14.02 Principles of Macroeconomics

Problem Set 5 Solutions

Fall 2017

Question 1 (Chapter 9)

Remember that the medium run equilibrium is characterized by these four conditions:

- Output equals its potential level
$$Y = Y^n$$
- Unemployment rate equals the natural rate
$$u = u_n$$
- The real policy interest rate is equal to the natural rate of interest r_n when aggregate demand equals Y^n
- The expected rate of inflation π^e is equal to the actual rate of inflation π

(a)

If the level of expected inflation is formed so that $\pi^e = \pi_{t-1}$, that is, previous year inflation, find the level of inflation π_t consistent with a medium run equilibrium.

(b)

If the level of expected inflation is $\bar{\pi}$, what is π_t in the medium-run equilibrium?

(c)

Write the IS relation as:
$$Y = C(Y - T) + I(r + x, Y) + G$$
Suppose $r_n = 2\%$. If the risk premium increases from 3% to 5%, how must the Central Bank change r_n to maintain output at the natural level in the existing medium-run equilibrium?

(d)

Suppose G increases. In what direction must the Central Bank change r_n to maintain output at its natural level?

(e)

Discuss whether the following statement is true: In the medium run, a fiscal expansion leads to an increase in the natural rate of interest.

Question 2 (Chapter 17 - ?)

Consider two bonds, one issued in euros (€) in Italy and one issued in dollars ($) in the U.S. Assume that both government securities are one-year bonds—paying the face value of the bond one year from now. The exchange rate, E, stands at 0.75 euros per dollar.

The face value of the U.S. bond is $10,000. The face value of the Italian bond is €10,000. The price of the U.S. bond is $9,615.38. The price of the Italian bond is €9,433.96.

(a)

Compute the nominal interest rate on each of the bonds.

(b)

Compute the expected exchange rate next year consistent with uncovered interest parity.

(c)

If you expect the dollar to depreciate relative to the euro, relative to the current exchange rate, which bond should you buy?

(d)

Assume that you are a U.S. investor and you exchange dollars for euros at time t at the current exchange rate $E_t = 0.75$, and purchase the Italian bond today. For this subpoint, assume that the exchange rate realization at $t + 1$ is actually $E_{t+1} = 0.72$ euros per dollar. What is your realized rate of return in dollars compared to the realized rate of return you would have made had you held the U.S. bond?

(e)

Are the differences in rates of return in (d) consistent with the uncovered interest parity condition? Why or why not?

Question 3 (Chapter 17 - ?)

Consider an open economy of the type described in Chapter 17. Suppose the domestic currency depreciates (E falls). Assume that P and $P^\star$ remain constant.

(a)

How does the nominal depreciation affect the relative price of domestic goods (i.e., the real exchange rate)? Given your answer, what effect would a nominal depreciation likely have on (world) demand for domestic goods? What about the domestic unemployment rate?

(b)

Given the foreign price level, $P^\star$, what is the price of foreign goods in terms of domestic currency? How does a nominal depreciation affect the price of foreign goods in terms of domestic currency? How does a nominal depreciation affect the domestic consumer price index?

[Hint: Remember that domestic consumers buy foreign goods (imports) as well as domestic goods. Assume that the change in prices does not affect the weight assigned to each type of goods in computing the price index. In what follows, denote the weight on domestic goods with α and on foreign goods by $1 - \alpha$.]

(c)

If the nominal wage remains constant, how does a nominal depreciation affect the real wage?

(d)

Briefly comment on the following statement: "A depreciating currency puts domestic labor on sale."