MSC Macroeconomics ECONG022, Autumn 2009

Problem Set 5: For tutorials in week 12. To be handed in to your tutor at the beginning of class.

1. Business Cycles: Suppose that we are looking at a representative agent economy. The preferences of the representative agent are given as:

$$U_0 = E_0 \sum_{t=0}^{\infty} \beta^t \left(\log c_t - \frac{\theta}{1+\kappa} h_t^{1+\kappa} \right)$$

The representative agent has access to a production technology given as:

$$y_t = A_t k_t^{\alpha} h_t^{1-\alpha}$$

and she can accumulate capital according to:

$$k_{t+1} = (1 - \delta) k_t + i_t$$

and is faced with the sequence of resource constraints:

$$c_t + i_t = y_t$$

The representative agent is of the Robinson-Crusoe type (i.e. acts as a competitive supplier of capital and labor and as a competitive producer of output). The variable A_t is productivity and is given by a stochastic process:

$$\log A_{t+1} = \rho \log A_t + \varepsilon_{t+1}$$

where ε_{t+1} is normally, independently and identically normally distributed over time with mean 0 and variance σ^2 .

(a) Find the first-order conditions of the representative agent's problem and interpret these conditions.

(b) Find the conditions for the deterministic steady-state. (note that A = 1 in the deterministic steady-state)

(c) Suppose that the average real interest rate is 1 percent per quarter, that agents work 25 percent of their time endowment on average (i.e. h = 0.25 in the deterministic steady-state), that the labor income share is 36 percent, and that the depreciation rate is 2.5 percent per quarter. Given these value, calibrate the parameters of the model and derive the steady-state spending shares (of consumption and investment).

Question 2: This continues question 1.

(a) Log-linearize the model around the steady-state.

(b) Make the following guess on the solution:

$$\begin{aligned} \widehat{k}_{t+1} &= \gamma_k \widehat{k}_t + \mu_k \widehat{A}_t \\ \widehat{c}_t &= \gamma_c \widehat{k}_t + \mu_c \widehat{A}_t \\ \widehat{h}_t &= \gamma_h \widehat{h}_t + \mu_h \widehat{A}_t \end{aligned}$$

where $\hat{k}_t = dk_t/\bar{k} \simeq \log(k_t/\bar{k})$ where \bar{k} denotes the steady-state value of k and likewise for other "hatted" variables. Insert the guess in the log-linearized model and write down the parameter restrictions that you get using the method of undetermined coefficients.

(c) Assume that $\rho = 0.95$ and that $\kappa = 0.25$. Write a computer code that solves for the coefficients in the guess. To do this you need to use the calibration that you performed in question 1(c). Note that you will need to solve for γ_k from a second order equation where you need to choose the stable root. All other parameters are simple linear functions of this parameter.

(d) Given you solution, compute the response of the economy to a one percent increase in A for a forecast period of 25 quarters. Repeat it with $\kappa = 4$. Comment on the differences.

Question 3: Read the recent articles "Modern Macroeconomics in Practice: How Theory is Shaping Policy" by V.V. Chari and Patrick Kehoe, "The Macroeconomist as Scientist and Engineer" by N. Gregory Mankiw, and "How Did Economists Get It so Wrong?" by Paul Krugman (available on course web page), and answer the following questions.

(a) According to Chari and Kehoe, what must a coherent framework for the design of macroeconomic policy consist of? Briefly explain why.

(b) What is a time inconsistency problem? Explain briefly how such a problem can arise in taxing alternative forms of income. How can the time inconsistency problem be resolved?

(c) What is rule-based monetary policy? What is inflation targeting? Why do Chari and Kehoe argue that rule-based policies have become so widespread?

(d) According to Mankiw, what were the successes of the Keynesian revolution? What was the neoclassical Keynesian synthesis? What were the impacts on policy?

(e) Summarize briefly the three waves of New Classical macroeconomics that arose in the 1960s, 1970s and 1980s.

(f) How does New Keynesian macroeconomics differ from traditional Keynesian economics?

(g) Explain why Mankiw is more negative regarding the impacts of macroeconomic theory on policy than Chari and Kehoe.

(h) Discuss briefly Krugman's main criticisms of modern economics. Would you say that he is closer to the views of Mankiw or Chair and Kehoe or none of them? Kehoe

is now a colleague of Krugman - would you predict them writing research papers together?