

Description of the replication files for “**Estimation and Inference in Spatial Models with Dominant Units**” by M. Hashem Pesaran and Cynthia Fan Yang

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This readme provides a summary of the MATLAB files needed for the replication of the results reported in the main paper as well as in the online supplement. The “MC\_programs” folder contains programs to replicate the Monte Carlo results. The “application” folder contains data and codes to replicate the results of the empirical application.

**List of Files:**

**Monte Carlo Simulations**

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<b>Main programs</b>	
main_MC.m	Main program to run simulations under various DGPs with different estimation methods
outtab.m	Tabulates MC results (in the format of the tables in the supplement)
plot_power_main_paper.m	Plots empirical power functions for BMM and GMM estimators as displayed in the main paper
plot_power_supplement.m	Plots empirical power functions for BMM, GMM and ML estimators as displayed in the supplement

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<b>Functions</b>	
BMM_moment_SARX_iid.m	Forms moment conditions for the BMM estimator assuming homoskedastic errors
BMM_moment_SARX_het.m	Forms moment conditions for the BMM estimator assuming heteroskedastic errors
GMM_multiP_moment_SARX.m	Forms moment conditions for the GMM estimator
GMM_multiP_var_SARX_iid.m	Computes variance of the GMM estimator assuming homoskedastic errors
GMM_multiP_var_SARX_het.m	Computes variance of the GMM estimator assuming heteroskedastic errors
invpd.m*	Computes generalized inverse (required for MLE)
matadd.m*	Performs matrix addition if only row or column is compatible (required for MLE)
nearestSPD.m***	Finds the nearest positive definite matrix
normw.m*	Normalizes row sums of a matrix such that each row sums to unity
qqWeight.m	Generates "q ahead and q behind" spatial weights matrix
sar2.m	Implements ML estimation
f_sar.m*	Evaluates concentrated log-likelihood (required for MLE)
f2_sar.m*	Evaluates log-likelihood (required for MLE)
lndetfull.m*	Computes log det(I-rho*W) using sparse matrices (required for MLE)

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## Empirical Application

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<b>Data</b>	
data_application.mat	Data used in the empirical application Contains price levels and W matrices

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<b>Main Program</b>	
main_application.m	Main program for the empirical application

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<b>Functions</b>	
est_delta.m**	Estimates the degrees of dominance
BMM_SARX.m	Implements the BMM estimation
rbstw.m	Constructs robust spatial weights matrix with a given threshold

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The rest of the .m files are the same as those in the MC\_programs folder.

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Notes:

- \* Codes from the Econometrics Toolbox by James P. LeSage.
- \*\* This function was part of the replication package accompanying the study by Pesaran and Yang (2020).
- \*\*\* Retrieved from MATLAB Central File Exchange. Only used for BGMM estimation of pure SAR models when  $\rho=0.95$  and  $\delta=1$ .

## References

- John D'Errico (2014). nearestSPD (<https://www.mathworks.com/matlabcentral/fileexchange/42885-nearestspd>), MATLAB Central File Exchange. Last accessed December 2019.
- Lesage, J. P. Econometrics Toolbox Version 7. Available at <https://www.spatial-econometrics.com/>.
- Pesaran, M. H. and C. F. Yang (2020). Econometric analysis of production networks with dominant units. *Journal of Econometrics* (forthcoming).

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