README for "Dynare Replication of «A Model of Secular Stagnation: Theory and Quantitative Evaluation» by Eggertsson et al. (2019)"

Overview

This replication package contains all the necessary data and codes you need to produce the results of the paper. Specifically, it contains two main folders:

1. "Dynare_Repl_Code": It contains the Dynare files we made to replicate the model as written in the Matlab code of Eggertsson et al. (2019). This folder also allows to recalibrate the model directly with Dynare and to run the alternative calibrations in Eggertsson et al. (2019). See below for the details.

2. "Dynare_Repl_Paper": It contains the Dynare files we made to replicate the model as written in the Paper of Eggertsson et al. (2019).

Package Description

Raw Data

The raw data we used come from the original replication package of Eggertsson et al. (2019) available from the AEJM repository (http://doi.org/10.3886/E114159V1 or https://www.openicpsr.org/openicpsr/project/114159/version/V1/view) called "114159-V1". For convenience, this package is stored in both of the folders mentioned above, into the subfolder "Eggertsson_Matlab_Code". Moreover, we made two slightly changes to the original code into the folder "114159-V1", which are:

1. It doesn't produce all the results that you will obtain by directly downloading it from the AEJM repository, but just the most important ones, of interest for this replication paper. Specifically, the program will run just the steady state at 1970 and the full transitional dynamics for the main calibration. By simply downloading the original replication package from AEJM repository the user can grasp the difference.

2. We changed their tolerance from 1e-03 to 1e-05 in order to be equal to Dynare default (this would just make the original results more precise, therefore nothing is affected). The user can see the change at line 555 of the file "Eggertsson_Matlab_Code/114159-V1/data/Section-8/sec_stag_runmachine.m/sec_stag_runmachine.m".

Other Data

Both folders, "Dynare_Repl_Code" and "Dynare_Repl_Paper", contain the following:

1. a folder called "data" in which are stored input data that are used by Dynare to solve the model as well as data directly produced by Dynare in solving the model. For what concerns input data, given that we used a different software (Dynare) from the original authors (Matlab), we had to take some of the original data and rewrite them in a different form (for example, for some Excel files we changed the configuration from columns to rows or the other way round, and for other files we changed the extension from .csv to .xlsx) but without doing any kind of approximation. All the input data that we used, in terms of quality, remain the same as the original authors. The two folders differ in terms of the number of items, because with the file "Main.m" into "Dynare_Repl_Code" we also allowed the possibility to recalibrate the model with Dynare, as did by the original authors. This procedure requires additional input data (specifically, "alpha.xlsx", "beta.xlsx", "mu.xlsx", "D_1970.xlsx", "D_2015.xlsx", "theta_1970.xlsx", "theta_2015.xlsx", "ss_1970_calibr.xlsx", and "ss_2015_calibr.xlsx") and produces new data (specifically, "CDY_1970.xlsx" and "CDY_2015.xlsx", plus "calibration_1970_baseline_dynare.xlsx" and "calibration_2015_baseline_dynare.xlsx". The latter are directly stored into the folder "Dynare_Repl_Code"). That's why the number of items differs.

2. a folder called "Eggertsson_Matlab_Code", see Section "Raw Data" above.

3. a file called "Main.m" which runs the simulations, a file called "dynare_transition.mat" which stores the results of the simulations, and a folder called "Figures" which instead stores the graphs of the simulations.

4. three Dynare .mod files, "dynare_ss_1970.mod", "dynare_ss_2015.mod", and "dynare_transition.mod", used to compute the steady state at 1970, 2015 and the transitional dynamics, respectively.

The folder "Dynare_Repl_Code" alone, contains also:

a) two additional Dynare .mod files "dynare_ss_1970_calibr.mod" and "dynare_ss_2015_calibr.mod" and two additional .xlsx files "ss_1970_calibr.xlsx" and "ss_2015_calibr.xlsx", the reason is that into the main program "Main.m" of "Dynare_Repl_Code" we also allowed the possibility to recalibrate the model with Dynare, as did by the original authors (see point 1 above).

b) the file "plot_comparison.m" which are called by "Main.m" and save the graphs into "Figures". Into the folder "Dynare_Repl_Paper" this file is

missing because the function is directly computed into "Main.m". Here however, we decided to put it outside, for convenience.

c) a folder "Alt_Calibrations", which allows us to run different calibrations, as did by the original authors. As the other two folders "Dynare_Repl_Code" and "Dynare_Repl_Paper", it has its own "Main.m" file, "data" and "Figures" folder, .mod files, and so on.

Output

The output is computed through the function "Main.m" in both folders, "Dynare_Repl_Code" and "Dynare_Repl_Paper". It saves the results into the file "dynare_transition.mat" and saves the figures into the folder "Figures". Figures 1 and 2 comes from "Dynare_Repl_Code/Figures", figures 3 and 4 from "Dynare_Repl_Paper/Figures". Table 1 instead, has been written by hand copying output of Dynare when you run the simulation for the steady-state at 1970 through "Dynare_Repl_Code/Main.m" line 120. Into the Dynare file "dynare_ss_1970.mod" you will find all the variables present in Table 1. Just a remark on the variable "Consumer-debt-to-output-ratio" it is computed at the end of the .mod file (outside Dynare), see line 408 of "dynare_ss_1970.mod".

Software and Hardware

We used Matlab R2020 and Dynare 5.3. The latter can be downloaded from "https://www.dynare.org/". We computed the simulations with two laptops:

1. MacBook Pro (2016), Processor 2 GHz Dual-Core Intel Core i5, Memory 8 GB 1867 MHz LPDDR3, Graphics Intel Iris Graphics 540 1536 MB
2. HP notebook, Intel(R), Core(TM), i5-8250U, CPU 1.60GHz, 1.80 GHz, RAM 8 GB.

How to Run

First of all, choose what you want to replicate:

1. The Matlab code ("Dynare_Repl_Code"): the main program is "Main.m". Setting "run_calibration=1" at line 35 will run again the baseline calibration otherwise you just take the values as in Eggertsson et al. (2019) by setting "run_calibration=0". You need to put your path of where you stored this folder, in two parts of "Main.m" at lines 136 and 154 for Windows (139 and 157 for Mac), and run it in order to compute the full replication. Moreover, there is also the folder "Alt_Calibrations" which runs the simulations with the alternative calibrations. The process is like before, and the main file to run is "Main_Alt_Calibrations.m". Again you need to change your path.

2. The equations as in the paper ("Dynare_Repl_Paper"): same process as before. The main program is "Main.m". You just need to put your path of where you stored this folder, in two parts of "Main.m", and run it in order to compute the full replication.