ECON501 2017

lab08

OUTLINE

SOFTWARE

1. Octave 3.8.2 works with Dynare

http://www.dynare.org/documentation-and-support/quick-start

https://web.archive.org/web/20150402161713/http:/mxeoctave.osuv.de/

2. Watch video

https://www.youtube.com/watch?v=ZH-BRQaAaBU

https://www.youtube.com/watch?v=P9VYrKMAYrE

https://www.youtube.com/watch?v=RtGW-ZogMqg

TUTORIAL

1. Intro

http://fabcol.free.fr/dynare/pdf/tr_dynare.pdf

2. Basic

http://www3.nd.edu/~esims1/using_dynare_sp17.pdf

3. Practice

http://www.sfu.ca/~kkasa/Sargent_Dynare.pdf

4. Models

https://github.com/JohannesPfeifer/DSGE_mod

THE NEOCLASSICAL MODEL WITH FIXED LABOR

Consider a simple stochastic neoclassical model with fixed labor as the laboratory. The planner's problem can be written:

$$\max \quad E_0 \sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma} - 1}{1 - \sigma}$$

$$\text{s.t.}$$

$$k_{t+1} = a_t k_t^\alpha - c_t + (1 - \delta)k_t$$

TFP is assumed to follow a mean zero AR(1) in the log:

$$\ln a_t = \rho \ln a_{t-1} + \varepsilon_t$$

The first order conditions for this problem can be characterized with three non-linear difference equations and a transversality condition:

$$
\begin{aligned}
c_t^{-\sigma} &= \beta E_t c_{t+1}^{-\sigma} (\alpha a_{t+1} k_{t+1}^{\alpha-1} + (1 - \delta)) \\
k_{t+1} &= a_t k_t^{\alpha} - c_t + (1 - \delta) k_t \\
\ln a_t &= \rho \ln a_{t-1} + \varepsilon_t \\
\lim_{t \to \infty} \beta^t c_t^{-\sigma} k_{t+1} &= 0
\end{aligned}
$$

TRY TO IMPLEMENT COMPUTATION IN DYNARE

See github

PARAMETERS

parameters alpha beta delta rho sigma sigmae;

beta   = 0.99; % discount factor

delta   = 0.025;   % appreciation rate

alpha   = 1/3;   % share of capital in production function

sigma   = 1;   % intertemporal preference parameter

rho   = 0.95;   % coefficient for AR(1) stochastic process of technology

sigmae = 0.01; % standard error of technology shock

MODEL;

model;

$\exp(c)^\wedge(-sigma) = beta*\exp(c(+1))^\wedge(-sigma)*(alpha*\exp(z(+1))*\exp(k)^\wedge(alpha-1) + (1-delta));$

$\exp(y) = \exp(z)*\exp(k(-1))^\wedge(alpha);$

$\exp(k) = \exp(z)*\exp(k(-1))^\wedge(alpha) - \exp(c) + (1-delta)*\exp(k(-1));$

$z = rho*z(-1) + e;$

$\exp(y) = \exp(c) + \exp(I);$

$\exp(c)^\wedge(-sigma) = beta*\exp(c(+1))^\wedge(-sigma)*(1+r);$

$\exp(R) = alpha*\exp(z)*\exp(k(-1))^\wedge(alpha-1);$

$\exp(w) = (1-alpha)*\exp(z)*\exp(k(-1))^\wedge(alpha);$

end;