

**::Solutions::**

## **Practice Exam 3 (12/7/2018)**

- You have 75 minutes to complete this exam.
- You may use a calculator; you may **not** use any other device (cell phone, etc.)
- You may consult one page of notes (both sides); you may not use books, notebooks, etc.
- Show your work.

**I understand that the honor code applies: I will not lie, cheat, or steal to gain an academic advantage, nor tolerate those who do.**

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Signature

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Printed Name

1. [5 pts] The home country fixes its exchange rate to the foreign country and has open capital markets. When the foreign interest rate rises, all else equal, what happens to the stock of foreign reserves at the home central bank? Explain your answer.

The home central bank must raise the interest rate to keep in step with the higher foreign interest rate. To do this, the central bank needs to decrease the money supply ( $i = i^* + E^e/E - 1$ ). The central bank will buy its money back with reserves, **decreasing** its stock of reserves.

2. [5 pts] Why do countries with a fixed exchange rate use monetary policy, rather than fiscal policy, to manage the exchange rate?

Fiscal policy is much less flexible than monetary policy. Foreign exchange markets are very volatile and managing the exchange rate requires daily (if not hourly) intervention. The inside and outside policy lags are very long, too. Changing government spending or tax rates is a slow process and the effects of a change in government spending or tax rates takes time to develop.

3. [5 pts] Consider two countries, home and foreign, each of which peg their currency to the U.S. dollar. Suppose home devalues its currency against the dollar and foreign does not. Clearly explain how the devaluation in home affects foreign output. Use an IS-LM diagram for the foreign country.

When the home country devalues against the dollar, it is also devaluing against the foreign country. [By triangle arbitrage.] The devaluation makes home country goods more attractive. This diverts spending away from the foreign country, shifting IS, and contracting output.

See figures at the end.

4. [5 pts] Suppose the home country has a floating exchange rate. International investors are becoming increasingly worried that the home country will impose capital controls. All else equal, how would you expect the exchange rate to change? Explain your answer.

Extended UIP is

$$i = i^* + \frac{E^e}{E} - 1\gamma_{df} + \gamma_{fx}$$

Surprise capital controls make it more difficult for foreign investors to move their capital out of the country. This increases the riskiness of the investment, increasing the country premium,  $\gamma_{df}$ . This shifts the  $FR$  curve to the right, which **depreciates** the currency.

See figures at the end.

The home country fixes its exchange rate against the dollar at one-to-one and allows for the free flow of international capital. The home country's central bank holds \$100 of home country bonds, makes \$200 of loans to its domestic commercial banks, and holds \$300 of dollar reserves. Use this information to answer questions 5–8.

5. [5 pts] Write out the home central bank's balance sheet.

A		L	
Reserves	300	Money	600
Loans to banks	200		
Domestic bonds	100		

6. [5 pts] A drop in asset prices has made many of home's commercial banks insolvent. Define what it means for a bank to be insolvent.

A bank is insolvent when its assets are worth less than its liabilities.

7. [10 pts] The central bank decides to make new loans to the domestic banking system. If the central bank wants to keep the fixed exchange rate, what is the maximum value of the loans it can make? Explain your answer.

To keep the exchange rate fixed, the central bank needs to sterilize the loans by using reserves to buy money. The central bank has \$300 of reserves so the central bank could make \$300 of loans and still be able to sterilize it.

In this case, the central bank would be left with zero reserves and the peg would surely break soon.

[If you answered the question as “\$250 in loans because the bank needs to keep some reserves to manage the fx rate,” that’s a good answer, too.]

8. [5 pts] Suppose the home central bank made the maximum loan amount you calculated in part (c). The central bank then receives a loan from the IMF for \$800 of reserves. Write out the home central bank’s balance sheet.

The loan increases the central bank’s reserves and the loan itself is a liability of the central bank.

A		L	
Reserves	800	Money	600
Loans to banks	500	Dollar denominated loans	800
Domestic bonds	100		

9. [15 pts] Consider the “second generation” currency crisis model in which beliefs over the central bank’s commitment to the fixed exchange rate may change. Explain why it is more costly to defend a peg when the market thinks the peg is not credible. You should reference an IS-LM-FX diagram in your answer.

