Replication package for 'The central bank balance sheet as a policy tool: lessons from the Bank of England's experience'

This file provides details of the replication codes for the paper "The central bank balance sheet as a policy tool: lessons from the Bank of England's experience' by Andrew Bailey, Jonathan Bridges, Richard Harrison, Josh Jones and Aakash Mankodi.

1 Computational Requirements

The hardware, OS and software used is listed below (and the timings detailed in Section 2.2 refer to this configuration):

- CPU: Intel Core i5-6300U 2.40GHz
- RAM: 16GB
- OS: Windows 10 Enterprise
- Software: MATLAB 2020b (64bit) with control system, optimization and symbolic math toolboxes installed and available.

The code has not been tested on other hardware, operating systems or software versions.

2 Replication Instructions

2.1 Replication package structure

The zip folder containing the replication scripts also contains the following folders:

- **Data** Excel spreadsheets with the data used to plot Figure 1.
- **Functions** Functions used to generate and plot the results.
- **MAPSlite** A (minimal) version of the 'Model Analysis & Projection System' (MAPS), developed at the Bank of England and described in Burgess et al. (2013).
- **Models** Text files containing the model described in Section 3.1 of the paper (in MAPS format).
- **Results** Results files for the experiments reported in Section 3.1 of the paper.
- **Figures** Figure outputs from the plotting codes.
- **Toolkit** The optimal policy toolkit of Harrison and Waldron (2021).

2.2 Replication of results in paper (and appendix)

The main scripts used to produce the results in the paper call the script `tidyUpAndSetPath.m`, which clears the workspace and adds the relevant paths for the functions. These are expressed relative to the working directory containing the scripts. This allows the relevant toolkits to be saved elsewhere as long as this script is altered accordingly.

The main folder of the replication package contains scripts to generate the results (saved in the 'Results' folder) and scripts to plot the figures in the paper. These are described in turn.

The scripts used to generate the results in the paper and appendices should be executed in the following order (computation times reported to the nearest minute):

1. `buildInputs.m` This script builds an initial guess for the non-linear policy functions using the piecewise linear solution algorithm described in Harrison and Waldron (2021). Solution time = 17 minutes.

2. `computeSolution.m` This script solves for the non-linear policy functions and using results produced by `buildInputs.m` to initialise the solution. The solution algorithm closely follows the method outlined in Harrison (2021). The code uses low-level functions from the CompEcon toolkit (Miranda and Fackler, 2002) and the function by Floden (2010) used to implement the Rouwenhorst (1995) Markov approximation of AR processes proposed in Kopecky and Suen (2010). Solution time = 1 hour 28 minutes.

3. `runSimulation.m` Solution time = <1 minute.

The script `plotSimulationResults.m` plots Figure 4 and Figure A.1, using the results computed in `runSimulation.m`.

The script `plotFigure1.m` plots Figure 1 in the paper, reading data from the spreadsheet in the 'Data' folder. The legend is produced using `legendflexm` (Kearney, 2023).

References

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