous research has shown that emissions are highly unequally distributed, both between and within countries (Chancel 2022; Chancel and Piketty 2015; Ivanova and Wood 2020). Additionally, researchers have identified a positive relationship between income inequality and emissions (for the US: Jorgenson, Schor, and Huang (2017)), and between wealth inequality and consumption-based emissions in high-income countries (Knight, Schor, and Jorgenson 2017). Furthermore, energy footprints vary widely across different income groups and income inequality shapes the quantity and composition of overall energy demand (Oswald, Owen, and Steinberger 2020; Oswald et al. 2021). As income inequality increases, meeting basic needs becomes more energy intensive (Vogel et al. 2021). Research also shows that the emissions of the global top 1% are generally driven more by their investments rather than their consumption (Chancel 2022). Moreover, private investors in rich countries are largely exposed to stranded fossil-fuel assets and therefore have a greater interest in continued fossil-fuel production (Semieniuk et al. 2022).

Linking production-based emissions to income raises the question of who benefits economically from emissions. This paper explores this question by focusing on the distribution of capital and labour income. With the analysis, it aims to add the aspect of the functional income distribution to the existing research on emissions and inequality.

---

\*University of Duisburg-Essen, Institute for Socio-Economics. Email: [theresa.lagemann@stud.uni-due.de](mailto:theresa.lagemann@stud.uni-due.de)

The paper first provides descriptive evidence on whether capital and labour have benefited equally from GHG emissions, using data for 12 European countries. In a second step it examines econometrically whether there is an overall statistically significant relationship between GHG emissions and the functional income distribution, measured by the profit share in different sectors, over the period 2000-2014. Preliminary results show that there is no statistically significant relationship between GHG emissions and the profit share, but that differences in the profit shares can rather be explained by sectoral differences. It is striking that the profit shares of the GHG-intensive energy sector are consistently among the highest sectoral profit shares in all countries in the sample.

In a final step of the analysis, the paper zooms in on the case of Germany to investigate sector-specific characteristics that might explain the high profit shares in the energy sector relative to other sectors. First, the paper focuses on the type of energy inputs used. This approach assumes that certain physical characteristics of resources affect secondary features related to production as well as social and political processes (Balmaceda 2018). Using data on lobbying expenditure and employees, a second approach examines whether there is evidence that political influence through lobbying can possibly explain the high profit rates.

## References

- Balmaceda, Margarita M. 2018. “Differentiation, Materiality, and Power: Towards a Political Economy of Fossil Fuels.” *Energy Research & Social Science* 39: 130–40. <https://doi.org/10.1016/j.erss.2017.10.052>.
- Chancel, Lucas. 2022. “Global Carbon Inequality over 1990–2019.” *Nature Sustainability*. <https://doi.org/10.1038/s41893-022-00955-z>.
- Chancel, Lucas, and Thomas Piketty. 2015. *Carbon and Inequality: From Kyoto to Paris*.
- Huwe, Vera, and Miriam Rehm. 2022. “The Ecological Crisis and Post-Keynesian Economics – Bridging the Gap?” *European Journal of Economics and Economic Policies: Intervention* 19 (3): 397–414. <https://doi.org/10.4337/ejeep.2022.03.08>.
- Ivanova, Diana, and Richard Wood. 2020. “The Unequal Distribution of Household Carbon Footprints in Europe and Its Link to Sustainability.” *Global Sustainability* 3: e18. <https://doi.org/10.1017/sus.2020.12>.
- Jorgenson, Andrew, Juliet Schor, and Xiaorui Huang. 2017. “Income Inequality and Carbon Emissions in the United States: A State-Level Analysis, 1997–2012.” *Ecological Economics* 134: 40–48. <https://doi.org/10.1016/j.ecolecon.2016.12.016>.
- Knight, Kyle W., Juliet B. Schor, and Andrew K. Jorgenson. 2017. “Wealth Inequality and Carbon Emissions in High-Income Countries.” *Social Currents* 4 (5): 403–12. <https://doi.org/10.1177/2329496517704872>.
- Oswald, Yannick, Anne Owen, and Julia K. Steinberger. 2020. “Large Inequality in International and Intranational Energy Footprints Between Income Groups and Across Consumption Categories.” *Nature Energy* 5 (3): 231–39. <https://doi.org/10.1038/s41560-020-0579-8>.
- Oswald, Yannick, Julia K. Steinberger, Diana Ivanova, and Joel Millward-Hopkins. 2021. “Global Redistribution of Income and Household Energy Footprints: A Computational

- Thought Experiment.” *Global Sustainability* 4: e4. <https://doi.org/10.1017/sus.2021.1>.
- Semieniuk, Gregor, Philip B. Holden, Jean-Francois Mercure, Pablo Salas, Hector Pollitt, Katharine Jobson, Pim Vercoulen, Unnada Chewpreecha, Neil R. Edwards, and Jorge E. Viñuales. 2022. “Stranded Fossil-Fuel Assets Translate to Major Losses for Investors in Advanced Economies.” *Nature Climate Change* 12 (6): 532–38. <https://doi.org/10.1038/s41558-022-01356-y>.
- Vogel, Jefim, Julia K. Steinberger, Daniel W. O’Neill, William F. Lamb, and Jaya Krishnakumar. 2021. “Socio-Economic Conditions for Satisfying Human Needs at Low Energy Use: An International Analysis of Social Provisioning.” *Global Environmental Change* 69. <https://doi.org/10.1016/j.gloenvcha.2021.102287>.