

Homework Assignment #3: Answer Sheet

This assignment is due on Thursday, December 9 at the beginning of class (or sooner) .

1. *Consider the open-economy IS-LM model with perfect capital mobility. If the exchange rate is flexible, explain what happens to income and the exchange rate if:*

- (a) *there is an expansionary monetary policy*

brief answer The LM curve shifts to the right. With $i < i^*$ the balance of payments would be in deficit causing the currency to depreciate, so e , and thus q , to rise. This shifts the IS curve to the right, until it intersects the LM curve at the interest rate i^* . Hence, income rises and the exchange rate appreciates.

- (b) *foreign income rises*

brief answer This increases net exports at every value of Y , so the IS curve shifts to the right. This causes $i > i^*$, which pushes the currency up in value, so the exchange rate decreases. This causes the IS curve to shift back where it was. So Y is unchanged, but e is lower. This is the general phenomenon that under flexible exchange rates and PCM the exchange rate insulates the economy (income) against IS shocks.

- (c) *foreign prices rise (our price level unchanged)*

brief answer This causes the domestic economy to be more competitive at any value of the exchange rate. So the IS curve shifts to the right. Then as in part (b) the incipient capital inflow causes currency appreciation. Thus e will fall, shifting the IS curve back to where it was. Essentially, e will fall to offset the rise in foreign prices so that q will be unchanged in equilibrium.

- (d) *a contractionary fiscal policy*

brief answer This causes the IS curve to shift left. The interest rate falls causing capital outflow and thus currency depreciation. Hence, we become more competitive and the IS curve shifts back. So Y is unchanged, and e rises.

2. *Suppose that the economy has a fixed exchange rate and that there is imperfect capital mobility. What happens to income and the domestic interest rate if:*

- (a) *there is a contractionary monetary policy*

brief answer The LM curve shifts to the left. This causes the interest rate to rise, which causes capital inflow. With no sterilization this causes the monetary base to increase and the LM shifts back to where it was. The answer is really no different than if there were perfect capital mobility. Perhaps the adjustment would take longer (because the capital flows are smaller for any interest differential) but that was not part of the question.

(b) *there is an expansionary fiscal policy*

brief answer Consider figure 1. We start at point A. The IS curve shifts to the right. There are then two cases, depending on whether the BB curve is steeper or flatter than the LM curve (essentially, *how* imperfect capital markets are). We move either to point C, and then interest rates fall further as the LM curve shifts right to point D, or if BB is steeper than LM we move to point B, and the capital outflow causes LM to shift left to D. Notice that income rises in both cases. But when the BB curve is flatter the interest rate will rise less than when the BB curve is steeper. And the corresponding change in Y is smaller when the BB curve is steep.

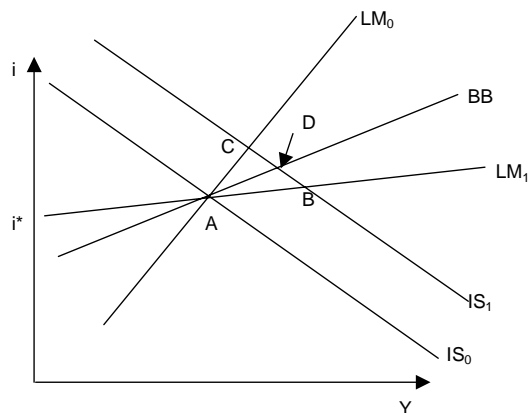


Figure 1:

(c) *foreign income rises and there is no sterilization*

brief answer Foreign income rising is a rightward IS shock. So the case is just like part b

3. *How can inflation be imported under fixed exchange rates? Why is this not a problem under flexible exchange rates? Explain.*

brief answer If inflation is higher in the rest of the world we become more competitive. This causes the IS curve to shift to the right. Since there are fixed exchange rates Y rises. Notice that the LM curve will also shift to the right since the capital inflow causes the monetary base to rise. If income rises above full employment levels the price level will increase. Because exchange rates are fixed the domestic money supply will rise when we have a balance of payments surplus. Rising domestic money supply must eventually cause inflation. This is not a problem under flexible exchange rates because changes in the value of the currency can insulate the domestic economy. The rightward IS shock is offset by currency appreciation, as in problem 1 part c. Under flexible exchange rates we can have independent monetary policy

