Replication Files – README

1 Quantitative Model

All the files to compute and simulate the quantitative models in Section 2 and in Appendix B are in the folder "codes_model."

1.1 Baseline model (section 2)

a. Computation of the different economies.

- **solve_indexed.f90**: Fortran file that solves the model.
- **sim_indexed.f90**: Fortran file that uses the solution to generate simulations.
- **get_moments.m**: Matlab file that generates business cycle statistics from the simulations.

b. Other files that are needed to run the Fortran codes.

- **calibration_all.txt**: This file contains the parameter values.
- **solve_and_sim.sh**: (Optional) Bash script to run all files from the command line.

How to run the codes The "benchmark" and the "indexed-debt" models are obtained when setting the value for "phi_param" in calibration_all.txt at zero or one, respectively.

All the Fortran codes for this model invoke subroutines from the IMSL library. Access (i.e. a working license) is needed to run the codes.

The parameters governing the grid configuration are specified in the "module param" at the beginning of each Fortran code. The file with the calibration parameter values must be saved in the same directory that .f90 files are saved.

The sequence for successfully running the codes is:

1. First, run **solve_indexed.f90**,
2. Second, run **sim_indexed.f90**,
3. Third, run **get_moments.m**.

File **solve_and_sim.sh** runs steps 1 to 3 all from one call (Optional).

1.2 Extended model (Appendix B)

a. Computation of the different economies.

- **solve_SP_STURZE_production.f90**: Fortran file that solves and simulates the model with production.
- **get_moments.m**: Matlab file that generates business cycle statistics from the simulations.

b. Other files that are needed to run the Fortran codes.

- **param_xxx.txt**: where 'xxx' stands for various model parameters. All these files are in the replication folder. They need to be changed to solve and simulate the model under different parametrizations.
- **toolbox.f90**: this contains a toolbox of numerical routines provided by Fehr and Kindermann (2018). This toolbox can be obtained in the book's Github repository:
  https://github.com/fabiankindermann/ce-fortran
  We are **not** providing this toolbox file in our replication package but this is freely available at the above website. Please see their installation instructions.
- **solve_and_sim.sh**: (Optional) Bash script to run all files from the command line.

How to run the codes The different indexations of government and private debt are obtained by the values of "param_phi.txt" and "param_phi_firm.txt", respectively. The baseline specification has $\phi^g = \phi^f = 0$.

The parameters governing the grid configuration are specified in the "module param" at the beginning of each Fortran code. The files with the calibration parameter values as well as the "toolbox.f90" file must be saved in the same directory that .f90 files are saved.

The sequence for successfully running the codes is:

1. First, run **solve_SP_STURZE_production.f90**,
2. Second, run **get_moments.m**.

File **solve_and_sim.sh** runs steps 1 to 2 all from one call (Optional).

2 Empirical Results

The folder "codes_empirics" has the following files:

- **empirical_script.R**: an R script with all the regressions,
- numerous Excel files containing the raw data.

The script reads the data and produces all the regression results in the paper. The only software needed to run this code is R (with the necessary packages installed, all mentioned at the beginning of the script).

It is necessary that the execution of the lines of code is done in the order specified, since in some cases new information and computations are added to the main database. We label each section of the code according to the table in the paper that it replicates. The only exception is Table 5, which itself is made of a collection of coefficients estimates in different regressions. Theses different regressions are in Appendix C, and the R script replicates them.

As we move from table to table, we also compute the test for the equality of certain coefficients of interest (following the formula in footnote 19). This is also done within **empirical_script.R**. The p-values for these different test are then presented in Tables 4 and 6.

References

Fehr, Hans and Fabian Kindermann, *Introduction to computational economics using Fortran*, Oxford University Press, 2018.