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**14.02 Principles of Macroeconomics**  
**Problem Set 3**  
**Fall 2005**

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Posted: Wednesday, October 12, 2005

Due: Wednesday, October 19, 2005

Please write your name AND your TA's name on your problem set. Thanks!

**Exercise I. True/False? Explain**

- 1) "Unemployment rate" and "nonemployment rate" are synonyms.
- 2) When we formalize the price setting relation as  $P = (1 + \mu)W$ , we implicitly assume that the reservation wage of the workers is such that  
$$\text{reservation wage} \leq \frac{P}{(1 + \mu)}.$$
- 3) In an economy where product markets are not perfectly competitive (that is firms can charge prices higher than the marginal cost), it is always optimal for a profit maximizing firm to choose a combination of price  $P$  and markup  $\mu$  such that  
$$\frac{P}{(1 + \mu)} = W = \text{reservation wage}.$$
- 4) An increase in the workers bargaining power leads to an increase in the equilibrium nominal wage; however the equilibrium real wage stays constant.
- 5) The natural level of unemployment determines a natural level of output that always corresponds to the IS-LM equilibrium  $Y$ .
- 6) The aggregate demand curve represents at the same time the demand for goods, money and labor in the economy.
- 7) In the medium run the paradox of saving disappears.
- 8) In the medium run monetary and fiscal policies are neutral.
- 9) In the AS-AD model, higher competition among producers leads to a medium run equilibrium with higher output, lower interest rate, and lower price level.
- 10) In the AS-AD model, lower bargaining power for workers in the market of labor leads to a medium run equilibrium with higher income, lower interest rate, and lower price level.

## Exercise II. AS-AD Model

Assume that the following is true about the economy:

$$C = 70 + 0.1(Y - T)$$

$$I = 40 - 200i + 0.1Y$$

$$G = 100$$

$$T = 100$$

$$M^d = \$Y(0.4 - i)$$

$$M^s = 80$$

Assume the following wage setting relation:

$$W = P^e(z - 30u) \text{ where}$$

$z = \frac{140}{13}$  is a parameter that represents the workers bargaining power and  $u$  is the

unemployment rate.

The following is the price setting relation

$$P = (1 + \mu)W \text{ where}$$

$\mu = 0.3$  is the markup.

The economy production function is:

$$Y = N$$

The labor force is

$$L = 300.$$

- 1) Derive the AS relation and graph the AS curve.
- 2) Derive the AD relation and graph the AD curve.
- 3) Calculate and graph the medium run equilibrium.
- 4) Imagine an expansionary monetary policy such that  $\Delta M^s = 80$ , that is the money supply increases by 80, from 80 to 160.  
Assume two different scenarios:
  - a)  $P^e \neq P$  (Expectations can differ from the actual price level in the short run);
  - b)  $P^e = P$  (Expectations are always equal to the actual price level).Describe the short run equilibriums in both scenarios – you need to do calculations only for b).
- 5) Show the dynamics to the medium run equilibrium in both scenarios, using diagrams with explanations. Conclude by explaining how the effects of the monetary policy depend on the expectation formation process.
- 6) Assume that the medium run equilibrium you calculated in part 3) is perturbed by a shock that dramatically increases  $\mu$  by 1.3, to a value of 1.6. Calculate the new medium run equilibrium. How can the government and the central bank restore the pre-shock medium run equilibrium you calculated in part 3)?