

Open Economy Macro: Solutions to PS4

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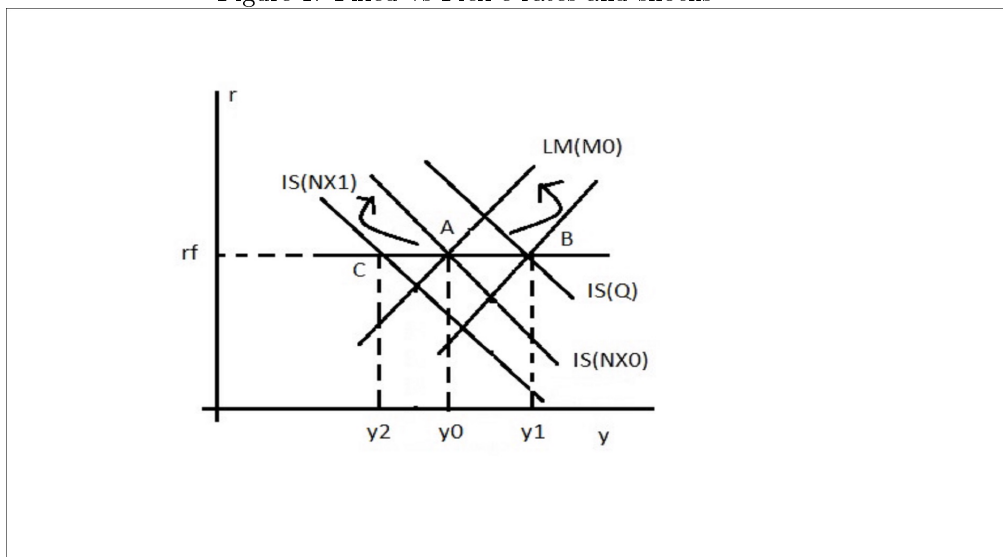
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1. (Choice of exchange rate regime under free capital mobility) Assume perfect capital mobility. (Remember what this means in terms of the BoP line!) The domestic economy is bombarded by two types of shocks, one originating in the financial/money market and the other from in the goods market. For concreteness, think of the financial market shock as sudden fall in the demand for (domestic) money and of the goods market shock as sudden fall in net exports. The domestic policy maker can choose between a flexible or fixed exchange rate regime. The policy maker cares about output stability. So which, according to the Mundell-Fleming model, of the two exchange regimes is more efficient in stabilizing output, when the economy faces a) financial market shocks and b) goods market shocks?
2. Solution: The first thing to realize is that under perfect capital mobility, the BoP schedule in the (y, r) space is horizontal, meaning that the domestic interest rate is fixed at the level of the foreign interest rate. Now, check the following figure. Initially the economy is in equilibrium at the point A, where output and the interest rate is (y_0, r^f) . a) Money demand suddenly falls, creating an incipient excess supply in the domestic money market. This puts pressure on the interest rate to fall. Under credibly fixed exchange rates, such a fall in the interest rate is not possible, so what is left for the central bank is to contract the money supply. The central bank has to contract the money supply as long as the domestic interest rates would be out of line with the foreign one under perfect capital mobility. Hence, the economy returns back to its original equilibrium at A (right curved arrow). Under flexible exchange rates, on the other hand, the induced excess supply in the domestic money market (LM shift!) will put pressure on the domestic currency to weaken (ie. the liquidity effect tends to lower the domestic interest rate, which cannot happen under free capital mobility). The implied depreciation of the domestic currency will generate gains in competitiveness and international expenditure switching towards domestically produced goods. Net exports will thus increase shifting the goods market equilibrium curve in the above figure. This shift keeps going - exchange rate keeps depreciating - as long as the excess supply in the domestic money market exists, ie. till the domestic interest rate is consistent with the with perfect capital mobility. Hence

