

The Is-LM model in the open economy

Exercises

Economics II – Week 2

Lecturer: dr. Andrea Venegoni

Exercise 4:

Let's consider an economy operating in a fixed exchange rates regime. Assume a contractionary fiscal policy, consisting in a government public expenditure cut.

- What effect does this have on the exchange rate? How does the central bank should intervene to restore the medium run equilibrium?
- How investment (I), consumption (C) and net exports (NX) vary?

Solutions

A contractionary fiscal policy, such as a public expenditure cut ($G \downarrow$) provokes a diminution in the aggregate demand and finally in the income.

The decrease in income causes the breaking of the equilibrium in the financial markets as the money demand, which is positive function in the income, drops ($M^d \downarrow < M^s$), leading people to buy bonds and so making the bond price increase and the interest rate drop.

So the final effects of such a government intervention on the IS-LM equilibrium will be: $\Delta Y < 0$; $\Delta i < 0$.

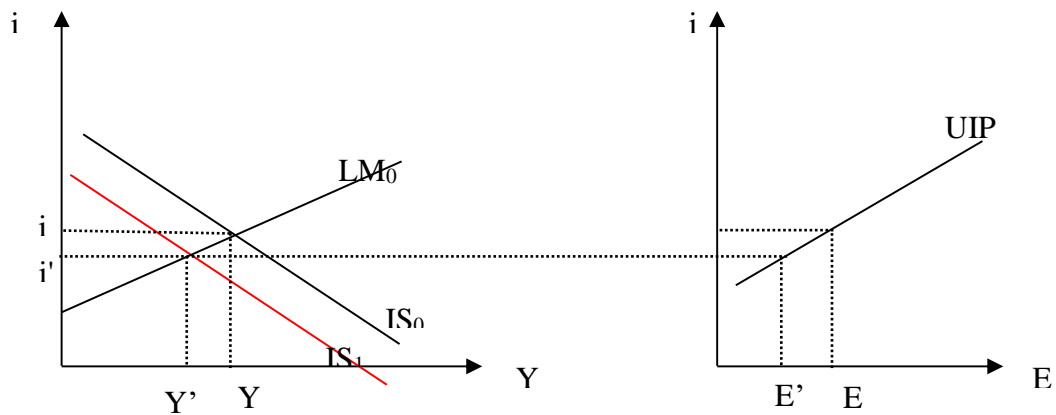
The decrease in the interest rate leads to a decrease in the nominal exchange rate (E) on the UIP side. Indeed, being E a positive function of i, if i goes down also E does so. So finally also $\Delta E < 0$.

Investments (I) are bound to decrease, being a positive function in the income and a negative one in the interest rate. Y decreases so $\Delta I < 0$.

NX is a function negative in the domestic income (Y) and in the exchange rate (E) and positive in the foreign income (Y^*). As the domestic income (Y) and the nominal exchange rate (E) vary by decreasing, NX is bound to increase. $\Delta NX > 0$.

Consumption (C) function is the following: $C = f(Y, T)$. Taxes have not changed while income dropped. This brings us to claim that consumption diminished too. $\Delta C < 0$

Graphically:



Exercise 5:

