Computer Tutorial 3: Fat Data Regression Methods and VARs

Data and Matlab code for all questions are available on the course website.

Exercise 1: *SSVS*
In my handout, "Bayesian Methods for Fat Data", I carry out an empirical exercise using an SSVS prior and a data set from the economic growth literature. This data set covers $N = 72$ countries and contains $K = 41$ potential explanatory variables. The dependent variable is average per capita GDP growth for the period 1960-1992. I use a default semi-automatic prior with particular values for the constant used to define "small" and "large" prior variances. The code is called ssvs.m. Use this code to reproduce the tables in the handout. Next, investigate prior sensitivity with respect to the constant. Optional exercise: Modify the code to remove the default semi-automatric prior and replace it with subjectively chosen values for τ_{0i}^2 and τ_{1i}^2 chosen by you.

Exercise 2: *The LASSO*
In my handout, "Bayesian Methods for Fat Data", I carry out an empirical exercise using a LASSO prior for the same data set as Exercise 1. The code LASSO.m replicates the results in the handout using particular prior hyperparameter values. After replicating my results, carry out a prior sensitivity analysis. Are results sensitive to choice of prior?

Exercise 3: *VAR posteriors using analytical results, and their properties*
Use the MATLAB code BVAR_ANALYT.m that estimates the VAR model using analytical methods (i.e. no posterior simulation is done), with a choice of three available priors (Noninformative, Minnesota and natural conjugate). Load the macroeconomic dataset provided, and experiment with the prior hyperparameters of the Minnesota prior. (Note: This code does not directly print out any output to the screen. So you will have to figure out what the program is producing and how to print it out).
Take a training sample of the first 40 quarters of data and estimate a VAR model using this training sample (and a Noninformative prior. Use the posterior from the training sample VAR to determine the prior hyperparameters of a Normal-Wishart prior. Estimate a VAR using this prior and the remainder of the data. Compare your results with those of part a).

Exercise 4: *Impulse response analysis*
Perform impulse response analysis using the code BVAR_FULL.m and replicate the results of the first empirical illustration in the monograph by Koop and Korobilis. This code gives you the option to choose six between different priors. Experiment with all of them and try different prior hyperparameter choices.