The extra difficulty is the market’s expectation that the country will devalue. This changes the expected depreciation rate, which shifts  $FR$ . This shift requires higher home interest rates to defend the peg, which lead to greater contractions in output.

See the figures at the end.  $Y_{nc} < Y_c$ .

10. [15 pts] Consider the “first generation” currency crisis model in which fiscal dominance creates the crisis. Why do myopic agents generate a jump in the exchange rate when the central bank runs out of reserves? What assumption about prices is key to generating this result?

When the central bank runs out of reserves, the agents in the economy suddenly learn that inflation will increase in the future (they are myopic, so they did not anticipate the end of the peg).

This increase in inflationary expectations makes the home interest rate jump ( $i = \pi^e + r^*$ ). The quantity equation says

$$\frac{M}{P} = L(i)Y.$$

The increase in  $i$  makes  $L(\ )$  decrease. At the time the peg breaks,  $M$  does not jump, so to make the quantity equation hold, the price level jumps up. The jump in the price level creates the jump in the exchange rate through PPP:  $E = P/P^*$ . [Notice that this is very much like the long-run change in money growth rate problem that we studied for the first exam.]

The key assumption here is that prices are flexible. It is the jump in price that brings the jump in exchange rates.

11. [15 pts] Define the backing ratio. Can it be greater than one? If so, explain how a central bank can achieve it. If not, explain why it cannot.

The backing ratio is the fraction of the money supply accounted for by reserves,  $R/M$ . The ratio can be greater than one if the central bank issues its own domestic currency debt. That is, if it borrows home currency. The central bank balance sheet equation is now

$$M = R + B$$
$$M = (A_F - L_F) + (A_D - L_D)$$

and now  $B$  can be negative.

If  $B$  is negative, then  $R > M$ , and the backing ratio is greater than one.

12. [5 pts] Under the gold standard, the price of gold in terms of francs is  $P^{FR}$  and the price of gold in terms of dollars is  $P^{US}$ . What is the par exchange rate in terms of dollars per franc?

$$E_{\$/F}^{par} = \frac{P^{US}}{P^{FR}}$$

13. [5 pts] *Challenging*. Suppose a country with a fixed exchange rate and the free movement of international capital experiences a positive shock to IS which puts equilibrium output greater than the target output level,  $\bar{Y}$ . Why is responding to this situation less likely to cause an exchange rate crisis than responding to a negative shift of IS? Explain your answer.

Most currency crises happen because the central bank is running out of reserves.

In this case, the shock creates pressure to appreciate the currency (see figures at the end). To offset this, the central bank must increase the money supply, and sell its currency for reserves.

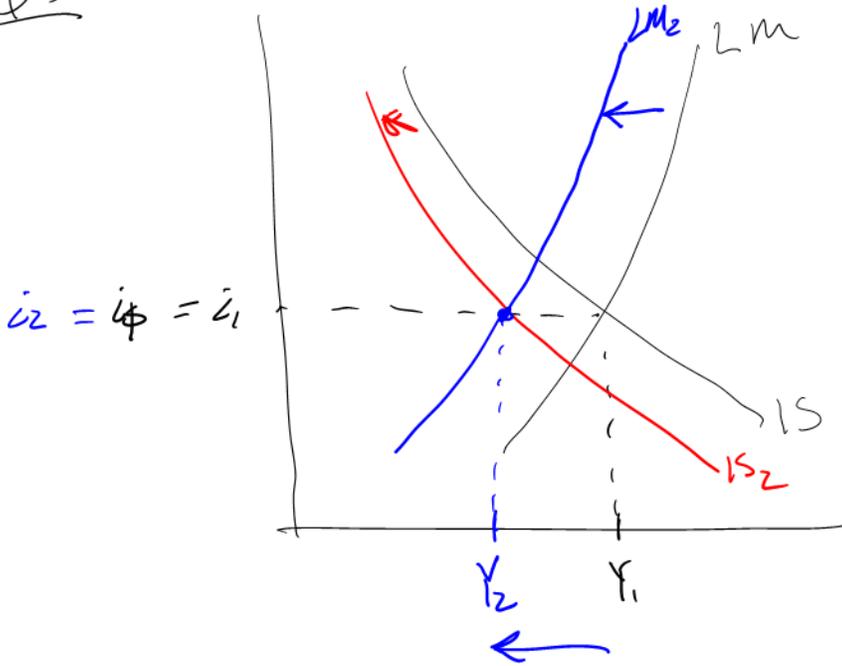
In this case the central bank is increasing its stock of reserves, so it does not face the problem of running low on reserves.

