Economics 202a;Spring 1998

Problem Set 6

Due Thursday April 30, 1998

1. Consider a static one-period model. Suppose that the economy consists of a large number of imperfectly competitive firms. Suppose further that each firm's optimal (log) price p_i^* is given by:

   $p_i^* = p + \varphi y$

   where p is the (log) overall price level, y is the (log) level of output, and φ is the responsiveness of the firm's optimal price to shifts in total demand. Total demand in this economy is given by:

   $y = m - p$

   where m is the (log) level of the money stock. Close the model by assuming that the cost to the firm of adjusting its price is Z, and that the loss to the firm from having a price different from the optimal price is:

   $(p_i - p_i^*)^2$

   Suppose, last, that the economy starts at its flexible price equilibrium, with (log) output y, the (log) price level p, and the (log) money stock m equal to zero.

   a. Consider a situation in which m jumps suddenly from 0 to some positive level m'. What if a share of firms s (where s is between zero and one) change their prices? Defining the (log) overall price level p as the average of the (logs) of individual prices, determine p*, p, and y as functions of m' and of s.
   b. For the case $\varphi < 1$, determine a representative firm's incentive to adjust its price as a function of the share s of firms that change their prices.
   c. For the case $\varphi > 1$, determine a representative firm's incentive to adjust its price as a function of the share s of firms that change their prices.
   d. Is it possible for there to be a case in which there are two equilibria: one in which all firms adjust prices, and one in which no firms adjust prices?

1. Consider John Taylor's model with two groups of firms that stagger their price setting, and that fix prices for two periods. Suppose that the money stock follows not a random walk (as in the textbook), but instead a white-noise process: $m_t = \varepsilon_t$. Solve

the model for the overall price level and level of output as a function of current and past shocks.

3. Suppose that the economy has (log) linear IS and LM curves that are subject to disturbances:

   IS: $y = c - ai + \varepsilon_{IS}$
   LM: $m - p = hy - ki + \varepsilon_{LM}$

   Where c, a, h, and k are fixed and positive. Suppose that prices are fixed and that policy makers wish to stabilize output, but that they cannot observe the disturbances to the IS or the LM curves.

   a. Suppose that policy makers can control the interest rate i. What is the variance of output y as a function of the parameters of the model and the variances of the shocks to the IS and LM curves?
   b. Suppose that policy makers can control the money stock m. What is the variance of output y as a function of the parameters of the model and the variances of the shocks to the IS and LM curves?
   c. In the 1980s the LM curve became much more unstable—the variance of the shock to the LM curve became larger. Would this make it more likely that good stabilization policy would be based on control of interest rates, or that it would be based on control of the money stock?