Exercise 2: An and Schorfheide (2007)

1. How many observable variables are needed for a Bayesian estimation?

A Bayesian estimation of a DSGE-model requires that the number of shocks is equivalent to the number of observable variables. Since we face three shocks in the model of An and Schorfheide, namely a monetary shock, a government spending shock and a technology growth shock, we also need to have three observable variables.

3. What is the intuition behind prior information in a Bayesian estimation?

Estimating DSGE models using calibrations is highly criticized since there is no stochastic foundation and parameters can take different values. But even estimating DSGE models with the help of Maximum-Likelihood often fails because of lack of information about the parameters, e.g. the distribution or non-separable identifiable parameters.
Therefore the Bayesian method is used to combine knowledge from available observations with additional (prior) believes about the distribution of the parameter. Of course even if these priors are included, the Bayesian method does not allow us to an estimation of the parameters but the priors can be used to identify those parameters that are unlikely.

4. How would you asses the quality of this estimation?

The priors and posteriors are chosen using information from the observed variables. As it can be seen, the probability distribution for the prior estimate is broader than the one for the posterior estimate which is a combination of the prior distribution with current data. Using the Bayesian approach and include current data therefore leads to a tighter probability distribution than then a classic regression does. Therefore the quality of the Bayesian estimation of An and Schorfheide is quite high leading in more likely parameter values.