

### Problem Set 5

Due *in lecture* on Wednesday, December 15th. Be sure to put your name – as well as the name of your official TA on your problem set. Put “boxes” around your answers to the algebraic questions.

1. Chapter 15, Numerical Question #1
2. Chapter 15, Analytical Question #1.
3. Chapter 15, Analytical Question #4.
4. Consider an economy with the IS curve

$$R_t - R_t^* = -\sigma \hat{Y}_t$$

And the Taylor rule

$$r_t = \pi_t + B\hat{Y}_t + \delta(\pi_t - \pi_t^*) + R_t^*$$

Where  $B = 0.5, \delta = 0.5, \sigma = 0.75, \pi^* = 0.03, R^* = 0.02$

- 4.1 Derive the equation for the macroeconomic policy curve. **Show your work!** What is the GDP gap if inflation equals the target rate of inflation?
- 4.2. Suppose the Fed raises the target rate of inflation to 0.04. What is the effect of this policy on the Taylor rule and the macroeconomic policy curve?
- 4.3 Suppose that, because of an increase in government purchase, the equilibrium real interest rate rises to 0.03. What is the effect of this policy on the Taylor rule and the macroeconomic policy curve?
- 4.4 Using the macroeconomic policy curve you derived in 7.3, and price adjustment schedule

$$\pi_t = \pi_{t-1} + f\hat{Y}_{t-1} + Z_t$$

where  $\pi^* = 0.02, R^* = 0.03, f = 0.25$ . Trace the path of the economy by computing the values of inflation and the GDP gap for five years. You can assume the economy starts with the GDP gap  $\hat{Y}_0 = 0$  and inflation  $\pi_0 = \pi_0^* = 0.02$  (2 percent). A price shock of 3 percent occurs in the first year ( $Z_1 = 0.03$ ). No further price shocks occur ( $Z_t = 0$  for  $t > 1$ ).

5. Suppose the public uses all available information to make unbiased, but not error-free, forecasts of inflation, and can act on those forecasts in terms of setting prices (i.e., prices are not sticky). In that case, we can say that:

$$\pi_t = \pi_t^e + e_t$$

Where  $e_t$  is a forecast error whose average value is zero.

What does this relationship between inflation and expected inflation imply about the average value of the output gap? (Hint: Use the price adjustment equation).