the economy settles at point B with output at y_2 . Conclusion #1: output is more stable under fixed exchange rates when the dominant shock to the economy comes from the financial markets. b) Next, take a goods market shock, like a sudden fall in net exports. The goods market equilibrium shifts initially to $IS(NX_1)$ in the figure. Under fixed exchange rates, the reduction in net exports implies an increase in the demand for foreign currency (to finance the implied trade deficit), i.e. fall in the demand for domestic currency which would require a fall in income and/or a fall in the domestic interest rate for the domestic money market to remain in equilibrium. This cannot happen under the condition of perfect capital mobility, hence foreign exchange reserves of the central bank start to fall, i.e. domestic money supply starts to fall. Outflow of foreign currency continues till the domestic interest rate is in line with the foreign one as required by perfect capital mobility. Hence, the economy settles at point C in the figure with output at y_2 . (Mind you, the shift in the LM curve up and to the left is not shown). Under floating, on the other hand, the fall in net exports will induce a depreciation of the domestic currency, which has an expansionary effect in the domestic goods market, starting to shift the IS-curve back towards the original position. Under free capital mobility, the depreciation continues as long till the domestic interest rate is consistent with the foreign one under perfect capital mobility. What this actually means is that depreciation continues to the extent that domestic income has risen to a level (at the interest rate r^f) that is consistent with the initial equilibrium in the domestic money market. Conclusion #2: for goods markets shocks, output is more stable under flexible exchange rates than under fixed exchange rates.

3. (Devaluation) Assume fixed exchange rates. The policy maker decides to devalue the domestic currency. Use the Mundell-Fleming model to trace out what happens to the macroeconomic equilibrium of the home country. To what extent, if any, does the outcome depend on the degree of capital mobility?
4. Solution: See the next figure. So, the devaluation gives the domestic economy a competitiveness boost, shifting the goods market equilibrium from $IS(Q_0)$ to $IS(Q_1)$, where $Q_0 < Q_1$. The (trade balance part of the) current account thus improves, implying that the BoP is not in balance, with an increase in the inflow of capital or with a fall in the outflow of capital. Hence, the balance of payment curve BP will shift down and to the right from $BP(Q_0)$ to $BP(Q_1)$. (Note: given the devaluation the initial point A represents a current account surplus, i.e. at the given interest rate, income has to increase to reduce the current account surplus, i.e. the BP line has to shift down and to the right.) The fact that capital inflow increases (or outflow falls) means that foreign exchange reserves increase (or do not fall as much), i.e. domestic money supply increases shifting the domestic money market equilibrium curve down and to the right from $LM(M_0)$ to $LM(M_1)$, $M_0 < M_1$. In conclusion, the because

Figure 1: Fixed vs Flex e-rates and shocks



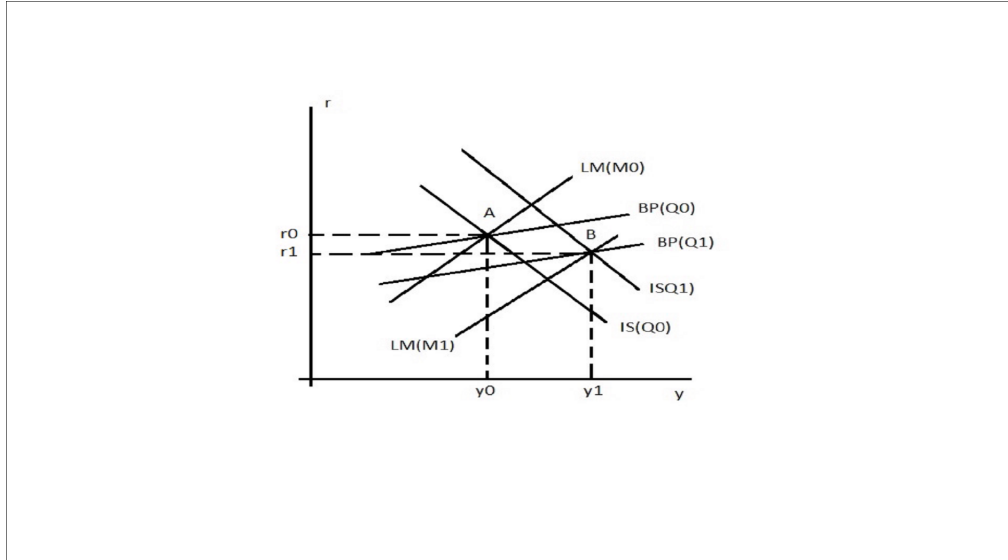
of the devaluation of the domestic currency, the economy shifts from the initial equilibrium at point A to an equilibrium at point B with interest and output at (r_0, y_0) and (r_1, y_1) , respectively. The degree of capital mobility matters a lot, particularly for the effect on the domestic interest rate, which need not fall after the devaluation. Also the relative shifts of the *BoP* and *IS* schedules with respect to a devaluation matter for the outcome, as does the relative slopes of the *BP* curve and *LM* curves. In particular, if the *BoP* equilibrium responds strongly to a devaluation (relative to *IS*), the domestic interest rate will fall relative to the initial equilibrium.

