Midterm Exam #2: 14.02

Fall 1999

Answers

Question 1 True, False or Uncertain? Explain your answers in at most 5 sentences. (5 points each)

a) Governments do not like running expansionary fiscal policies in open economies, because they fear that other countries will also retaliate with expansionary steps and the entire positive effect will be dissipated.

FALSE. Governments do not like running expansionary fiscal policies in open economies, because they fear trade deficits. On the other hand, they would applaud other countries' expansions because their positive effects are shared at home and abroad.

b) A country with a fixed exchange rate has a higher interest rate than the foreign country (to whose currency it is pegging). Under perfect capital markets this reflects a more contractionary monetary policy at home.

FALSE. If the exchange rate is credible, then this situation cannot happen under perfect capital markets. So it must be the case that the exchange rate regime is not credible. If a future devaluation is expected, then domestic interest rates will be higher than foreign interest rates. But it is of no indication about monetary policy in the home country (which is basically nonexistent). (Note: full credit was already given for saying that the two interest rates should be equal.)

Question 2 (20 points total)

Consider an open economy goods market described by the following equations. Let e denote the real exchange rate, G describes government spending, T represents lump-sum taxes, Y and Y^* are domestic and foreign output, C is consumption, I is investment, X is exports, Q is imports, and r the interest rate. All parameters are strictly positive. Demand for domestic goods is denoted by ZZ.

$$C = c_0 + c_1(Y - T)$$
$$I = i_0 + i_1 Y - i_2 r$$
$$X = x_0 + x_1 Y^* + x_2 e$$
$$eQ = q_0 + q_1 Y - q_2 e$$

a) (3 points) Solve for equilibrium output.

$Y = \frac{c_0 - c_1 T + i_0 - i_2 * r + G + x_0 + x_1 * Y^* - q_0 + (x_2 + q_2) * e}{1 - c_1 - i_1 + q_1}$

b) (8 points) Solve for the change in each of output, consumption, and the trade balance that would be generated by a real appreciation of size Δe (keeping Y^* fixed). Indicate the actual sign of each change. Illustrate the effects on output and trade balance in (ZZ,Y) and (NX,Y) spaces, respectively.

Answer

Simply use the expression for equilibrium output and the behavioral equations for consumption and net exports to sign these comparative statics.

$\Delta Y = \frac{(x_2 + q_2)\Delta e}{1 - c_1 - i_1 + q_1}$

$\Delta C = c_1 \Delta Y = \frac{c_1 * (x_2 + q_2)\Delta e}{1 - c_1 - i_1 + q_1}$

$\Delta NX = (x_2 + q_2)\Delta e - q_1 \Delta Y = (x_2 + q_2)\Delta e - \frac{q_1 * (x_2 + q_2)\Delta e}{1 - c_1 - i_1 + q_1} = (x_2 + q_2)\Delta e \left[\frac{1 - c_1 - i_1}{1 - c_1 - i_1 + q_1}\right]$

The change in each of output, consumption, and net exports will have the same sign as the change in real exchange rate, which is negative. In (ZZ,Y) space the ZZ curve shifts down as net exports deteriorate in response to the appreciation, holding output constant, while the DD curve is constant. This creates an excess supply of domestic goods, corrected by lower output in equilibrium. As the ZZ and DD curves have a new intersection, the net exports schedule in (NX,Y) space also shifts to the left as the trade balance worsens holding income constant. The lower income offsets part of this worsening, but not enough for the trade balance to worsen at the end of the day.

c) (2 points) Assume there is no difference between the current account and trade balance. Briefly explain how this country is financing its change in trade balance.

The country is financing its trade deficit by permitting foreigners to accumulate more domestic assets (by directly selling domestic assets to foreigners or by borrowing from them) or by reducing ownership of foreign assets (by selling foreign assets to foreigners or by lending less to them).

d) (7 points) What is the change in lump-sum taxes that completely reverses the effects of appreciation on output? Show the effects of this policy on each of the trade and budget deficits.

Answer

Use the fact that the change in output is zero with the equilibrium condition above to solve for the appropriate change in lump-sum taxes.

