Description of the replication files of Monte Carlo experiments in "Heterogeneous Autoregressions in Short T Panel Data", written by M. Hashem Pesaran and Liying Yang, 2024

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This folder contains codes and simulated results for the Monte Carlo (MC) experiments in "Heterogeneous Autoregressions in Short T Panel Data", written by M. Hashem Pesaran and Liying Yang, 2024.

The MATLAB scripts were written and executed using the MATLAB version R2022b. The R scripts were written and executed using the Rstudio version 2023.12.0+369. Please ensure that the path is correctly set in both MATLAB and R scripts to the directory containing the data files and the results of the estimations, and the packages loaded in the R scripts are installed on either local desktops or clusters.

1) The MC experiments comparing the proposed FDAC and HetroGMM estimators
    a) FDAC and HetroGMM estimators of E(phi_i):
        i) To generate the results, run the R script "HP_AR_MC_FDAC_m1.R".
        ii) To tabulate results and plot the figures, run the R script "HP_AR_MC_FDAC_vs_HomoGMM_tab_fig.R", using either the obtained simulation results or old RData results in the directory "MC/Simulation results/FDAC vs HetroGMM".
        iii) The tables will be shown in an Excel file named "HetroAR_MC_FDAC_moments_exp_m1.xlsx".
    b) FDAC and HetroGMM estimators of Var(phi_i):
        i) To generate the results, run the R script "HP_AR_MC_FDAC_var.R".
        ii) To tabulate the simulated results and plot the figure, run the R script "HP_AR_MC_FDAC_var_tab_fig.R", using either the obtained simulation results or old RData results in the directory "MC/Simulation results/FDAC vs HetroGMM".
        iii) The tables will be shown in an Excel file named "HetroAR_MC_FDAC_moments_exp_var.xlsx".
    • The processing time for the above simulations was less than a few hours on a local desktop.

2) For the experiments comparing FDAC and HomoGMM estimators, we modify the MATLAB codes in the replication package of "An Augmented Anderson-Hsiao Estimator for Dynamic Short-T Panels", by Alexander Chudik and M. Hashem Pesaran (2022), downloaded from the link: http://www.econ.cam.ac.uk/people-files/emeritus/mhp1/fp21/CP_AAH_paper_July_2021_codes_and_data.zip. We are grateful to Alexander Chudik for making the codes publicly available. The codes and instructions (in a ReadMe file) are contained in the sub-folder "FDAC vs HomoGMM".

3) The MC experiments comparing FDAC and MSW estimators*
   a) The Monte Carlo simulations for the MSW estimator can be executed on a local desktop, but they typically require a considerable amount of time due to their lengthy duration — more than a week with no interruptions. Hence, we recommend executing the MC simulations on a cluster.
      i) Generating MC results using a local desktop: run the R script "HP_AR_MC_FDAC_vs_MSW_exp.R".
      ii) Generating MC results using a cluster: use script " HP_AR_MC_FDAC_vs_MSW.job" to submit MC jobs to a cluster. Please adjust the parameters in the job file to match the cluster configuration, and install the packages used in the R script "HP_AR_MC_FDAC_vs_MSW_exp.R" on the cluster before executing it.
   b) After completing the simulations, copy the result RData files to a path accessible by R.
   c) To generate tables and plots, run the R script "HP_AR_MC_FDAC_vs_MSW_exp_tab.R", using either the new simulation results or old RData files from the directory "MC/Simulation results/FDAC vs MSW". The tables will be shown in an Excel file named " HetroAR_MC_FDAC_vs_MSW_results.xlsx".

*The codes of the MSW estimator proposed by Mavroeidis, Sasaki and Welch (2015) were downloaded from https://drive.google.com/file/d/1hdRFpcWo3r88YV_5Kc40ur-siCYGSBDN/view?usp=sharing. We are grateful to Yuya Sasaki for also sharing the codes of the MSW estimator used in their Monte Carlo experiments by private correspondence.

Table 1 summarizes the files of MC codes corresponding to the tables and figures in the online supplement.

Table 1: Files of MC codes and the respective tables and figures

Codes file	Tables	Figures	Software
HP_AR_MC_FDAC_m1.R HP_AR_MC_FDAC_m1_exp_tab_fig.R	S.1-S.2, S.5 & S.12-S.13	S.1 & S.4–S.5	R
HP_AR_MC_FDAC_var.R HP_AR_MC_FDAC_var_tab_fig.R	S.3-S.4 & S.6-S.7	S.2	R
HP_AR_MC_FDAC_vs_HomoGMM_exp.m HP_AR_MC_FDAC_vs_HomoGMM_tab_fig.R	S.8-S.10 & S.14-S.16	S.3	MATLAB R
HP_AR_MC_FDAC_vs_MSW_exp.R HP_AR_MC_FDAC_vs_MSW_tab.R	S.11 & S.17	-	R

4) The "Simulation results" folder comprises three subfolders: "FDAC vs HetroGMM", "FDAC vs HomoGMM" and "FDAC vs MSW". Each subfolder contains the simulation outcomes stored in RData files, tables in Excel format, and generated figures in png format.

References

Chudik, A., & Pesaran, M. H. (2022). An augmented Anderson–Hsiao estimator for dynamic short-T panels. *Econometric Reviews*, *41*, 416-447.

Mavroeidis, S., Sasaki, Y., & Welch, I. (2015). Estimation of heterogeneous autoregressive parameters with short panel data. *Journal of Econometrics*, *188*, 219-235.