Guide to replication codes for: "Optimal policy with occasionally binding constraints: piecewise linear solution methods"

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These notes provide details on the use of the replication files accompanying the paper "Optimal policy with occasionally binding constraints: piecewise linear solution methods".

1 Overview

The results for the paper were generated using MATLAB 2018b (64-bit) on a Windows system. The replication codes make use of the "MAPS" toolkit developed at the Bank of England (see Burgess et al (2013) referenced in the paper) and a (stripped down) version of MAPS is included in the replication code. MAPS requires the MATLAB control and symbolic math toolboxes to be installed and available. The MATLAB code used to generate the results in the paper also requires the optimization toolbox to be installed and available.

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

- **Data** This contains an Excel spreadsheet containing the data used for the FRB/US application in Section 7 of the paper.
- **Functions** The folder contains general and application specific functions used to generate the results (organized in subfolders).
- **MAPSlite** A (minimal) version of the 'Model Analysis & Projection System' developed at the Bank of England.
- **ModelsAndAddOns** Text files containing the models used for the applications in Sections 3–7.
- **Results** Folder containing results files for the experiments in Sections 3 and 4 of the paper. The sub-folder **Figures** contains figure outputs saved (as ".eps").
- **Toolkit** This folder contains the functions that implement the methods detailed in the paper:
  - **Commitment** contains the functions that implement the methods described in Section 3 of the paper.
  - **Discretion** contains the functions that implement the methods of Sections 4 and 5 in the paper.
  - **Helpers** contains a set of functions that perform general, low-level tasks and are used by the main algorithms in the paper.
  - **HoldenPaetz** contains a set of functions for our implementation of the method described by Holden and Paetz (2012).
  - **NonPolicyOBCs** contains the functions that implement the methods described in Section 6 of the paper.

2 Replication of results in Sections 3–7

The main scripts used to produce the results in the paper call `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. If the toolkit functions are saved elsewhere, this script should be altered accordingly.

The MATLAB scripts used to generate the results in the paper are described below.

2.1 doSec3And5examples.m

This script produces and plots results for the examples using the model with QE under commitment (Section 3) and discretion (Section 5).

2.2 doSec4examples.m

This script produces and plots results for the examples using the monetary/macro-prudential policy model in Section 4.

2.3 doSec6pt4pt1example.m

This script produces and plots results for the Smets-Wouters model with irreversible investment, shown in Section 6.

2.4 doSec6pt4pt2example.m

This script produces and plots results for the inertial New-Keynesian model with downward nominal wage rigidity, shown in Section 6.

2.5 doSec7example.m

This script produces results for the FRB/US model, shown in Section 7. Please note that:

- The code produces a warning when attempting to compute the model-implied covariance matrix of the endogenous variables. This is because the model includes a pure unit root process (so that the covariances are not finite). By default in these circumstances MAPS sets the covariance matrix to an identity matrix in such circumstances. This does affect the results of the simulations in Section 7 because the baseline forecast is constructed by 'inverting' the model forecast on the paths taken from the SEP.
- This code takes some time to run, so the results are saved and plotting is done in a separate script.

2.6 plotSec7results.m

This script plots results for the FRB/US model experiments of Section 7.