Economics 314 Spring 2020

Daily Problem #30 April 6

Today is time zero and we are setting prices (because contracts expired, menus wore out, or our firm has decided for some other reason to set a new price this period). Because of price rigidities, we recognize that the price we set today is likely to be in effect not only in period zero, but in some future periods as well—until the next time we set prices.

The ideal price for period *t* is p_t^*, which generally varies with *t*. We usually model this as $p_t^* = \phi m_t + (1-\phi) p_t$. Our current (time zero) expectations of those ideal prices are $E_0\left(p_t^*\right)$. The price that we set today, which will persist into the future, is a weighted average of current and expected future optimal prices: $p_0 = \sum_{t=0}^{\infty} \omega_t p_t^*$ with the weights ω_t summing to one. The most important component of the weights is the probability q_t that the currently-set price will still be in effect *t* periods from now. He argues that we can approximate ω_t closely as $\omega_t = \frac{q_t}{\sum_{s=0}^{\infty} q_s}$.

1. Explain the intuition of this expression for ω_t.

2. Calculate the sequence of q_t and ω_t for each of the following scenarios:

a. The firm knows that the price it sets in period zero will be in effect for exactly two periods (0 and 1).

b. The firm knows that the price will be in effect in period zero, but there is a 50% chance that it will change price in period 1. If the firm does not change price in period one, it does so in period two.

c. The firm tosses a coin in each future period and changes price if it comes up heads, so there is a 50% probability of changing price in every future period.