

PROBLEM SET SEVEN SOLUTIONS

1.

a.

$$\begin{aligned} W &= P \ln(1/u) && \text{wage-setting as } z=1 \\ P &= 2 * W && \text{price-setting as } m=1 \end{aligned}$$

$$\begin{aligned} -0.5 &= \ln(u) \text{ implies } u = e^{-0.5} = 0.606 \\ Y &= (1-u)L = (1-u) = 0.393 \\ W/P &= -\ln(u) = 0.5 \end{aligned}$$

b.

$$\begin{aligned} W &= 2 * P \ln(1/u) \\ P &= 2 * W \end{aligned}$$

$$\begin{aligned} -0.25 &= \ln(u) \text{ implies } u = e^{-0.25} = 0.778 \\ Y &= (1-u) = 0.221 \\ W/P &= -\ln(u) = 0.5 \end{aligned}$$

c.

A procyclical markup (markup increases when times are good, unemployment is low) can be motivated by the existence of more competition between firms when output is low, and consequently demand is low.

$$\begin{aligned} W &= P \ln(1/u) \\ P &= (1.5 - 0.5 * u) * W \end{aligned}$$

So $u = 0.45$ is equilibrium unemployment rate (use spreadsheet or graphing calculator to calculate) $Y = 0.55$ is equilibrium output, and $W/P = 0.798$ is equilibrium real wages, so the equilibrium markup is $0.5 * (1-u) = 0.275$.

d.

$$\begin{aligned} W &= 2 * P \ln(1/u) \\ P &= (1.5 - 0.5 * u) * W \end{aligned}$$

So $u = 0.65$ is equilibrium unemployment rate, $Y = 0.35$ is equilibrium output, and $W/P = 0.861$ is equilibrium real wages, so the equilibrium markup is $0.5 * (1-u) = 0.075$.

The difference between comparative statics in the two cases is that when the markup is constant, all of the adjustment must come in the level of employment as the real wage is fixed. When real wages are flexible (as in the case of a procyclical markup) part of the adjustment comes through real wages, and so less comes through the unemployment rate.

2.

a.

$$\begin{aligned} P &= P e * z * (1+m) * \ln(1/u) && \text{plug wage-setting into price-setting} \\ P &= P e * z * (1+m) * (-1) * \ln(1-Y) && \text{note } u = 1 - N/L \text{ and } N = Y \end{aligned}$$

b.

$$1 = z * (1+m) * (-1) * \ln(1-Y)$$

The aggregate supply curve is vertical if P is on the y-axis and Y is on the x-axis.

c.

Expansionary monetary policy shifts the AD curve right, but this only raises prices. This result is in contrast to an upward-sloping AS curve, where increasing the money supply raises both output and prices in the short-run.

d.

When $P = P_e$ expansionary monetary policy shifts both wage-setting and price-setting curves (graphing the nominal wage versus the rate of unemployment) so the real wage is constant and unemployment rate unchanged. When $P < P_e$ then only the price-setting curve shifts up, causing unemployment to fall with the real wage.

The main difference between these two cases is the expectations of the workers. It should be clear that expected policy has no effect on unemployment or output, while on the other hand unexpected policy changes will affect these variables. This contrast also nicely captures differences between Keynesian and Real Business Cycle schools of thought. In the latter case, the short-run AS curve is vertical, as in the section above.