Practice questions for Exam #2

Economics 808: Macroeconomic Theory

Fall 2001

1 The Fischer model

The model of sticky prices we built in class had nominal wage contracts that lasted one period. The Fischer model is one of several models of staggered contracts.

First, we have a simple money demand equation (this equation, like all the others should be considered as log deviation from trend):

$$y_t = m_t - p_t$$

The money supply m_t will be stochastic.

There are two types of firms, "even" and "odd". Every odd-numbered time period, the "odd" firms select their prices for the next two periods. Every even-numbered time period, the "even" firms select their prices for the next two periods. Half of the firms are odd and half are even.

To develop notation, p_t^1 is the price that holds at time t for firms that set their price one period ago, and p_t^2 is the price that holds at time t for firms that set their price two periods ago. The average price is:

$$p_t = \frac{p_t^1 + p_t^2}{2}$$

To see how this works: At time zero, the even firms set p_1^1 and p_2^2. At time one, the odd firms set prices p_2^1 and p_3^2, and so on.

So what prices do they set them at? We assume that every firm has the same optimal price $\hat{p}_t$, where

$$\hat{p}_t = \phi m_t + (1 - \phi) p_t$$

Firms set prices so that the future price will be at the expected value of the optimal price. In other words:

$$p_t^1 = E_{t-1}\hat{p}_t$$
$$p_t^2 = E_{t-2}\hat{p}_t$$

a) Find p_t^1 as a function of $E_{t-1}m_t$ and p_t^2.

b) Find p_t^2 as a function of $E_{t-2}m_t$ and $E_{t-2}p_t^1$.

c) Use your answers to the previous two questions to find p_t^2 as a function of $E_{t-2}m_t$.

d) Find p_t^1 as a function of $E_{t-2}m_t$ and $E_{t-1}m_t$

e) Now find p_t as a function of $E_{t-2}m_t$ and $E_{t-1}m_t$.

f) Now find y_t as a function of m_t, $E_{t-2}m_t$ and $E_{t-1}m_t$.

2 A simple coordination game

Consider the following two person economy. Each worker $i \in \{1, 2\}$ chooses effort level $e_i \in [0, \bar{e}]$, where $\bar{e} > 1$. Worker i's utility is given by:

$$U_i = c_i - e_i$$

where c_i is her consumption. Each worker produces separately, and gets to eat the results. However, there are spillovers in production. As a result

$$c_1 = c_2 = e_1 e_2$$

a) Find worker 1's best response function.

b) Plot worker 1's best response function, i.e., put e_2 on the x axis and the optimal value of e_1 given that value of e_2 on the y axis. Also plot the 45 degree line.

c) Describe all symmetric Nash equilibria in this game.

d) Can the symmetric Nash equilibria be Pareto ranked? If so, what is the Pareto dominant equilibrium?

e) Using the Cooper-John terminology, do the payoffs in this game exhibit strategic complementarity?

f) Using the Cooper-John terminology, do the payoffs in this game exhibit positive spillovers?

g) Now assume that $\bar{e} < 1$. Do the payoffs in this game exhibit strategic complementarity? Describe the symmetric Nash equilibria of this game.

3 True, false, or uncertain

Answer these questions with "true", "false", or "uncertain" and explain your answer.

a) The baseline RBC model is difficult to reconcile with the fact that measured productivity is procyclical.

b) Most of the fluctuations seen in output can be traced to fluctuations in employment.

c) The problem with using the "St. Louis equation" (a simple regression of output growth rate on money growth rate) to ascertain the effect of money on output is that output probably affects money as well.

d) Consumption varies much more than investment over the business cycle.

4 Suggestions for further work

a) Readings in Romer

- Real business cycles: Chapter 4
- Time series: Refer to notes.
- Sticky prices: Chapters 5-6 (skim)
- Monetary policy: Chapter 10

b)Problems in Romer Take a look at the problems at the end and do the ones that look like things we've talked about in class.