14.02 Principles of Macroeconomics
Spring 2014
Problem Set 4
Due: April 18, 2014

1 Phillips curve (35 pts)

Consider the framework of chapter 7, with a wage-setting relation given by

$$W_t = P_t^e (1 - \alpha u_t + z)$$

where W is the nominal wage, P^e the expected price level, u represents the unemployment rate and z captures unemployment benefits. Consider the standard price-setting relation

$$P = (1 + m)W$$

where m denotes the mark-up.

1. State the AS equation for this economy. [4 pts.]

2. . Let $\pi_t = (P_t/P_{t-1}) - 1$ and $\pi_t^e = (P_t^e/P_{t-1}) - 1$.
(a) Show, step by step, how you can derive the following equation from the AS relation [6 pts.]
$$\pi_t = \pi_t^e - \alpha u_t + (m + z) \tag{1}$$

(b) If you used any approximations to derive this equation from the AS relation, state them and also discuss which assumptions are required in order for them to work. [2 pts.]

3. Given expected inflation and unemployment, what is the effect of increasing unemployment benefits z in period t on the inflation rate in period t, π_t? Explain both intuitively and analytically (i.e. with algebra). [6 pts.]

4. Show that you can eliminate m and z from equation (1) and express it as

$$\pi_t = \pi_t^e - \alpha(u_t - u_n)$$

where u_n is the natural rate of unemployment. [6 pts.]

5. What is the value of u_n in this economy? [2 pts.]

6. Suppose that expectations of inflation are formed according to the rule

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

Explain briefly in word what this equation means. [2 pts.]

7. Can a single value of θ be used to account for the observed pattern of inflation and unemployment in the U.S. between 1950 and 2000? [7 pts.]

2 Uncovered interest rate parity (35 pts.)

1. UK bond is demoninated in british pounds, and US bond is denominated in dollars. For both 1-year US and UK bonds, the interest rate is 2%. The yield to maturity in 2 year bonds is 4% in the UK and 2% in the US. Suppose now that the exchange rate is 1.7 dollars per pound.

(a). What is the value of expected exchange rate at the end of the first year? (7 pts)

(b). What is the value of expected exchange rate at the end of the second year? (7 pts)

2. Currently the interest rates on one year Spanish bonds and German bonds are 6%, and 1%, respectively. Spain and Germany share the same currency (i.e. Euro).

(a). Suppose that the individuals believe that Spain will remain in the Euro Area but there is risk that it can default on its debt. What is the default risk premium that Spain is paying? (7 pts)

(b). Suppose that individuals believe that Spain will honor its debt using a different currency, Pesetas. Suppose that the exchange rate today is 1 Peseta per Euro. Given the interest rate differential, what is the expected exchange rate between Peseta and Euro in one year. (7 pts)

(c). In light of your answers, can you always interpret interest rate differential as having the same sign as expected depreciation? (7 pts)

3 The goods market in the Open Economy (10 pts)

Consider a small open economy with its exchange rate pegged to the US dollar. According to the UIP condition, its interest rate is equal to the interest rate in

the US, which is taken as exogenous. Government spending is equal to G. The following equations characterize the economy's other variables.

$$C = c_0 + c_1(Y - T)$$

$$I = d_0 + d_1 Y - d_2 r$$

$$IM = m_1 Y - m_2 r$$

$$X = x_1 Y^*$$

Find the equilibrium output in this economy. How does equilibrium output change when foreign output increases? What is the effect of an increase in government spending? Suppose that government spending is given by a budget balanced rule $G = T = tY$. Find the equilibrium output. What is the effect of lowering (tax rate) t on equilibrium output.

4   The trilemma (20 pts)

Suppose that a small open economy has its exchange rate pegged to the US dollar. The IS and the LM are given by $Y = C(Y-T)+I(Y,i)+G+NX(Y,Y^*,E)$ (with Y, T, i, G, Y^*, E output, taxes, nominal interest rate, government spending, foreign output and the nominal exchange rate, respectively) and $\frac{M}{P} = YL(i)$. Use the IS-LM-UIP diagrams to answer the following questions.

1. There is perfect capital mobility and the public fully trust the exchange rate regime. Is monetary policy effective? (5pts)

2. Suppose now that the government can control who buys and sells foreign currency. Does the UIP holds? Does money supply a ect the domestic interest rate? (5pts)

3. Suppose that the government does not fix the exchange rate. Does an increase in money supply affect the interest rate? (5pts)

4. Is it possible to have simultaneously effective monetary policy, perfect capital mobility, and fixed exchange rate? (5pts)

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