4. *Suppose that initially the level of output in the economy is below the level of full employment, while the trade balance is in deficit. The government wants to remedy these two problems with fiscal and monetary policy. The economy has a flexible exchange rate and there is perfect capital mobility.*

- (a) *How should the government use monetary and fiscal policy to achieve these two goals? Which policy should be used to decrease output and which policy should be used to improve the trade balance? Show your answer graphically. Explain how this works.*

brief answer Notice the typo – it should say "increase output" no one would choose to reduce output when the economy is already below full employment. Would they? Since there is a flexible exchange rate only monetary policy is effective at changing income. So to raise income (or lower it for that matter) they would use monetary policy. Shift the LM curve to the right, Y rises to Y_F . But this policy worsens the trade balance even further (since income is higher). To remedy this use contractionary fiscal policy. This shifts IS left which will cause the exchange rate to appreciate and we become more competitive. Hence, the trade balance will improve. Essentially reduced government expenditures will allow for a greater amount of net exports. Notice that if we did the opposite policies it would not work. An expansionary fiscal policy would not raise income, it would only cause us to become less competitive. Meanwhile a contractionary monetary policy could improve the trade balance, but it would move us farther from full employment.

- (b) *Suppose that the country had a fixed exchange rate, how would your assignment of policies change, if at all? Explain*

brief answer It would change dramatically. Now we use fiscal policy to increase output and monetary policy to improve the trade balance. By shifting IS to the right output will rise. But this will also worsen the trade balance further. Notice that there is not much to be done here with monetary policy. Since the exchange rate is fixed you cannot change competitiveness. Since the exchange rate is fixed you cannot change the rate of interest. So the trade balance is not going to change due to any monetary policy. You need another *instrument* to meet the goal of improved trade balance (tariff policy perhaps) because monetary policy is impotent under flexible exchange rates with pcm.

5. *Suppose that China decides to revalue the yuan relative to the dollar. What will happen to the US current account balance? Explain, using the model of midterm two, problem one. Under what circumstance will the current account change? Under what circumstances will it not?*

brief answer First, you might note that China is not the only US trading partner, so the effect of revaluation on the effective exchange rate is smaller than the yuan revaluation itself. But let us ignore that point. Suppose then that the yuan revaluation causes q to rise. We know that this causes the trade balance to improve at any level of income. But income is not unchanged when there is a change in competitiveness. The key factor is how sensitive is savings to income. If savings rise with income (that means $a < 1$ in terms of the notation of the problem) then the current account will improve. The curve for $NS - I$ is steep enough so that as Y rises the trade deficit declines. Essentially the rise in income induces more savings. So the opposite case is when income changes do not impact savings. Since the current account is the difference between national savings and investment, then currency depreciation does not help in this case. Essentially, we have $a \rightarrow 1$ and the answer is given in problem 1.d from midterm two and I copy the answer here. If a is very large $1 - a$ (the slope of the $NS - I$ curve) goes to zero – it

is very flat. Economically, this means that net national savings ($\overline{NS} - I$) is not very sensitive to income. The reason is that savings is unresponsive to income because we spend domestically almost every cent we earn when income rises. The situation is then given in figure 2. There is a current account deficit at point A . Even if q rises and T shifts upward the trade deficit remains. Income will rise, but most of that will be spend on domestic goods. So no there is very little switching of expenditure towards net exports. The real exchange rate would have to rise *a lot* and that means that dollar would have to fall a lot to restore the trade balance.

