

Consider the following behavioral equations and information describing the economy:

goods market

$$C = 200 + 0.25Y_D$$

$$I = 150 + 0.25Y - 1000i$$

$$G = 250$$

$$T = 200$$

financial market

$$(M/P)^d = 2Y - 8000i$$

$$M^s = 1600$$

$$[(M/P)^s = 1600/P]$$

labor market

$$W = P^e(0.815 - 0.315u) \quad [\text{wage-setting relation}]$$

$$P = 1.25W \quad [\text{price-setting relation – i.e. 25\% mark-up on wages}]$$

$$u = (1 - Y/1050) \quad [\text{relationship linking the unemployment rate and output}]$$

a) Calculate the Aggregate Demand curve. (Derive the *IS* curve as in Chapter 5, problem 4. Derive the *LM* curve as in Chapter 5, problem 4, but treating the aggregate price level *P* as an arbitrary variable. Eliminate the interest rate as usual when equating *IS* and *LM*. Arrange the resulting expression so that *P* is alone on the left and a ratio including *Y* and some numbers is on the right.)

b) Calculate the Aggregate Supply curve. (Convert the wage-setting relation so that it depends positively on output rather than negatively on the unemployment rate. Then insert the wage-setting relation into the price-setting relation, treating the expected price level P^e as an arbitrary variable. Use up to six decimal places as necessary.)

c) Find the natural rate of unemployment and the natural level of output. (Remember that the “natural” state of the economy occurs when $P = P^e$. You should find that the natural level of output is 1000. The natural rate of unemployment will not be a round number. You can either find output first through the *AS* curve then unemployment through the linking relationship, or the unemployment rate first by equating real wages from the wage-setting and price-setting relations then output through the linking relationship.)

d) Assume that the expected price level is 1.1. Calculate the short-run equilibrium output level and price level. Is the equilibrium output level higher or lower than the natural level? Is this what you would expect? Explain. (Equate *AS* and *AD*, and solve for *Y*. This will be tedious, and will not result in a round number. You will end up having to use the quadratic formula. Use six or more decimal places in your intermediate calculations.)

e) Continue to assume that the expected price level is 1.1. Calculate the unemployment rate in the short-run equilibrium. Calculate the real wage rate that workers expect to earn, and calculate the real wage rate that is actually paid.

f) Repeat parts d) and e), this time assuming that the expected price level is 0.9.

g) Explain how, over the medium run, the economy will converge to its natural state, starting either from part d) or part f). Calculate the price level and the real wage rate in the natural state.