Replication Code:
"Evaluating Policy Counterfactuals: A VAR-Plus Approach"

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This document describes the replication files for the paper "Evaluating Policy Counterfactuals: A VAR-Plus Approach". The code produces all numbers and figures referred to in the paper. All codes have been run and tested on Matlab R2022b on a Dell Inspiron 15 3000, with an Intel(R) Core(TM) i7-1065G7 CPU @ 1.30GHz processor and 12GB of RAM, running on Windows 11.[1] To ensure that all codes run, the variable "local"—located near the top of the various m-files—needs to be changed to reflect the local machine.

In addition to code that we have produced, the replication material draws on the following files that have been wholly or partially produced by other authors:

- Our solution of the HANK model uses: first, several files from the replication codes of the article Ahn et al. (2017); second, the CompEcon toolbox of Miranda and Fackler, available here: `www4.ncsu.edu/~pfackler/compecon`; and third, the `ergodicdist.m` function, written by Marco Maffezzoli. The codes closely build on those used by one of the authors in Wolf (2024).
- The files `jbfill.m` and `winsorize.m` are available on Mathworks file exchange.
- The file `regcyc.m` is taken from the replication codes for the article Hamilton (2018).

1 Main results

All figures and tables can be produced by running the file `main_varplus.m`. This main file calls other files to produce each of the figures and tables. The exact files that produce each figure are referenced below.

[1] The following toolboxes are required: Econometrics toolbox; Optimization toolbox; and Statistics toolbox. Furthermore, Dynare is also required, and the code is tested in Dynare 6.1.

- *Figure 1.* `/invertibility/sw_sequence/get_2mom_ninvwold_all.m` for the top and `/invertibility/sw_sequence/get_2mom_ninvwold_fcstvars.m` for the bottom
- *Figures 2 - 4.* `/model_estim/plot_model_irfs.m`
- *Figures 5 and D.1 - D.2.* `/applications/second_moments/get_cnfctl_stats.m`
- *Figure 6.* `/applications/second_moments/get_cnfctl_mbc.m`
- *Figures 7 and D.3.* `/applications/hist_evol/get_historical_evol.m`
- *Figures 8 and D.4.* `/applications/hist_scenario/get_historical_scenario.m`
- *Figure 9.* `/applications/hist_scenario/decompose_realrates_brank.m`
- *Table 4.1.* `/model_estim/get_posterior_probs.m`
- *Table C.1.* `/var_inputs/run_var_spf_fcst_compare.m`
- *Table C.2.* `/var_inputs/run_var_swfactors.m`
- *Table C.4.* `/model_estim/get_param_post.m`

The main results file `main_varplus.m` takes around 20 minutes to run.

2 Required inputs

The main results file calls several inputs, already saved in the subfolders of the replication file directory. We here detail how to construct those inputs.

- For Figure 1, we require the dynamic causal effect matrices for monetary policy shocks in the model of Smets & Wouters (2007), created in `/invertibility/sw_sequence/_get_mp_irfs/get_mp_irfs.m`, as well as the true counterfactual second moments, created in `/invertibility/sw_sequence/get_2mom_truth.m`.
- For Figure 2-9 and D.1 - D.4 as well as Tables 4.1 and C.4, we require all of the posterior draws from our models, stored in the folder `/suff_stats`. These posterior draws are created by the files `/model_estim/sample_posterior.m` (to sample from all individual model posteriors) and `/model_estim/get_posterior_probs.m` (to sample from the posterior across models).

  - The `/suff_stats` folder contains sub-folder for posterior draws from all individual models as well as various mixtures. In particular:
    1. RE RANK: `/ratex/rank_draws_main.mat`
    2. RE HANK: `/ratex/hank_draws_main.mat`
    3. RE RANK & HANK: `/ratex/non_behav_models_draws.mat`
    4. Behav. RANK: `/behavioral_fixed/rank_draws_main_behav.mat`
    5. Behav. HANK: `/behavioral_fixed/hank_draws_main_behav.mat`
    6. Behav. RANK & HANK: `/behavioral_fixed/behav_all_models_draws.mat`
    7. RE and Behav. RANK: `/mix/rank_behav_and_non_behav_draws.mat`
    8. RE and Behav. HANK: `/mix/hank_behav_and_non_behav_draws.mat`
    9. All models: `/mix/all_models_draws.mat`
  - The posterior draws files require as an input our empirical VAR estimates of monetary policy shock causal effects. Those are generated by the file `/var_inputs/run_var_mp_ad.m`.

- For Figures 2, 3, 4 and 9, we require the posterior modes for our four estimated models, generated by the file `/model_estim/get_posterior_mode.m`.
- For Figures 5 and D.2, we require the Wold impulse response functions, generated by the file `/var_inputs/run_var_wold.m`.
- For Figure 6, we require the impulse response functions to the "main business-cycle shock," generated by the file `/var_inputs/run_var_mbc.m`.
- For Figures 7 and D.3, we require the forecasts throughout the Great Recession, generated by the file `/var_inputs/run_var_fcst_evol.m`.
- For Figures 8 and D.4, we require the forecasts for the post-covid inflationary episode, generated by the file `/var_inputs/run_var_fcst_scenario.m`.
- For Figure D.1, we require the Wold impulse response functions for the early sample, generated by the file `/var_inputs/run_var_wold_early.m`.

Among the files that create the required inputs, the main bottleneck is to obtain draws from the model posteriors. This will take several hours for each of our four models.

References

Ahn, S., Kaplan, G., Moll, B., Winberry, T., & Wolf, C. K. (2017). When Inequality Matters for Macro and Macro Matters for Inequality. *NBER Macroeconomics Annual*, *32*.

Hamilton, J. D. (2018). Why you should never use the hodrick-prescott filter. *The Review of Economics and Statistics*, *100*(5), 831–843.

Smets, F. & Wouters, R. (2007). Shocks and frictions in us business cycles: A bayesian dsge approach. *American economic review*, *97*(3), 586–606.

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