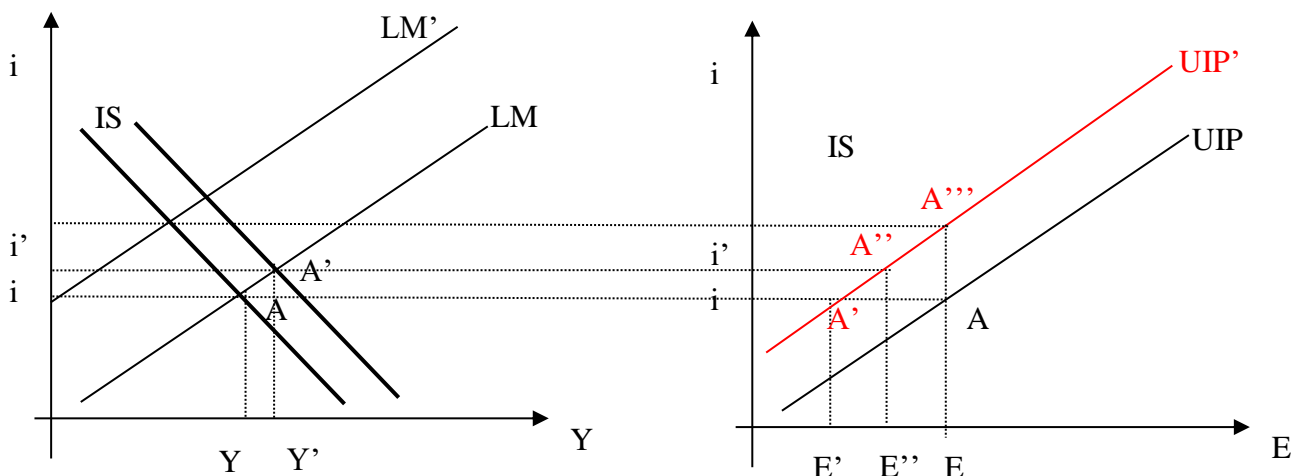
Suppose the world economy is composed of two countries: country A (domestic) and country B (foreign), characterized by perfect capital mobility, fixed prices and a fixed exchange rate regime.

a. Suppose that the interest rate on foreign financial assets (country B) increases as a result of a restrictive monetary policy by country B. Describe both economically and graphically (IS-LM model) the effects on country A's production and interest rate.

b. Now assume that a flexible exchange rate regime is in place. What effect does an increase in the foreign interest rate have on production and the interest rate in country A? Motivate the answer and provide a graphical representation. Compare the results with those obtained in point.

Solution

a) An increase in the foreign interest rate (i^*) makes the financial assets of country B more attractive, generating an outflow of capital from country A to country B. The domestic interest rate is lower than foreign. The exchange rate will tend to depreciate and the UIP curve will move leftwards, as now to the same level of domestic interest rate is associated a lower exchange rate. However, to maintain the fixed exchange rate regime, the central bank of A intervenes increasing the policy rate and bringing it to the same level as the foreign one. The LM moves upwards. The interest rate has increased while the level of production has fallen.