5. (Foreign exchange reserves) We have assumed that under pure floating the central bank does not hold foreign exchange reserves. However, use the Mundell-Fleming model to analyze the macroeconomic consequences of the central bank wanting to accumulate foreign exchange reserves. (Hint: definition of money supply in an open economy). The reason for such a desire could be that the domestic financial markets are not sufficiently well developed to provide strong financial buffers for different shocks
6. Solution: The definition of the money supply in an open economy is

$$M = FX + DC \tag{1}$$

ie. it is the sum of foreign exchange reserves and domestic lending. Now, if the central bank decides to accumulate foreign exchange reserves, it will buy foreign currency with domestic money, thereby increasing the

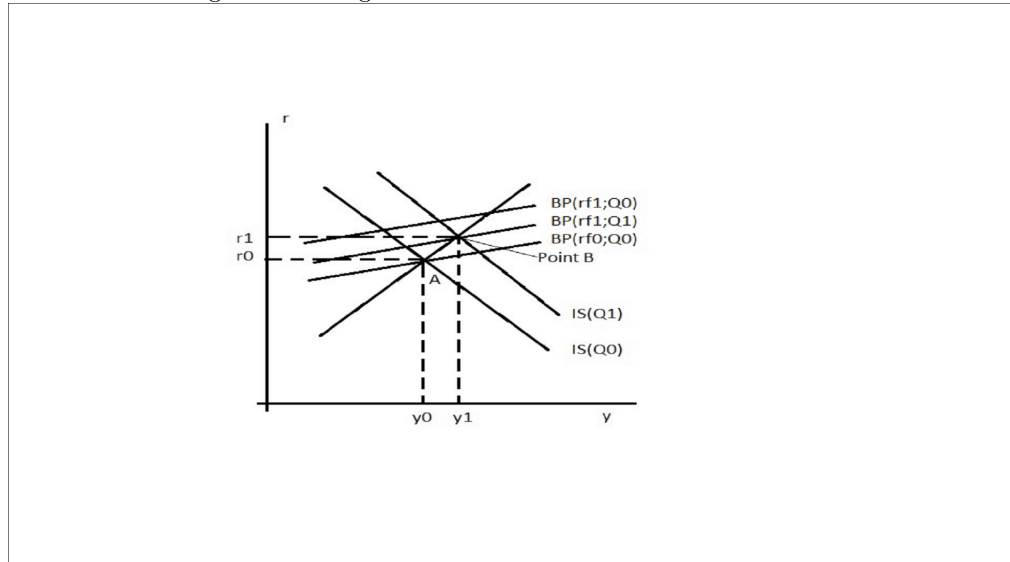
Figure 2: Devaulation in M-F model



money supply and putting pressure on the domestic currency to weaken, ie. to depreciate. In terms of the Mundell-Fleming model, the increase in the money supply will shift the LM curve down and to the right, while the depreciation of the domestic currency will shift both the BP and IS curves to the right. The effect is much like with devaluation in the previous exercise, so the details of the final outcome depend on a) the degree of capital mobility and b) the relative slopes and size of the shift of the various curves.

7. (Foreign interest rates) What happens to the macroeconomic equilibrium of the home country, when the foreign interest rate increases (according to the Mundell-Fleming model). What is the role of the exchange rate regime to the outcome of your analysis?
8. Solution: Consult the next figure for the case of flexible exchange rates. The economy is initially in an equilibrium at point A with interest rate at r_0 and output at y_0 . Once the foreign interest rate increases, capital starts to flow out of the domestic economy, generating a deficit in the BoP. We can represent this as an initial shift in the BP curve up and to the left from $BP(r_0^f, Q_0)$ to $BP(r_1^f, Q_0)$ (r^f is the foreign interest rate). Under floating, the exchange rate starts to depreciate, which gives a competitiveness boost to the domestic economy. Goods market equilibrium IS will shift from $IS(Q_0)$ to $IS(Q_1)$ while the balance of payment equilibrium BP starts to shift back from $BP(r_1^f, Q_0)$ to $BP(r_1^f, Q_1)$. The economy settles down to an equilibrium at Point B, where the interest rate - output pair is (r_1, y_1) .

Figure 3: Foreign interest rate in the M-F model



Under fixed exchange rates, on the other hand, the domestic money market equilibrium LM has to shift up and to the left to intersect the original $IS(Q_0)$ and the $BP(r_1^f, Q_0)$ curve, ie. the domestic central bank has to contract money supply so as to induce an interest increase and income fall which will make sure that the demand for domestic money after the increase in the foreign interest rate is consistent with the fixed exchange rate.