$\Delta Y = \frac{-c_1 \Delta T + (x_2 + q_2)\Delta e}{1 - c_1 - i_1 + q_1} = 0$

$\Delta T = \frac{(x_2 + q_2)\Delta e}{c_1}$

Next use the equations for trade and budget deficits to solve for the final solutions.

$\Delta NX = (x_2 + q_2)\Delta e - q_1 \Delta Y = (x_2 + q_2)\Delta e$

$\Delta(G - T) = -\Delta T = \frac{-(x_2 + q_2)\Delta e}{c_1}$

While the policy reverses the effects of the appreciation on output, this is done by increasing the budget deficit, and the trade balance has actually become worse as lower output previously moderated the effects of the appreciation on the trade balance.

Question 3 (20 points total)

Suppose that an open economy is described by the following equations:

$$Y = C(Y - T) + I(Y, i) + G + NX(Y, Y^*, E)$$
$$M/P = YL(i)$$
$$i = i^* + \frac{E^e - E}{E}$$

The exchange rate is flexible, and it is initially equal to the expected exchange rate.

a) (5 points) Specify and graph the open economy IS and LM curves in the (i,Y) space. Are they steeper or flatter than their closed economy counterparts? What if only the goods market is open?

The IS curve in the (i,Y) space can be obtained by expressing E in terms of i^* and E^e from the interest parity equation and plugging that into net exports:

$Y = C(Y - T) + I(Y, i) + G + NX(Y, Y^*, \frac{E^e}{1 + i - i^*})$.

In terms of its graph, it is downward-sloping (both effects of an interest rate rise are contractionary). The LM curve is simply the middle equation from above, upward-sloping.

There is no difference in terms of the LM curve. There is, though, in terms of the IS. When there is a drop in the interest rate, that implies an increase in investment given Y. As the closed economy multiplier is larger than the open goods market multiplier (with the exchange rate constant), it translates into a larger

total output increase in the closed economy. This means that the closed economy IS curve is flatter (more responsive to the interest rate) than the open goods market IS.

When we open up financial markets as well, the same interest rate rise will have an extra effect: from $E = \frac{E^e}{1+i-i^*}$, we see that E will rise and that will improve net exports. So output will respond more to the same interest rate drop – the entirely open economy IS is flatter than the open goods market IS. We cannot, however, compare the fully open and the fully closed cases: there is one factor pointing to steepening, and another to flattening.. It depends on the sensitivity of net exorts to output and the exchange rate.

b) (6 points) Graph the effect of a *fiscal* expansion on domestic production. Can you determine what happens to investment and net exports? Are the effects smaller or larger than with fixed exchange rates?

The IS curve shifts out. So output and the interest rate rises. This means that the effect on investment is ambiguous. For net exports, the increase in output causes a drop, and the rise of the interest rate causes E to decline, which worsens net exports further on.

With fixed exchange rates, the interest rate stays constant: so the same shift of IS causes a higher increase of output. Investment increases for sure, since there is no negative effect through interest rates. Hence it increases more than with flexible exchange rates. For net exports, the higher output increase causes more worsening, but we do not get the extra worsening from the appreciation – so this comparison is ambiguous.

c) (9 points) Graph the effect of a *monetary* expansion on domestic production. Can you determine what happens to investment and net exports? Are the effects smaller or larger than with fixed exchange rates? Would the effect on output be smaller or larger under capital control (i.e., closed financial markets – meaning that E remains the same, but the interest parity condition no longer holds)? Interpret.

Now it is LM that shifts out, causing output to rise and the interest rate to drop. So investment increases. For net exports, we have the negative effect from higher output, and the positive effect from lower interest rates (thus, a depreciation of the currency).

With fixed exchange rates, the interest rate is fixed, so whatever monetary expansion the central bank tries to implement, it will be 100% undone by the market (giving back the extra money to the central bank in exchange for its reserves). So no effect at all.

With capital controls, the IS curve is steeper, so the same shift of the LM curve leads to a smaller increase of output. A potential interpretation is that the drop in the interest rate leads to a depreciation under fully open markets, and that improves net exports, which generates an extra expansionary effect. This effect will be missing with capital controls.