

Problem Set 4: Expectations, Macroeconomic Policy, Exchange Rates and Interest Rate Parity

Answer all the parts of the questions separately giving your reasons for your answer.

1. The purpose of this question is to highlight the sensitivity of the Policy Ineffectiveness Proposition to the nature of the rigidities on the supply and demand side of the economy and to the information available to the private sector and to the government respectively.

Consider the sticky wage model of Aggregate Supply and suppose that wage contracts are set simultaneously throughout the economy and they last two periods (the nominal wage may be different in each period of the contract). Workers have rational expectations, so that they use all available information (including the structure of the economy) in forming their expectations of the future price level.

Recall that the Lucas' surprise supply function can be written as:

$$Y = \bar{Y} + \alpha(P - P^e) \quad (1)$$

Suppose that potential GDP, $\bar{Y} = 0$. The supply function for the economy during the first half of the contract is thus given of the form $Y = \alpha(P - P^e)$, with P^e being the best available estimate of the price level given information available at the start of the period. The supply function for the second half of the contract is then also of the form $Y = \alpha(P - P^e)$, but P^e is now based on information that is a period out of date.

Now consider Aggregate Demand. Suppose that the Aggregate Demand curve is given by $Y = A + e\frac{M}{P}$, where A is subject to random fluctuations. You can think of this as just a reformulation of the Quantity Equation presented in lecture notes, or a shortened form of the Aggregate Demand equation that was derived in lecture notes and used in problem set 3.

For the questions below, try and determine if the answer is yes or no and provide your reasoning.

- (a) During the first half of the life of the contract, is there scope for stabilization policy:
- (i) if the authorities observe the current value of A;
 - (ii) if they only observe A with one period delay?
- (b) During the second half of the life of the contract, is there scope for stabilization policy:
- (i) if the authorities observe the current value of A;
 - (ii) if they only observe A with a one-period delay and fluctuations in A are not generally correlated over time (that is the value in A in any period is independent of its value in the previous period);
 - (iii) if they only observe A with a one period delay and fluctuations in A are correlated over time (the value of A in any period is related to its value in the previous period)?

[Hint: For each part above, try to think about what information the government has relative to the workers who formed expectations about prices in advance. It may help you to draw out a timeline to show when price expectations are being set, when shocks occur and when the government could do something about offsetting any shocks that hit the economy (based on the information that they have)].

2. Consider an economy described by the following equations:

$$Y = C + I + G + NX$$

$$Y = 5000; G = 1000; T = 1000$$

$$C = 250 + 0.75(Y - T)$$

$$I = 1000 - 50r$$

$$NX = 500 - 500\varepsilon$$

$$r = r^* = 5$$

- a. In this economy, solve for national saving, investment, the trade balance, and the equilibrium exchange rate.
 - b. Suppose now that G rises to 1250. Solve for national saving, investment, the trade balance, and the equilibrium exchange rate. Explain what you find.
 - c. Now suppose that the world interest rate rises from 5 to 10 percent. (G is again 1000). Solve for national saving, investment, the trade balance, and the equilibrium exchange rate. Explain what you find.
3. The Mundell-Fleming model takes the world interest rate, r^* as an exogenous variable. Lets consider what happens when this variable changes.
- a. What might cause the world interest rate to rise?
 - b. In the Mundell-Fleming model with a floating exchange rate, what happens to aggregate income, the exchange rate, and the trade balance when the world interest rate rises?
 - c. In the Mundell-Fleming model with a fixed exchange rate, what happens to aggregate income, the exchange rate, and the trade balance when the world interest rate rises?
4. Suppose that higher income implies higher imports and thus lower net exports. That is, the net exports function is:

$$NX = NX(e, Y)$$

Examine the effects in a small open economy of a fiscal expansion on income and the trade balance under:

- a. A floating exchange rate
- b. A fixed exchange rate

5. Suppose quotes for the dollar-euro exchange rate, $E_{\$/\text{€}}$ are as follows: in New York \$1.50 per euro, and in Tokyo \$1.55 per euro. [Note that this is different from the exchange rate used in the lecture notes since here we are defining the exchange rate as the domestic price of foreign currency instead of the lecture notes where it was the foreign price of domestic currency].

- (a) Describe how investors use arbitrage to take advantage of the difference in exchange rates.
- (b) Explain how this process will affect the dollar price of the euro in New York and Tokyo.

Now suppose that we use the dollar-euro exchange rate, $E_{\$/\text{€}}$ quoted by New York banks as the current spot rate. Furthermore, assume that investors in the market expect the dollar-euro exchange rate to be \$1.60 per euro a year from now. In addition, interest rates in the US are at 2% and interest rates in Germany are at 5%.

- (c) What should happen to the dollar-euro exchange rate? Is the dollar expected to appreciate or depreciate? [Hint use the idea behind interest parity to determine what should happen to the exchange rate.]