



Trade's Emissions Paradox: Cutting Greenhouse Gases, Raising Air Pollution

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This review verifies the reproducibility of the exhibits included in the paper "*Trade's Emissions Paradox: Cutting Greenhouse Gases, Raising Air Pollution*".

Contents in this review:

1. Main findings
2. List of exhibits and reproducibility status
3. Reproduction Environment

Main findings

- **Every exhibit has been reproduced accurately.**
- No changes are required to run the code.
- The output demonstrates consistent stability across multiple runs. Specifically, executing the code two times consecutively yielded identical results.
- The code takes approximately 15 minutes to run.
- We conducted our reproducibility analysis based on the paper shared by the authors by email on June 23.
- The reproducibility package includes three types of datasets by access: open, accessible (public but not included in the reproducibility package), and limited-access (available upon purchase).
 - Open data are included in the reproducibility package.
 - The reviewers verified that the accessible data matches what was provided by the authors; results of this verification are documented in the file *comparison_report.csv*.
 - *data_hash_report.csv* lists the SHA256 hashes of all data inputs used by the authors to support data integrity checks. Users can use this file to verify that the data has not been altered.
- **Reproducibility Summary:**
 - **Data:** Some data is restricted and has not been included in the reproducibility package. For more details, please refer to the README file.
 - **Code:** All code files (from cleaning to analysis) are included in the reproducibility package.
 - **Outputs:** One output is not entirely generated by code, and it is created manually in Excel, but instructions for producing this output are included in the README file.

- **Reproducibility verification:** Reviewers used data provided directly by the authors to conduct the reproducibility verification, and some of this is not included in the public reproducibility package. The accessible dataset that is not part of the package was verified by the reviewers against the data provided by the authors, and it matched.
- **Dependencies environment:** The reviewers created a new environment using the latest versions of dependencies available at the moment of the review.

List of exhibits and reproducibility status

Results in the Main Section of the Paper

- **Figure 1** All values reproduced. The figure was recreated using an Excel plot with column F of *GTAP_GHG_trade.csv* and two line plots with the results in columns B and C.
- **Figure 2 Panel A** Reproduced.
- **Figure 2 Panel B** Reproduced.
- **Figure 3 Panel A** Reproduced.
- **Figure 3 Panel B** Reproduced.
- **Figure 4 Panel A** Reproduced.
- **Figure 4 Panel B** Reproduced.

Results in the Annex

- **Figure S1.1 Panel A** Reproduced.
- **Figure S1.1 Panel B** Reproduced.
- **Figure S1.2 Panel A** Reproduced.
- **Figure S1.2 Panel B** Reproduced.
- **Figure S1.3 Panel A** Reproduced.
- **Figure S1.3 Panel B** Reproduced.
- **Figure S2.1 Panel A** Reproduced.
- **Figure S2.1 Panel B** Reproduced.

Reproduction Environment

Paper exhibits were reproduced on a computer with the following specifications:

- OS: Windows 11 Enterprise, version 23H2
- Processor: Intel(R) Xeon(R) Platinum 8562Y+ 2.80 GHz (2 processors)
- Memory available: 32 GB
- Software version: R 4.4.1