Problem Set 4 Answers

Due in Lecture on Monday, May 6th. Box in your answers to the algebraic questions.

1. Flexible price monetary model of exchange rates. Assume $\lambda = 5$.

1.1 If the money supply increases by 3% today, and stays 3% higher than it was expected to be, in all future periods, what happens to the nominal exchange rate and nominal interest rate today, and into the future? Use the present value expression of the flexible price monetary approach.

$$s_i = \left(\frac{1}{1+\lambda}\right) \sum_{r=0}^{\infty} \left(\frac{\lambda}{1+\lambda}\right)^r E_r (\hat{m}_{i+r} - \phi \hat{y}_{i+r})$$

where the circumflexes denote differences relative to the foreign country. The term in the parentheses is the same as the $\hat{M}_{i+r}$ we considered in lecture.

If all future money supplies are 3% higher than previously expected, then by substituting in, one will find that the nominal exchange rate will be 3% higher immediately.

1.2 If the money supply expected in period $t+i$ falls by $\Delta m$, for $i>2$ relative to what it was previously expected to be (and is expected to remain lower for all the future thereafter), what would immediately happen to the exchange rate today?

Use the present value expression of the flexible price monetary approach.

$$s_i = \left(\frac{1}{1+\lambda}\right) \sum_{r=0}^{\infty} \left(\frac{\lambda}{1+\lambda}\right)^r E_r (\hat{m}_{i+r} - \phi \hat{y}_{i+r})$$

where the circumflexes denote differences relative to the foreign country. The term in the parentheses is the same as the $\hat{M}_{i+r}$ we considered in lecture.

Note that if one changes the expectation of money at time $t$ by the indicated amount, then $s$ will change by:

$$\Delta s_i = \left(\frac{1}{1+\lambda}\right) \times \left[\left(\frac{\lambda}{1+\lambda}\right)^3 + \left(\frac{\lambda}{1+\lambda}\right)^4 + ... \right] \times (\Delta m).$$

We know that if the money supply increased this period (0), then the exchange rate would be higher by $\Delta m$. Since we can figure out the difference between the two as

$$\text{difference} = \left(\frac{1}{1+\lambda}\right) \times \left[\left(\frac{\lambda}{1+\lambda}\right)^0 + \left(\frac{\lambda}{1+\lambda}\right)^1 + \left(\frac{\lambda}{1+\lambda}\right)^2 \right] \times (\Delta m)$$

Then

$$\Delta s_i = \left(\frac{1}{1+\lambda}\right) \times \left[\left(\frac{\lambda}{1+\lambda}\right)^3 + \left(\frac{\lambda}{1+\lambda}\right)^4 + ... \right] \times (\Delta m) = [1 - \text{difference} / \Delta m] \times (\Delta m)$$

$$\Delta s_i = \left(\frac{1}{1+\lambda}\right) \times \left[\left(\frac{\lambda}{1+\lambda}\right)^3 + \left(\frac{\lambda}{1+\lambda}\right)^4 + ... \right] \times (\Delta m) = [1 - 0.42] \times (\Delta m) \approx 0.58 \times 0.03 = 0.0174$$
1.3 Suppose the fundamentals grow by 2% per annum. Suppose the growth rate decreases by 3%. What happens to the exchange rate, if anything, the instant the growth rate changes?

2. Sticky price monetary model of exchange rates.

2.1 Explain what happens if the monetary authority in US increases the money supply by 3 percent. In your answer, indicate the time paths of $M, P, M/P, r-r^*, s$. Use graphs.

This is just Figure 27.6(a) on page of 597 of the textbook, with the jump up in M, P-bar, M/P, and S-bar equal to 3%.

2.2 Suppose $\theta$ equals infinity. Redo 4.1.

This is just Figure 27.1(a) on page of 581 of the textbook, with the jump up in M, P-bar, M/P, and S-bar equal to 3%.