

Computer Tutorial 3: Fat Data Regression Methods

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

Exercise 1: *BMA in Cross Country Growth Regressions*

In my handout, “Bayesian Methods for Fat Data”, I carry out a BMA exercise using 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. In it, I use a g-prior value of $g = \frac{1}{K^2}$ recommended by Fernandez, Ley and Steel (2001, Journal of Econometrics) and the MC³ algorithm took 2,200,000 draws and discarded the first 200,000 as burn-in replications. Repeat this example using smaller numbers of draws so as to investigate how sensitive results are to the number of draws. Next investigate the sensitivity of results to the choice of g . Code is available in BMA.m. Optional exercise: For a given value of g , the weighted average of the marginal likelihoods across the draws can be used as a measure of support for the value of g . Modify the code to calculate this measure of support for a range of values of g , selects the value of g which maximizes it and presents BMA results for this value.

Exercise 2: *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 (labelled c in the handout) 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-automatic prior and replace it with subjectively chosen values for τ_{0i}^2 and τ_{1i}^2 chosen by you.

Exercise 3: *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?