

## Midterm Exam II

## Answer Sheet

1. (30%) Suppose that initially the level of output in the economy is above 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 Contractionary monetary policy can reduce income. Shifting the  $LM$  curve to the left. This will cause a capital inflow and dollar appreciation if there is no other policy change. While the fall in income could help the trade balance, the appreciation of the dollar will hurt it. To reduce the trade deficit, the government needs to use fiscal policy for *expenditure switching*. Specifically, by reducing government spending or increasing taxes, the  $IS$  shifts to the left. This causes the dollar to depreciate and competitiveness to improve. This offsets any change in  $Y$ , but it must improve the trade balance.

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

brief answer With a fixed rate we need the opposite assignment. Under these conditions we cannot have an independent monetary policy. Fiscal policy should be used to contract income. This will lead to incipient capital outflows and thus an increase in the monetary base. The  $LM$  curve will shift to the right. The fall in income and the contractionary fiscal policy should improve the trade balance.

2. (30%) Under the classical gold standard capital mobility was very high. What were the critical features of the gold standard that made this possible?

brief answer The most critical feature was the restoration rule, which meant that if convertibility was temporarily suspended, it would be restored at the old parity. This reduced (eliminated) exchange rate risk. Another important feature was that central banks "played by the rules of the game." This meant that they encouraged capital flows that eliminate the need for gold flows. The simplest way to think of this is as anti-sterilization. Rather than offset the outflows of gold that would arise if the country's price level was too high. They accelerated the contractionary effects. They sacrificed internal balance for external balance. This gave the system credibility.

- (a) *If countries played by the rules of classical gold standard what would we expect to observe with regard to the interest differential across these countries? Explain.*

**brief answer** If countries play by the rules of the game then exchange rates will not fluctuate beyond the bounds created by the cost of shipping gold (gold points). Moreover, if countries play by the rules of the game capital will be mobile. So interest differentials will be arbitrated away. Putting these two ideas together, we see that interest differentials cannot get very large. The reason is the absence of exchange rate risk if the gold standard is credible. Interest differentials under the gold standard should thus be very small. Alternatively, we could say that the low interest differentials indicate that investors believed that the gold standard was credible. We can show this more formally. Let  $\bar{S}$  be the maximum value of the exchange rate between dollars and sterling so that it is not profitable to ship gold to Britain, and let  $\underline{S}$  be the minimum rate so that it is not profitable to ship gold from Britain to the US, and let  $S_t$  be the current exchange rate. Then if agents *believe* that the rule of the game will be played then  $\frac{\bar{S}}{S_t}$  is the maximum appreciation of sterling over the period of the investment. So the domestic interest rate could never exceed  $\bar{R}_t$ , where this is defined by:

$$\bar{R}_t = (1 + R_t^*) \frac{\bar{S}}{S_t} - 1. \quad (1)$$

We can similarly calculate the lowest value that the domestic interest rate could take ( $\underline{R}_t$ ) consistent with the lower bound of the gold points:

$$\underline{R}_t = (1 + R_t^*) \frac{\underline{S}}{S_t} - 1 \quad (2)$$

Using the expressions (1) and (2) we have bounds for the domestic rate. That is, if the gold standard is credible we would expect to observe interest rates staying within these bounds:  $\underline{R}_t \leq R_t \leq \bar{R}_t$ . Interestingly, this is exactly what economists have found to be the case.

- (b) *After WW1 attempts to put the gold standard back in place failed. What changed to make it so difficult? Why was it so much harder to play by the "rules of the game" after WW1?*

**brief answer** The biggest problem was that countries no longer were willing to sacrifice internal balance for external balance. Partly due to increase in democracy. Also, prices were much less flexible downward than prior to WW1. Hence, the restoration rule was no longer feasible. This meant that people did not believe that par values would, or could, be maintained.

- (c) *It is sometimes argued that the problem was "too low a price of gold" after WW1. Why would this have been a problem? Explain.*

**brief answer** Too low a price of gold meant that the existing stock of gold would be insufficient to provide liquidity at the low price for gold. This requires deflation. With too low a price of gold, there is an outflow that will induce a fall in the price level. But this is politically unpopular and now there is democracy. If countries resist the outflow then the system cannot equilibrate.

3. (20%) Consider a small open economy with a flexible exchange rate. Suppose that there is a positive shock to the money supply. What happens to income and the exchange rate if there is zero capital mobility? How does this compare to the case when there is perfect capital mobility? In which case is the change in income larger? Explain.

brief answer A positive money shock shift the  $LM$  curve to the right, income to rise and the trade balance to fall. This causes the currency to depreciate. This improves competitiveness and shifts the  $IS$  curve to the right as well. The question is then when does this process stop? If there is zero capital mobility the condition for external balance is just the trade balance. We have a vertical  $BB$  curve, given by the expression  $\bar{Y} = \frac{1}{m}[\bar{T} - \phi q]$  where  $\bar{Y}$  is the level of income at which there is external balance (so the exchange rate stops depreciating). If there is depreciation this shifts to the right by  $\frac{\phi}{m}$  times the change in the exchange rate – a shift of the  $BB$  curve to the right. The  $IS$  curve shifts to the left by a smaller amount from a change in the exchange rate,  $\frac{\phi}{1-a+m}$ . Notice that the fall in the exchange rate is caused by the rise in income which worsens the trade balance – there is no other effect since there is zero capital mobility. If there is perfect capital mobility then the  $BB$  curve is horizontal, and income rises by the amount the  $LM$  curve shifts to the right. Clearly the interest rate does not rise under perfect capital mobility. The exchange rate will fall until interest parity is restored. So the rise in income is most likely larger under perfect capital mobility. The reason is that the monetary shock is *amplified* by the capital outflow.

4. (20%) Consider an economy that has a flexible exchange rate and very high capital mobility. Suppose that there is an unanticipated increase in the demand for money. What will happen to the exchange rate once we reach a new equilibrium? Explain.

brief answer If the demand for money increases the exchange rate will fall in value. Income will be lower in the new equilibrium. Obviously the  $LM$  curve shifts to the left. With greater money demand and no change in money supply, income must fall to restore equilibrium in the money market.

- (a) What happens to the exchange rate the moment it is learned that money demand has increased? Explain.

brief answer The exchange rate will fall immediately on impact. The reason is that people know the currency is going to rise in value in the future so they will purchase it raising its price now. Indeed, the exchange rate will fall more today than in the new equilibrium. Capital mobility means that  $i = i^*$ , but then there is excess demand for money. Since income has not fallen yet the only variable that can adjust is the expected depreciation of the currency. If the exchange rate falls immediately, people will then expect it to rise – meaning that they expect to earn a capital loss on holding dollars. This reduces demand relative to holding the foreign currency. Graphically, the  $MM$  curve shifts to the left.

- (b) What will happen to the exchange rate along the adjustment to the new equilibrium? Explain.

brief answer The exchange rate will rise as income falls along the path. The fall in income reduces the excess demand for domestic money. So the return on domestic money (which is equal to  $i^*$  plus the expected appreciation in the exchange rate) can fall. Since  $i^*$  is fixed, this can only happen as the expected capital gain on holding dollars falls. This means that the exchange rate should rise (reducing the gap between the current and new equilibrium rate).

- (c) *What are the important assumptions that generate the results you described in parts a and b, if any? Explain.*

brief answer The key assumptions are that the goods market adjusts slower than asset markets, and that expectations are rational.