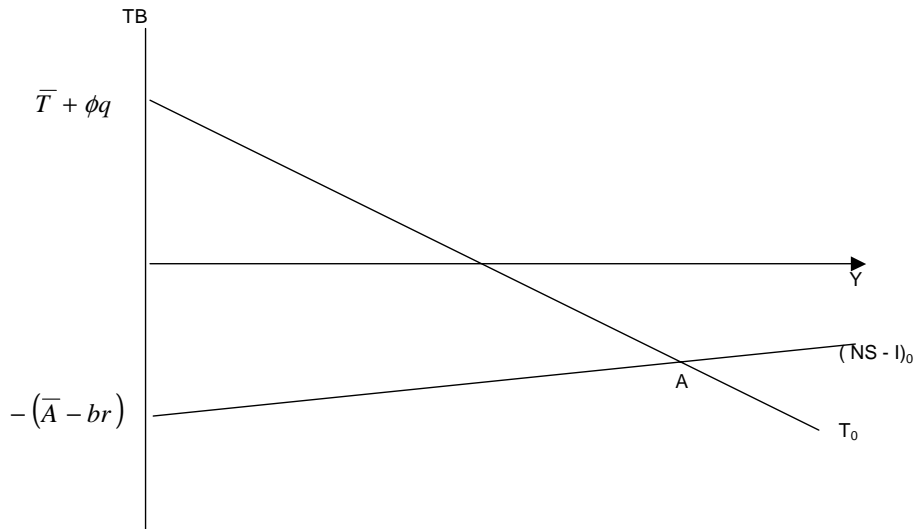


Figure 2: Savings Insensitive to Income

6. *Suppose the money stock is reduced.*

- (a) *Show that the immediate (impact) effect on the exchange rate is larger than the ultimate effect. Why does this occur?*

brief answer Suppose we consider the model with full employment and flexible prices.

Then we start at (e_0, P_0) in figure 3. The fall in the stock of money causes the LL curve to shift left to LL_1 . Eventually the exchange rate will fall to \bar{e} , but at impact it must fall further to e_1 . The reason is that if people expect the exchange rate to depreciate they will earn a capital gain from holding domestic currency. So the demand for money will rise relative to the supply. For markets to clear the demand for money must fall, but this only happens when people expect appreciation of the exchange rate.

- (b) *How does the extent of overshooting depend on the speed of adjustment?*

brief answer Intuitively one could note that if the goods market adjusted as fast as the asset market there could be no overshooting. In that case we would move to the full equilibrium values in both markets right away. Overshooting can only occur if the movement is slower in one market than another. The slower the speed of

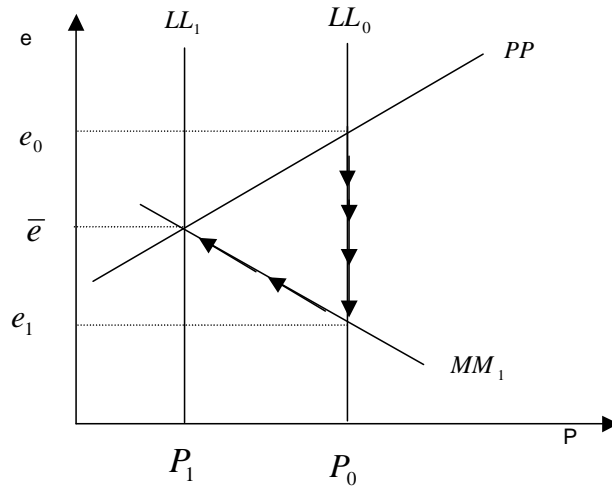


Figure 3:

adjustment the more pressure on the market that adjusts fast. One can see this from the equilibrium condition for the money market, which can be written as

$$Y = \frac{1}{k} \frac{M^s}{P} + \frac{h}{k} i^* + \theta \frac{\mu e - e_t}{e_t}$$

When the money stock falls the first term on the right-hand side falls. Since Y is unchanged, the last term must rise. This can only happen if e falls below \bar{e} , since that is the only endogenous variable. Now the smaller is θ the larger the required fall in e to offset a given fall in M .

- (c) *Suppose that the monetary authorities did not reduce the money stock, they only announced that they would do it next year. How does your answer to part (a) change?*

brief answer If the monetary authorities are *believed*, then the effect will be the same. Since people expect currency appreciation they will want to hold more dollars. The excess demand can only be choked off through immediate appreciation sufficient so that depreciation is now expected. What if the monetary authorities are only half-believed? Then the expected full-equilibrium exchange rate (\bar{e}) changes by less. This means that the amount of overshooting will also be smaller. Essentially, the MM curve will shift less.