Topics in Macroeconometrics, EUI
Fall 2014
Fabio Canova

Homework 1

To be done in groups of 3.You are supposed to hand-in a *tex and *pdf files with the derivations and the answers and a zip file with the codes. Due September 29, 2014. How much thinking to you have given to each of the points will be waited into the grade.

Take the Schmitt-Grohe and Uribe (2003) or the Gali and Monacelli (2005) small open economy models - ideally half of the groups the first model and half the second.

1) Derive analytically the first order optimality conditions and a first order linear expansion of the equations of the model.

2) Find a solution - you can use either a Matlab program or a dynare program to do this. Check the accuracy of the first order solution.

3) Derive a second order approximation to the solution.

4) Appropriately calibrate the parameters (each group should calibrate to different countries, e.g. Uk, Sweden, NZ, Australia, Canada, etc.) and compare the dynamics induced by shocks in the first order and second order approximations. Explain why differences emerge.

5) Evaluate the quality of the model by computing the probability that the model matches certain statistics of the data - you are free to choose among variabilities, autocorrelations coefficients, impulse response or variance decompositions.

6*) (EXTRA POINTS) Solve the model by Dynamic programming. Compute impulse responses to shocks and compare them to the case where you use a local approximation.

Homework 2

Using the model you have solved in Homework 1

1) Estimate the parameters of the Euler equation of the model. Make sure you clearly specify a) how you deal with potential non-statiorities; b) which instruments you choose and why; c) how do you deal with potential multiple solutions; d) how you identify the parameters. Test your basic specification against a specification where there is external habit persistence in consumption - careful here about how you do it.

2) With the (log-)linear approximate solution of your model compute impulse responses to a monetary shock (or any interesting shock). Do the same in the data - again be careful here that the identification is consistent with what your model suggests. Estimate the structural parameters by matching impulse responses to the monetary shock (an interesting shock) of the model to the data. Be very careful with identification of the parameters. To compute standard errors repeat the estimation exercise 20 times and take the dispersion of the estimates as your standard errors. Again explain very clearly all your choices, data transformations, weighting matrix you use and whether and why you have calibrated some of the parameters.

Most of the grade in this homework will be given to the explanations you provide.

Homework 3

Using the model you have solved in Homework 1

1) Estimate the parameters of the model using likelihood based Bayesian procedure.

Make sure describe well how you choose your priors, the data transformations you employ, report convergence statistics, prior and posterior distributions, marginal likelihood comparisons with a VAR and with a nested specification of the model (for example, if you estimate the model with habit in consumption, report also the marginal likelihood for a model without habit and the resulting odds ratios) and comment on them.

Be careful with non-identified, weakly identified and partially identified parameters and state which parameters you can estimate and which you do not.

2) Make your priors non-informative and repeat the exercise. Comment on the differences with 1).

3) Run a few specification/valuation statistics and try to assess in which dimensions the model is short relative to the data.

4) Compute impulse responses distributions to monetary shocks. How do they compare with those reported in homework 2?

5*) (EXTRA CREDIT) Estimate the model using a bridge approach (Canova, 2014 JME). How much the model explains of the data?

Again, most of the grade for this homework will be given to the description/explanations you provide.