User Guide: Macroeconomic Model Data with Newton Methods Comparison

This manual guides users through a comparison exercise with Newton's methods using the models from the Macroeconomic Model Data Base (MMB hereafter)

1 Environment Setting

1.1 Required Software

- Please install either **MATLAB** to run the matlab files. For MATLAB, the *Optimization Toolbox* package, the *Statistics Toolbox* package and the R2019a or newer versions are required.

- Please install **Dynare** to solve models on the MMB. The current version works with Dynare 5.x or newer version.

- Please go to https://www.dynare.org/resources/quick_start/ for instructions to set up your Dynare in MATLAB or Octave. For Matlab, you can use any Dynare version.

1.2 Folder Structures

- The folder contains two main sub folders. The replication contains the mod files and necessary replication files for all model in the MMB. Please note that some models are replicated by the MMB team and have been updated to work with newer version of Dynare and Matlab. Hence, we cannot guarantee identical aspects compared to the version that can be found on author's websites.

- If you just want to work with the replication files of models, you can just use the MMB_replication/Replication for your own purpose.

- If you want to conduct a solving method comparison exercise, please go to MMB_replication/Main_files.

2 The Comparison Exercises

2.1 Models

- The MMB categorizes the models into five groups. **'Calibrated'** includes models calibrated to match a closed economy. **'Estimated US'** and **'Estimated Euro Area'** include models estimated on the US and the Euro area data. **'Other'** includes models calibrated or estimated on data of multiple countries or countries outside the US or the Euro area, i.e., CA_BMZ12 is a model estimated on Canadian data; EAUS_NAWM08 is a two-economy model estimated on data of the Euro area and the US. **'Adaptive Learning'** includes models in which agents form expectations through adaptive learning.

- The name of a model starts with the group to which the model belongs, followed by the first letter of the model developers' last name, and ends with the publication year, e.g., US_SW07 stands for the model estimated on the US data and developed by Smets and Wouters (2007). For adaptive learning models, "AL" is added at the end of the name, e.g., US_SW07AL.

- To look for model details, type keywords, e.g., author, paper title, journal name or year, please go to the

2.2 Run Comparison Exercise

- For conducting the comparison exercise, you need to change the directory to MMB_replication/Replication

- **run_files.m** will run the comparison exercise. The file will create an execution folder for running. Please note that the folder will be deleted after generating the results.

- The file will run the comparison exercise through all models in the replication first as the default set-up. Some models will not work with Newton's method exercise.

- After that, all the reports will be stored in Result_allmodels.xlsx and First_Run_AMG_JS.m

- If you want to have the report of only the worked models, you have to go into **run_files.m**. At line 39, you have to set run_worked_model=1;

- If you only want it to run over all models, set run_worked_model=0;

3 Adding new models

- To add new models, you need to create the folder in Replication. The name of the folder should follow the MMB rule of naming the model.

- Inside the model folder, the mod file should follow the short name of the model _ rep. For example, Smets and Wouters (2007) will have the folder name US_SW07 and the mod file needs to be US_SW07_rep.

- After that, you should copy the MMB_replication/Replication folder into MMB_replication/Research_routine to run the comparison exercise

- The last step require that you must update the file overview_out.xlsx with the new model name so that the comparison exercise can be executed with a new model.

References

Smets, F., Wouters, R., 2007. Shocks and frictions in US business cycles: A bayesian DSGE approach. The American Economic Review 97(3), 586–606.