

# Guide to replication codes for “Uncertain policy promises”

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These notes provide details on the use of the replication files accompanying the paper “Uncertain policy promises”.

## 1 Overview

The results for the paper were generated using MATLAB 2017b (64-bit) on a Windows system.<sup>1</sup> 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 main scripts also contains the following folders:

- **Data** An Excel spreadsheet containing the data used for the threshold-based forward guidance application in Section 4 of the paper.
- **Functions** The folder contains functions used to generate the results organized in subfolders by type.
  - **Algorithm** Contains the functions that implement the algorithm in the paper. Each function contains extensive notes that document the usage of the function. The notation in the code is close to that in the paper. However, the code was written for an earlier version of the paper, which had slightly different notation. The table below provides details of the differences.

	In paper	In code
Endogenous variables	$x$	$x$
Policy instrument	$z$	$r$
Shocks	$\varepsilon$	$z$

- **SimulationSpecific** contains functions that support the production of the specific applications considered in Sections 3 and 4 of the paper (e.g. a function to compute probabilities using the Weibull distribution, a charting function for Section 3 etc).
- **Helpers** contains a set of misc functions that are used round the edges of the production of the sims or charting.

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<sup>1</sup>We have tested the code on MATLAB 2012b (64bit) on a Windows system and verified that the results are the same to those in the paper. This suggests that the code should be compatible with at least some earlier versions of MATLAB.

- **MAPSlite** A (minimal) version of the ‘Model Analysis & Projection System’ developed at the Bank of England.
- **Models** Text files containing the models used for the applications in Section 3 (`simpleNKmodel.maps`) and Section 4 (`FRBUS.maps`).
- **Results** Folder containing results files for the experiments in Sections 3 and 4 of the paper.
- **Figures** Folder in which figure output is saved (as “.eps”).

## 2 Replication of results in Sections 3 and 4

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

### 2.1 `generateSection3results.m`

This script produces results for the experiments studied in Section 3 of the paper and the assessment of the robustness of those results (Appendix B). There are two high-level options on lines 25 and 26, which dictate whether the results are saved out and whether the sensitivity analysis in the appendix is computed. The remainder of the options from lines 29 to 63 determine exactly which experiments are computed. The options are set to reproduce the results of the paper, but it would be possible e.g. to change the calibration of the probability mapping function in lines 53-54. Note that if sensitivity is computed, then this script takes some time for run because the initial guess used for the reversion probabilities is a vector of zeros (unlike for the main results which uses a previously-computed solution as the guess).

### 2.2 `generateSection4results.m`

This script the results in Section 4 of the paper, as well as the complete set of results (combinations of threshold value and ‘tightness’ of beliefs) in Appendix C. The only high-level option in this script is to choose whether or not to save the results out on line 28. Lines 34-71 specify all of the information necessary to compute the experiments. It is setup to compute the experiments in the paper. It would be possible, for example, to change the unemployment thresholds or to use different calibrations of the probability mapping functions (lines 34-43). Note, however, that FRBUS is a large model and so experiments can take a long time to run. The initial guesses for the reversion probabilities are setup using the results in the paper to ensure that this script runs quickly. Alternative experiments would take a lot longer to run (and may also run into numerical convergence issues).

### 3 Producing figures

The main folder contains a number of scripts that produce figures for the paper. These codes should be self-explanatory. However, the following points are worthy of note:

1. Most of the scripts require the results to have been generated and saved (with the appropriate names) in the **Results** folder. Limitations of the size of data files that could be uploaded for replication mean that we could not include a pre-run set of results. The plotting scripts therefore require you to generate the results as described in the previous section.
2. The codes are configured to save figures in .eps format and into the **Figures** sub-folder of the main folder. It would of course be possible to change both the format and save location of these figure.

### 4 Misc other

The main folder includes a script called `computeTBFGlosses.m` which was used to compute the loss improvements for the two threshold-based guidance policies at the end of Section 4 of the paper (this calculation is referred to in footnote 36 of the paper).

It also includes a script called `codeUsageChecker.m`, which we used to ensure that we were packaging only functions that were used (with removing superfluous MAPS functions in mind).