README

Overview

The two files in this replication package explain in detail how values in Table 1 and 3 are computed, including data sources, and how to simulate the numerical cases presented in Section 5, Figure 4 and Table 2 of the article "Confronting the carbon pricing gap: Second best climate policy", by Katheline Schubert, Aude Pommeret and Francesco Ricci, published in 2025 on the *Journal of the Association of Environmental and Resource Economists*.

Two files are made available for replication:

- `SchubertPommeretRicciJAERE2025parametersinitialvalues.xlsx`
  This file, created with Microsoft Excel, includes computations of the parameters and initial values for the numerical application to the case of European Union final energy consumption, as reported in Tables 1 and 3, and explained in online Appendix G of the article. The file also contains the original data and all intermediary operations, and citations of the sources of data.
  Structure:
  1. Sheet "main" computes the parameters and initial values, including the main intermediary steps, sources and references to more detailed information in other sheets.
  2. Other sheets report the original data, their sources, and preliminary computations such as averages.
- `SchubertPommeretRicciJAERE2025replicationfile.nb`
  This file, created with Wolfram Mathematica 12.1.1, contains the code to replicate data in Table 1 and 2, and the Figure 4.
  Structure:
  1. Calibration parameters
  2. Optimum
  3. Equilibrium with large constant carbon tax and temporary FIP
  4. Equilibrium with small constant carbon tax and temporary FIP
  5. Equilibrium with small constant carbon tax and permanent FIP

Data Availability and Provenance Statements

Statement about Rights

☑ The authors of the manuscript have legitimate access to and permission to use the data used in this manuscript, which were all made publicly available by the sources.

Summary of Availability

☑ All data **are** publicly available.

Details on each Data Source

Sources of data contained in the file `SchubertPommeretRicciJAERE2025parametersinitialvalues.xlsx`:

- Eurostat statistics
- World Bank databank (Climate Watch. 2020. GHG Emissions. Washington, DC: World Resources Institute.)
- European Environmental Agency: National projections of anthropogenic greenhouse gas emissions - GovReg

- EU Directorate-General for Climate Action
- International Energy Agency
- International Atomic Energy Agency
- Friedlingstein, P. et al. (2022), Global Carbon Budget 2022, *Earth System Science Data*, 14.
- World Nuclear Association

Computational requirements

Software Requirements

- Wolfram Mathematica (code was last run on version 12.1.1)
- Microsfot Excel (version Microsoft 365 in 2024)

Memory, Runtime, Storage Requirements

Summary Approximate time needed to reproduce the analyses on a standard (2025) desktop machine: 50 sec.

☑ <10 minutes

Approximate storage space needed:

☑ < 25 MBytes

Details The code was last run on a 11th Gen Intel(R) Core(TM) i7-1165G7 2.80GHz 2.80 GHz based laptop with 32 Gb of RAM and OS Windows Pro 10.

Description of programs/code

The Mathematica code allows to reproduce step by step the numerical analysis reported in the article. Comments along the code guide the replication through intermediary steps and algorithms.

Instructions to Replicators

The advice for replication is to run the Mathematica code Section by Section.

1. Calibration parameters: allows to introduce the parameters and calibrate the model on the business as usual scenario, as reported in Table 1.
2. Optimum: allows to replicate the scenario of the optimal energy transition, including the first best policy, reported in Figure 4 an the second line of Table 2.
3. Equilibrium with large constant carbon tax and temporary FIP: allows to replicate the scenario of the energy transition under second best policy with a large carbon tax, reported in Figure 4 an the third line of Table 2.
4. Equilibrium with small constant carbon tax and temporary FIP: allows to replicate the scenario of the energy transition under second best policy with a small carbon tax and temporary FIP, reported in Figure 4 an the fourth line of Table 2.
5. Equilibrium with small constant carbon tax and permanent FIP: allows to replicate the scenario of the energy transition under second best policy with a small carbon tax and permanent FIP, reported in Figure 4 an the fifth line of Table 2.

The provided code reproduces:

☑ All numbers provided in text in the paper
☑ All tables and figures in the paper