

Problem on Lucas supply function model, Fischer model and effectiveness of monetary policy.

For both cases below, assume that nominal aggregate demand m has two components: $m_t = m_t^* + v_t$. m^* is set by a central bank. v evolves as a random walk:

$$v_t = v_{t-1} + u_t \text{ where } u \text{ is mean-zero i.i.d. with variance } \sigma_u^2.$$

For both the public and the central bank, $E_t[u_{t+1}] = 0$. Expectations are rational.

When the central bank follows a "passive" monetary policy, it sets $m^* = \bar{m}$ in all periods.

When the central bank follows an "active" monetary policy, it sets $m_t^* = -v_{t-1}$. This means that $m_t^* - m_{t-1}^* = -u_{t-1}$. That is, it adjusts m^* to counteract the most recently observed fluctuation in v . Don't worry if this implies that some values below, such as $E_{t-1}[m_t]$ or p_t , turn out to be zero. Remember we're in logs, so zero means one in un-logged.

1) Suppose the economy is described by the Lucas supply function model.

a) Suppose also that the central bank follows a "passive" monetary policy. Take the value of b as given.

i) What is y_t ?

ii) What is p_t ?

iii) What is the variance of y (remember, take b as given)?

b) Now suppose the central bank follows an "active" policy. Again take the value of b as given.

i) What is y_t ?

ii) What is p_t ?

iii) What is the variance of y (remember, take b as given)?

c) Now consider how b is determined. Will b be bigger, smaller or the same size if the central bank follows an active monetary policy, relative to a passive monetary policy?

d) Given your answer to c), is the variance of output bigger, smaller or the same if the central bank follows an active monetary policy rather than a passive monetary policy?

2) Suppose the economy is instead described by the Fischer model with staggering: using information from time $t-1$ "odd" pricesetters set their prices for periods t and $t+1$; using information from time $t-2$ "even" pricesetters set their prices for periods $t-1$ and t . And so on.

a) Suppose also that the central bank follows a "passive" monetary policy.

i) What is y_t ?

ii) What is p_t ?

iii) What is the variance of y ?

b) Now suppose monetary policy is active. What is y_t equal to? What is p_t equal to? What is the variance of y ?

i) What is y_t ?

ii) What is p_t ?

iii) What is the variance of y ?

c) Is the variance of output bigger, smaller or the same if the central bank follows an active monetary policy, relative to a passive monetary policy?