Economics 204b
Spring 2009

Marek Kapicka

Problem Set 4

due Wednesday May 20

1 Calibration

This exercise will show how to calibrate a simple real business cycle model. All the data you will need are in a file G-Facts.xls.

1.1 Imputation of services from consumer durables

We will impute the flow of services from consumer durables in the measurement of output, consumption and capital share. The data for private domestic capital do not include the stock of consumer durables. (They include government capital which we do not consider separately here.)

1. Compute the income of private domestic capital (denoted by K-Dom) Y_{KP} and rental prices of capital $r + \delta_{KP}$. Using Y_{KP} and the depreciation of capital stock (Dep), compute the average return on capital r.

2. Using the stock of consumer durables (K-CD) and the depreciation of consumer durables (Dep K-CD), compute the rental prices for consumer durables $r+\delta_{CD}$.

3. Compute consumption C, investment I, rental income of capital Y_K, rental income of labor Y_L, output Y and stock of capital K. Here C includes the flow of services from consumer durables, Y_K includes renal income that owners of consumer durables earn by renting their consumer durables to themselves, and K is the sum of the stock of private domestic capital and the stock of consumer durables.

4. Compute the following time series:

   i. The growth rate of per capita real output

   ii. The growth rate of population

   iii. Capital and Labor share

iv. Consumption to output ratio

v. Investment to output ratio

vi. Capital to output ratio

Provide a plot for each of the series. Note that for i. you will need to deflate nominal output by GNP deflator.

1.2 Finding parameter values

Consider the model we studied in class:

$$v(k,\omega) = \max_{c,n,k'}\{\frac{1}{1-\sigma}[c^{1-\mu}(1-n)^{\mu}]^{1-\sigma} + \beta(1+\eta)(1+\gamma)^{(1-\sigma)(1-\mu)}E[v(k',\omega')|\omega]\}$$
$$\text{s.t.} \qquad c + (1+\eta)(1+\gamma)k' = e^{\omega}k^{\alpha}n^{1-\alpha} + (1-\delta)k$$

Using the answers from previous part, in particular, the averages of the time series i.-vi., find the values of $\mu, \beta, \eta, \gamma, \alpha, \delta$. Use $\bar{n} = 0.35$ for the steady state value of nonleisure time and $\sigma = \frac{1}{2}$ for the coefficient of relative risk aversion.