Economics 314 Spring 2019

Daily Problem #33 April 5

(Kind of long…)

The table below describes the dynamic price-setting framework in the Taylor fixed-price model:

t	1	2	3	4	5	6
Group A	x_1	x_1	x_3	x_3	x_5	x_5
Group B	x_0	x_2	x_2	x_4	x_4	x_6
p_t	$\frac{x_0+x_1}{2}$	$\frac{x_1+x_2}{2}$	$\frac{x_2+x_3}{2}$	$\frac{x_3+x_4}{2}$	$\frac{x_4+x_5}{2}$	$\frac{x_5+x_6}{2}$

In this model, the same price x_1 prevails in both periods of the contract established at the beginning of period 1.

The optimal price if firms had perfect information is $p_t^* = \phi m_t + (1-\phi) p_t$. They base the prices they set for each period of the contract on the best information they have as of the time the price is set. In contrast to the Fischer model (though it doesn't make a lot of difference), we assume that firms *do* know m_t when they make decisions at the beginning of period t. Thus the price x_t is based on all information through period t.

1. Recalling that ω_t is the weight assigned to period t when firms set prices dynamically, what is the pattern of ω_t, $t = 1, 2, 3, \ldots$ for Group A firms setting prices at the beginning of period one?

2. If they had perfect foresight, what price x_1 would Group A firms set at the beginning of period one? Which parts of this expression are known quantities and which are expectations?

We will assume that aggregate demand m follows a random walk: $m_t = m_{t-1} + u_t$, where u_t is "white noise," a completely unpredictable random variable with $E_{t-1}(u_t) = 0$.

3. Why do we need to assume some kind of stochastic (random) process for m?

Consider the setting of x_1, which occurs at the beginning of period 1 just after the value of m_1 is revealed.

4. Which values of m are important to the Group A price-setters when setting x_1? Why? What is their best guess of their values?

5. Which Group B prices are important to Group A price-setters when setting x_1? Why?

6. Romer derives the optimal price-setting rule for period 1 as

$x_1 = \frac{2\phi}{1+\phi} m_1 + \frac{1-\phi}{1+\phi} \tfrac{1}{2}\left(x_0 + E_1 x_2\right)$. Without worrying too much about the magnitude of the various coefficients, use your answers to 1 and 2 to justify the form of this equation.

Suppose that there is an unexpected positive shock u_1 to m_1. For simplicity, $u_t = 0$ in all other periods. The value of x_0 was set *before* the u_1 and m_1 were known, so this price cannot incorporate the information in the shock and will be "too low" given the unexpected expansion in aggregate demand.

7. Given that x_0 is set "too low," will x_1 be set in a way that fully adjusts to the shock? Why or why not?

8. If your answer to 5 is that x_1 is "too low," will x_2 also be too low? How about x_3? Will there ever be "full adjustment"?