Overview

The code in this replication package produces all the figures and tables in Cattaneo, Feng, Palomba, and Titiunik (2025) from a single data source (Billmeier and Nannicini, 2013) using `R`. `Stata` and `Python` code is also available for the figures presented in the main text. A single file run all of the code to generate all figures and tables in the paper. The replicator should expect the code to run for a minimum of 4 hours and a maximum of 130 hours depending on the number of cores available.

Data Availability and Provenance Statements

- ☐ This paper does not involve analysis of external data (i.e., no data are used or the only data are generated by the authors via simulation in their code).

Statement about Rights

- ☑ I certify that the author(s) of the manuscript have legitimate access to and permission to use the data used in this manuscript.
- ☑ I certify that the author(s) of the manuscript have documented permission to redistribute/publish the data contained within this replication package. Appropriate permission are documented in the LICENSE.txt file.

License for Data

The data are licensed under a Creative Commons license. See LICENSE.txt for details.

Summary of Availability

- ☑ All data **are** publicly available.
- ☐ Some data **cannot be made** publicly available.
- ☐ **No data can be made** publicly available.
- ☐ Confidential data used in this paper and not provided as part of the public replication package will be preserved for ___ years after publication, in accordance with journal policies.

Details on each Data Source

Here below we describe the content of the folder `data`.

#	Data Name	Data Files	Provided
1	"BNdata"	BNdata.dta, BNdata.csv	TRUE

1. `"BNdata"` [`data/BNdata.dta`, `data/BNdata.csv`] The original dataset contains data on some economic and political variables for 180 countries, over a period of time spanning from 1960 to 2005. We downloaded the dataset from the Harvard Dataverse. In detail, the variables available in the dataset are: real GDP per capita in 2002 US dollars, enrollment rate in secondary schooling, population growth, yearly inflation rate, the investment ratio (the investment of a country as a percentage of GDP), an indicator that captures whether the country is a democracy (1) or not (0), an indicator that captures whether the economy of the country is considered closed (0) or not (1). More details on each of these variables can be found in Section S.7.1 of our Supplemental Appendix.

Computational requirements

Software Requirements

- [x] The replication package contains one or more programs to install all dependencies and set up the necessary directory structure.

- `R` 4.3.3
    - `devtools` (2.4.5)
    - `dplyr` (1.1.4)
    - `ggplot2` (3.5.1)
    - `haven` (2.5.4)
    - `pacman` (0.5.1)
    - `scales` (1.3.0)
    - `scpi` (3.0.0)
    - `reshape2` (1.4.4)
    - `tidyverse` (2.0.0)
    - `tsDyn` (11.0.4.1)
    - `wesanderson` (0.3.7)
    - `writexl` (1.5.0)

DISCLAIMER: to run the analysis in `Stata` the user needs to first link `Python` and `Stata`. More information on how to do it can be found on the official Stata website.

- `Stata` 18.5
    - `scpi` (3.0.0)

- `Python` 3.12.7
    - `numpy` (2.1.3)
    - `pandas` (2.2.3)
    - `plotnine` (0.14.1)
    - `scpi` (3.0.0)

Controlled Randomness

- [x] Random seed is set at:
    - (R) line 64 of program code/0001_main.R and line 471 of program code/0001_graphsCreate.R.
    - (Stata) lines 114, 127, 140, 153, 166, and 180 of program code/0001_main.do.
    - (Python) line 30 of program code/0001_main.py
- [ ] No Pseudo random generator is used in the analysis described here.

Memory, Runtime, Storage Requirements

Summary

Approximate time needed to reproduce the analyses on a standard 2025 desktop machine:

- [ ] <10 minutes

- [ ] 10-60 minutes
- [ ] 1-2 hours
- [ ] 2-8 hours
- [ ] 8-24 hours
- [ ] 1-3 days
- [x] 3-14 days
- [ ] > 14 days

Approximate storage space needed:

- [ ] < 25 MBytes
- [x] 25 MB - 250 MB
- [ ] 250 MB - 2 GB
- [ ] 2 GB - 25 GB
- [ ] 25 GB - 250 GB
- [ ] > 250 GB
- [ ] Not feasible to run on a desktop machine, as described below.

Details

The code was last run on a node of the Princeton's Adroit cluster. The node featured 64 CPU-cores, 512 GB RAM, 100GB of free space.

Description of programs/code

Here below we describe the stucture of the `R` code only, as the `Stata` and `Python` ones replicate only parts of the analysis and are contained in this package for illustrative purposes only.

Programs in `code` generate all tables and figures in the main body of the article and in the supplemental appendix. The program `code/0001_main.R` will internally load the auxiliary functions contained in `code/0001_funs.R` and produce the graphs and the tables via `code/0001_graphsCreate.R`.

License for Code

The code is licensed under a BSD license. See LICENSE.txt for details.

Instructions to Replicators

- Edit `code/0001_main.R` to adjust the default path at **line 21**.
- Edit `code/0001_main.R` to select the number of cores at **line 25**. We run the analysis using 32 cores and it took less than 4 hours.
- Run `code/0001_main.R`.

Tables and figures

The provided code reproduces:

- [x] All numbers provided in text in the paper
- [x] All tables and figures in the paper
- [ ] Selected tables and figures in the paper, as explained and justified below.

References

Billmeier, Andreas, and Tommaso Nannicini. "Assessing economic liberalization episodes: A synthetic control approach." Review of Economics and Statistics 95, no. 3 (2013): 983-1001.

Acknowledgements

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