

Homework 8

1. Suppose that firm i has one domestic production facility that supplies both the domestic and foreign markets. Assume that the demand for the product in the domestic market is $D_i = 2,000 - 3P_i$ and in the foreign market, demand is given by $D_i^* = 2,000 - 2P_i^*$. Assume that the domestic cost per unit of production is a constant 600. If the initial real exchange rate is 1 (i.e., set the national price levels equal to one, so $P = P^* = 1$, and assume initially $S = 1$), what are the optimal prices and quantities sold in the two markets? By how much will the firm change the relative prices of the product if the foreign currency appreciates in real terms by 10%? What happens to production?
2. Suppose the log of the exchange rate is determined as in the model we have presented:

$$s_t = (1-a)x_t + aE_t s_{t+1}, \text{ where } 0 < a < 1$$

so we can determine: $s_t = (1-a)(x_t + aE_t x_{t+1} + a^2 E_t x_{t+2} + a^3 E_t x_{t+3} + \dots) = (1-a) \sum_{j=0}^{\infty} a^j E_t x_{t+j}$

- a. Suppose $E_t x_{t+j} = x_t$ for all $j \geq 0$. That is, the fundamental variable is not expected to change. Using the model formula above, calculate s_t . Your answer should express s_t as a function of x_t .
- b. Now suppose $E_t x_{t+j} = \rho^j x_t$, for all $j \geq 0$, where $0 < \rho < 1$. That is, the fundamental variable is expected to converge to zero over time, with its persistence measured by the constant ρ . Using the model formula above, calculate s_t . Your answer should express s_t as a function of x_t .
3. Use the same model as in question 2, but now assume that $x_{t+j} = \bar{x}$ for $j = 0, 1, 2$, Starting in period 3, x is permanently higher than \bar{x} . It takes on a value of \hat{x} where $\hat{x} > \bar{x}$. That is, assume $x_{t+j} = \hat{x}$ for $j \geq 3$. Assume at all times, even at time t that investors know with certainty the path of x : that it will equal \bar{x} in periods $t, t+1, t+2$ and \hat{x} every period after that.

Solve for s_t, s_{t+1}, s_{t+2} and s_{t+3} . Your solutions should be functions only of \bar{x} and \hat{x} (and, of course, the parameter a .)

Why does the exchange rate change in periods $t+1$ and $t+2$ even though the economic fundamental does not change?