

METU Department of Economics

ECON202 Macroeconomic Theory I (Sec. 2)

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PROBLEM SET 5

PART A: TRUE/FALSE

- 1) “Unemployment rate” and “nonemployment rate” are synonyms.
- 2) 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 μ such that $\frac{P}{1+\mu} = W$ reservation wage
- 3) An increase in the workers bargaining power leads to an increase in the equilibrium nominal wage; however the equilibrium real wage stays constant
- 4) When output is below the natural level of output, the actual price level is lower than the expected price level.
- 5) In terms of changing output, monetary policy is relatively more effective in the short run when the AS curve is relatively flat, while fiscal policy is more effective when the AS curve is relatively steep.
- 6) The neutrality of money suggest that monetary policy should not be conducted to affect output.
- 7) The AD curve is the sum of all the market demand curves in the economy.
- 8) The greater the interest sensitivity of investment, the flatter the aggregate demand curve.
- 9) In the medium run monetary and fiscal policies are neutral.

PART B: LONG QUESTIONS

- 1) Suppose that firm's mark-up over costs is 20%, and the bargaining function is given by $F(u, z) = z - 180u$, where $z = 90$, and u is the unemployment rate.
- a) What is the real wage as determined by the price – setting equation?
 - b) What is the natural rate of unemployment?
 - c) Suppose that the mark – up of prices over costs decreases by 10%. What happens to the natural rate? Explain the logic behind your answer.
 - d) Suppose the labor productivity coefficient is 120, and the labor force is normalized to one. Calculate the natural levels of output implied by parts (b) and (c)

- 2) Suppose that the labor market is described by the following equations

$$W = P * z * (1-u)/u$$

$$P = (1 + \mu) * W$$

$$Y = N$$

Here z is the variable catching institutional effects on wage setting, such as unemployment benefits, W is the mark – up of prices over wages.

- a) Assume initially that $z = 1$. Solve for the equilibrium real wage, unemployment and output.
- b) The government decides to increase unemployment benefits. This results in z increasing to 2. Solve for the new equilibrium real wage, unemployment and output.
- c) Suppose that the mark-up rate, instead of being fixed, depends on the unemployment rate. The new mark-up rate is given by $\mu = \frac{1-u}{2}$. Solve for the equilibrium output, natural level of unemployment and real wage. In addition, compare the effect of increase in z to unemployment rate in a and b.

3) Suppose Mervia, a closed economy, is defined by the following equations:

$$C = 20 + 0.5Y_d$$

$$I = 120 - 4i$$

$$M_d = P(254.5 + 0.6Y - 6i)$$

$$M_s = 220$$

$$Y_{\text{potential}} = 150$$

$$G = G_0$$

$$T = 0$$

where i is the interest rate (percent), P is the price level (index number), Y is GDP and $Y_{\text{potential}}$ is the GDP level attained at the natural rate of unemployment.

a) Derive the Aggregate Demand curve of Mervia

b) The Aggregate Supply curve of Antarctica is given by: $P = P^e + \frac{1}{100}(Y - Y_{\text{potential}})$ where P^e is the expected price level. Briefly explain, using economic intuition, why the overall price index, P , depends on P^e and $(Y - Y_{\text{potential}})$. When $P = 1$ and $G_0 = 0$, calculate the value of P^e and Y .

c) Suppose that there is a high rate of unemployment in Mervia. To convince people to remain in this paradise, the government decides to attain $Y_{\text{potential}}$ through monetary and/or fiscal policies. What will the overall price level be if the government is successful in attaining $Y_{\text{potential}}$? (Use P^e from above).

- 4) Consider the closed economy IS/LM – AS/AD model covered in class. You may find it useful to draw out these graphs in answering the equations, but they are not necessary for the solution.

$$IS: Y = C(Y - T) + I(Y, i) + G$$

$$LM: \frac{MS}{P} = Md(i, Y)$$

$$AS: P = PeF(u, z)[1 + m]$$

Investment has initial value I_0 . Output is initially at the natural level Y^n . Consider an increase in government spending $\Delta G > 0$. Assume for now that both price and expected price are fixed. Also assume throughout that government does not implement any other policy than what is stated.

- a) Denote the resulting investment level I_1 . How does I_1 compare to I_0 ?

Now assume that price is flexible, but expected price is still fixed.

- b) How does price P compare with initial value?
- c) How does real money demand M^d compare with initial value?
- d) Denote the resulting investment level I_2 . How does I_2 compare to I_1 ?
- 5) Starting from the wage setting relation and the price setting relation, derive an expression for aggregate supply. Make sure you clearly explain each steps in derivation.
- 6) A new source of energy has been discovered in Macronesia. This new technology will reduce the costs of production of macronesian firms, and as a consequence will reduce the mark-up of price over wage charged by firms. (The change in the mark-up is the only way in which the new technology affects the economy.)

As the finance minister of Macronesia, you would like to analyze the impact of this shock on the economy. Answer the following questions:

- a) In the AS-AD set up, the reduction in production costs shifts which curve, the AS or the AD? How? Explain in words.
- b) What happens in the short-run? Show in a graph and describe the effect on the price and the level of output.

- c)** What happens in the medium run?
- d)** Describe the adjustment from the initial equilibrium towards the medium-run. Show in the graph.
- e)** Compare the composition of spending (consumption, investment, and government
- f)** Suppose now that after the initial discovery, you as finance minister would like to accelerate the transition to the medium run by using fiscal or monetary policies. What kind of policies would you recommend? Can you stabilize the economy to its new medium run equilibrium level of output and keep prices constant at the initial level? Show in a graph.
- g)** Suppose that you achieved the objective in part (f) by changing government spending. What can you say about the new composition of spending (consumption, investment and government spending)?
- h)** Compare the composition of spending (Y , C , I , G) and the interest rate in parts (c) and (g).

7) 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: $W = P^e (z - 30u)$ where $z = \frac{140}{13}$ z : a parameter that represents the workers bargaining power and u is the unemployment rate.

The price setting relation: $P = (1 + \mu) W$ where $\mu = 0.3$ is the markup.

The economy production function: $Y = N$

The labor force: $L = 300$.

- a) Derive the AS relation and graph the AS curve.
- b) Derive the AD relation and graph the AD curve.
- c) Calculate and graph the medium run equilibrium.
- d) Imagine an expansionary monetary policy such that $\Delta = 80$ M_s , that is the money supply increases by 80, from 80 to 160. Assume two different scenarios:
 - $P^e \neq P$ (Expectations can differ from the actual price level in the short run);
 - $P^e = P$ (Expectations are always equal to the actual price level).Describe the short run equilibriums in both scenarios – you need to do calculations only for the second case which is given $P^e = P$.