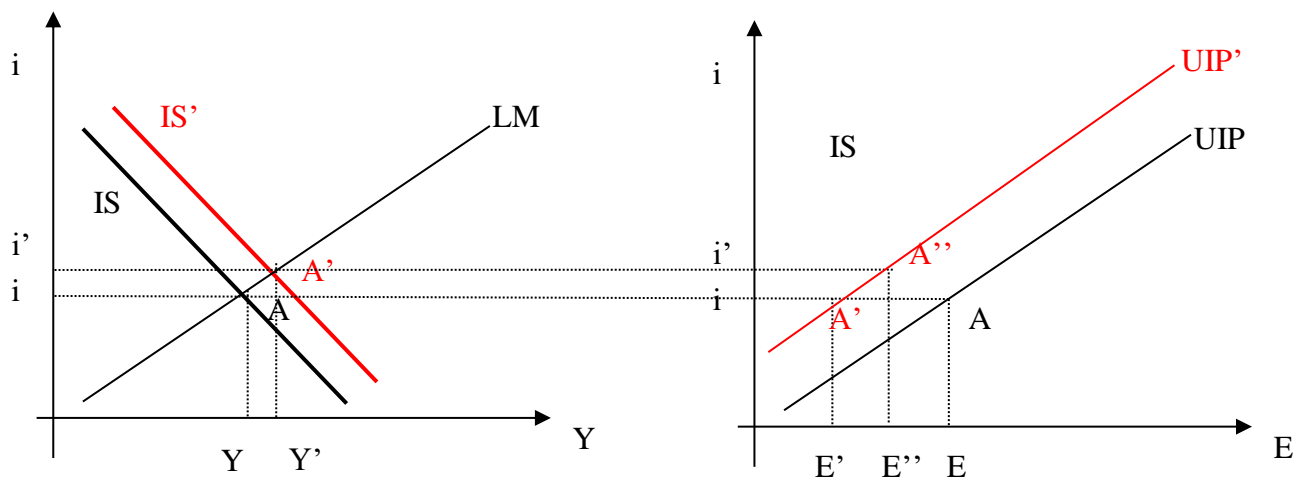


b. An increase in the foreign interest rate generates, as above, an outflow of capital from country A to country B. The UIP curve shifts leftwards as now, for the same level of domestic interest rate we have a lower exchange rate. This generates an increase in competitiveness in A and therefore an increase in the demand for national goods. The IS moves to the right. The domestic interest rate increases as production increases.

On the UIP side, the rightward movement of the IS, making the interest rate (i) increase, leads to an adjustment also of the exchange rate that moves up along the new UIP curve, still remaining lower than its initial level.

Finally we have:

- An increase in Y : $\Delta Y > 0$.
- An increase in i : $\Delta i > 0$.
- A decrease in E : $\Delta E < 0$.



Esercizio 6

Consider an economy open to foreign trade, with a flexible exchange rate. Suppose exchange rate expectations move permanently to the new level $E^e' > E^e$.

- How do IS, LM and interest rate parity move?
- How does production, interest rate and exchange rate change?
- What happens to C , I , NX ?

d. Suppose the central bank wants to neutralize the real effect of changing expectations. What policy should it implement?

Soluzione

a. An increase in the Expected future level of the exchange rate (E^e) makes the domestic financial assets more attractive, generating an inflow of capital from abroad to the domestic country. The domestic interest rate becomes higher than foreign. The exchange rate will tend to appreciate and the UIP curve will move rightwards, as now to the same level of domestic interest rate is associated a higher exchange rate. Since the LM does not move (the new equilibrium will be a new point along the old LM), we will have a new exchange rate E of equilibrium, more appreciated than the previous one. This leads to lower competitiveness of our goods in the foreign markets, lower exportations and so lower NX, and hence lower demand, causing a shift of the IS curve to the left, in IS' and lowering the income (Y).

The decrease in income causes the breaking of the equilibrium in the financial markets as $Md \downarrow < M_s$, leading people to buy bonds and so making the bond price increase and the interest rate drop.

This leads to a decrease in the nominal exchange rate (E) on the UIP side. Indeed, being E a positive function of i , if i goes down also E does so. However this contraction only mitigates the initial increase of E and the final effect remains $\Delta E > 0$.

b. Equilibrium goes from A to B, where we have lower income ($\Delta Y < 0$), lower interest rates, ($\Delta i < 0$) and a higher exchange rate ($\Delta E > 0$)

c. The effect on Investments (I) is uncertain. Indeed, being I a positive function in the income (that is decreasing, bringing a downward pressure) and a negative one in the interest rate (that are decreasing too, this time bringing an upward pressure) we cannot be sure on the direction of the Investments variation.

NX is a function negative in the domestic income (Y) and in the exchange rate (E) and positive in the foreign income (Y^*). As the domestic income (Y) decreases (pushing E up) and the nominal exchange rate (E) increases (pushing E down), the effect on NX is uncertain.

Consumption (C) function is the following: $C = f(Y, T)$. Taxes have not changed while income dropped. This brings us to claim that consumption diminished too. $\Delta C < 0$

d. To neutralize the real effect (on Y) of the change in expectations, the central bank must reduce the interest rate, moving the LM down, until it intersects the new IS curve (IS'), and reducing the rate up to i_c . This would stimulate investment and production would return to the initial level. Furthermore, pressure on the foreign exchange market would lead to a depreciation of the national currency, partially offsetting the initial appreciation. The exchange rate would pass to E_c .

