

14.02 Principles of Macroeconomics

Problem Set #5, Questions

Posted: Wednesday, November 19, 2003

Due Date: Wednesday, November 26, 2003

Part I: True/False

Decide whether each of the following statement is true or false, and justify your answer with a short argument.

1. Monetary policy is neutral in the medium run, but fiscal policy is not.

True. In the medium run changes in the money supply affect only the price level. Changes in fiscal policy affect the composition of aggregate demand through changes in the real interest rate.

2. The aggregate supply relation is consistent with the Phillips curve as observed before the 70's, but not since.

True, since the 70's it is an augmented Phillips curve that is consistent with the data. The traditional Phillips curve depicts a negative relationship between the rate of inflation and the rate of unemployment. The augmented Phillips curve depicts a negative relationship between the change in the rate of inflation and the rate of unemployment.

3. As long as we do not mind having high inflation, we can achieve as low a level of unemployment as we want. All we have to do is increase the demand for goods and services by using for example expansionary fiscal policy.

False. The expectations-augmented Phillips curve implies that maintaining a rate of unemployment below the natural rate requires increasing (not simply high) inflation. This is because inflation expectations continue to adjust to actual inflation.

4. There is a reliable negative relation between the rate of inflation and the growth rate of output.

False there is no direct relationship between inflation and output growth. There is a direct relationship between the change in inflation and the unemployment rate (Phillips curve) and a direct relationship between changes in the unemployment rate and the growth rate of output.

- In the medium run, the rate of inflation is equal to the rate of nominal money growth.

False: in the medium run the rate of nominal money growth is equal to the sum of the rate of inflation and the rate of output growth.

Part II: The Phillips curve

Suppose the Phillips curve is given by (all units are in percentage points):

$$\pi_t = \pi_t^e + 7.5 - 1.25u_t$$

$$\pi_t^e = \theta\pi_{t-1}$$

Assume that in period $t-1$, the unemployment rate is equal to the natural rate and the inflation rate is zero.

- What is the natural rate of unemployment in the economy?

In the medium run inflation is equal to expected inflation. The natural rate of unemployment is equal to 6%.

- Suppose that beginning in period t , the authorities bring the unemployment rate down to 5% and keep it there indefinitely. Determine the rate of inflation in period $t+1$, $t+2$, $t+3$ when $\theta=0$. Then do the same for $\theta=1$.

When $\theta=0$, the authorities must bring inflation to 1.25% for ever if they want to reduce unemployment to 5%. When $\theta=1$, inflation must be equal to 1.25% at $t+1$, to 2.5% at $t+2$, 3.75% at $t+3$...

- For which of the two values of θ does $u_t < u_n$ imply an acceleration of the price level?

When $\theta=1$, keeping unemployment below the its natural level necessitates an acceleration of inflation. When expectations do not adjust ($\theta=0$), increasing inflation once and for all is enough to reduce unemployment.

- Suppose the authorities do not know what the natural rate of unemployment is. Can they find out what it is, how?

When $\theta=1$ (expectations are adaptive), the natural rate of unemployment corresponds to a constant rate of inflation: this is the NAIRU. When unemployment drops below the NAIRU, inflation accelerates; when unemployment goes above the NAIRU, inflation decelerates.

- Assume that half of the workers sign indexed labor contracts (as in Blanchard p. 175). Redo point 2 under this assumption.

When half of the workers sign indexed wage contracts, the dynamics of inflation are given by:

$$\pi_t = \frac{1}{2}\pi_t + \frac{1}{2}\pi_t^e - 1.25(u_n - u_t)$$

When $\theta=0$, 0, the authorities must bring inflation to 2.5% for ever if they want to reduce unemployment to 5%. When $\theta=1$, inflation must be equal to 2.5% at $t+1$, to 5% at $t+2$, 7.5% at $t+3$...

6. Compare your answer in 2. and 5. What does indexing imply about the impact of maintaining the unemployment rate below the natural rate?

When part of the wages is indexed there is a stronger reaction of inflation to unemployment. Maintaining a low level of unemployment through monetary policy becomes harder.

Part III: The AS-AD in an open economy.

Consider the aggregate demand in an open economy with fixed exchange rate.

$$Y = C(Y - T) + I(Y, i^* - \pi^e) + G + NX\left(Y, Y^*, \frac{E}{P}P^*\right)$$

1. Given the domestic price level, explain the effects of an increase in the foreign price level.

An increase in the foreign price level causes a real depreciation, which leads to an increase in demand and output.

2. Given the domestic price level, explain the effects of an increase in the expected inflation.

An increase in expected inflation causes a decrease in the real interest rate, which leads to an increase in demand and output

3. Now the aggregate supply is

$$P_t = P_{t-1} (1 + \mu)F\left(1 - \frac{Y_t}{L}, z\right)$$

Assume the economy is initially in the medium run equilibrium. Describe the short run and medium run effects on an increase in G on output, the real exchange rate, and the interest rate...

In the short run, output increases, the real exchange rate does not change, and the nominal interest rate does not change (it remains equal to the world interest rate under fixed exchange rates). In the medium run, output returns to its natural level, the real exchange rate appreciates, and the nominal interest rate remains unchanged.

4. ... on consumption, investment and net exports.

In the short run, consumption and investment increase, but net exports fall. In the medium run, consumption and investment returns to their original levels, since output returns to its natural level and the interest rate is unchanged. Net exports fall by an amount equal to the increase in government spending.

5. Do budget deficit lead to trade deficit?

Budget deficits do lead to trade deficits, but not mechanically. Changes in the budget deficit lead to changes in output and the real exchange rate, both of which affect the trade deficit directly.