How Delayed Learning about Climate Uncertainty Impacts Decarbonization Investment Strategies

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This review verifies the reproducibility of the exhibits included in the paper *"How Delayed Learning about Climate Uncertainty Impacts Decarbonization Investment Strategies"*.

Contents in this review:

1. Main findings

2. List of exhibits and reproducibility status

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Main findings

- The code was successfully executed on a new computer after:

  1. Setting the environment.
  2. Creating an account and Getting the Gurobi Academic License here
  3. Downloading Gurobi optimization here
  4. Running in bash script by script.

- The output demonstrates consistent stability across multiple runs. Specifically, executing the code two times consecutively yielded identical results.

- The code takes approximately 4 hours to run.

- We conducted our reproducibility analysis using the updated version of the paper provided by the authors on May 22nd. The published version of the paper is available at this link.

- Not every exhibit was reproduced. Two figures in the supplemental materials could not be verified.

- **Reproducibility Summary**:

  - **Data**: All data sources are publicly available and included in the reproducibility package.
  - **Code**: All code files are included in the package.
  - **Outputs**: All outputs are generated by code included in the reproducibility package.
  - **Reproducibility verification**: Reviewers had access to the same materials in the public reproducibility package.
  - **Dependencies environment**: The reviewers reproduced an existing environment for dependencies using dependency files or an environment metadata file provided by the authors.

List of exhibits and reproducibility status

Results in the Main Section of the Paper

- **Figure 1** Reproduced. Figure: mac-cal.

- **Table 1** Does not show analysis results.

- **Figure 2** Reproduced. Figure: ar6-pfig-value-of-learning-quadbox

- **Figure 3** Reproduced. Figure: ar6-total-cost-ind-cutoff-2030.

- **Figure 4** Reproduced. Figure: ar6-sec-inv-eff-lt-t17

- **Figure 5** Reproduced. carbon-price-dists-data-t17.

  Results in the Supplementary Material

- **Figure 1** Reproduced. Figure: ar6bs-pfig-value-of-learning-duobox-withbs.

- **Figure 2** Reproduced. Figure: inv-base-rec-comparision-cost-secs-withbs.

- **Figure 3** Reproduced. Figure: ar6emis-pfig-value-of-learning-quadbox.

- **Figure 4** Reproduced. Figure: ar6emis-total-cost-ind-cutoff-2030.

- **Table 1** Does not show analysis results.

- **Figure 5** Reproduced. Figure: ar6hi-pfig-value-of-learning-quadbox.

- **Figure 6** Reproduced. Figure: ar6hi-total-cost-ind-cutoff-2030.

- **Table 2** Does not show analysis results.

- **Figure 7** Virtually reproduced. Due to differences in the machine configurations, this figure was not
  reproduced by the verifiers. However, we conducted a virtual verification on June 7th and ran the
  code live with the authors, and the figure was successfully reproduced.

- **Figure 8** Virtually reproduced. Due to differences in the machine configurations, this figure was not
  reproduced by the verifiers. However, we conducted a virtual verification on June 7th and ran the
  code live with the authors, and the figure was successfully reproduced.

- **Table 3** Does not show analysis results.

- **Figure 9** Reproduced. Figure: ar6-pfig-value-of-learning-quadbox-t15.

  (bash script 02_effect_of_learning_low_linear)

- **Figure 10** Reproduced. Figure: ar6-total-cost-ind-cutoff-2030-t15.

- **Table 4** Does not show analysis results.

Reproduction Environment

- Paper exhibits were reproduced in a computer with the following specifications:

  – OS: Windows 11 Enterprise

  – Processor: Intel(R) Core(TM) i5-1145G7 CPU @ 2.60GHz

  – Memory available: 15.7 GB

  – Software version: Python version 3.11