## Extra Space

Clearly label the question number, and leave a reference to this page near the question.

Q3

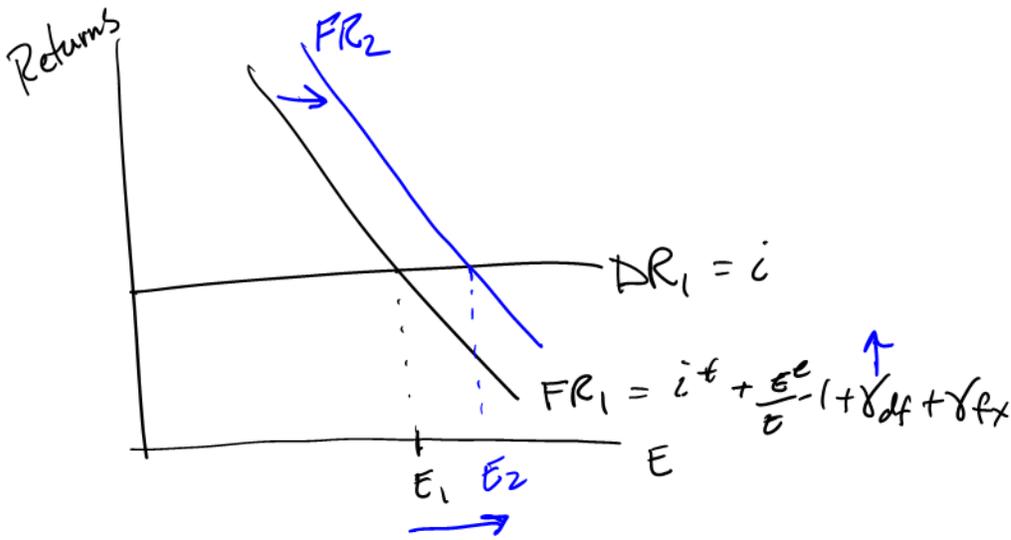
FOREIGN COUNTRY



①  $\uparrow E_H$  lowers TBF shifts IS

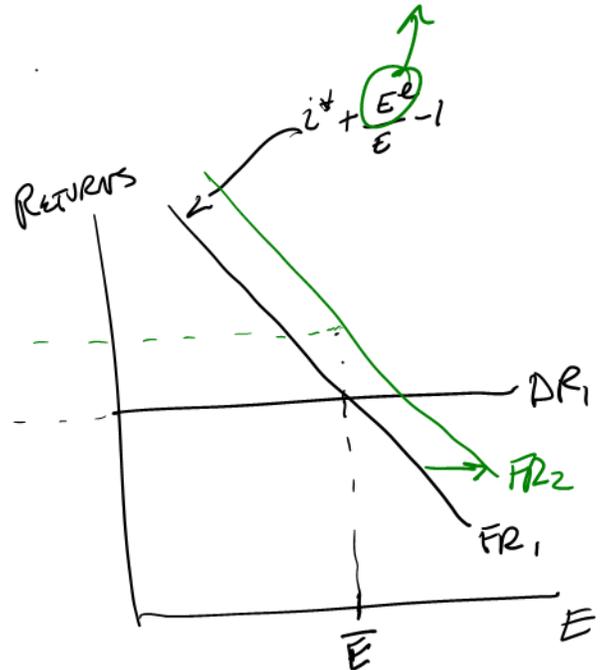
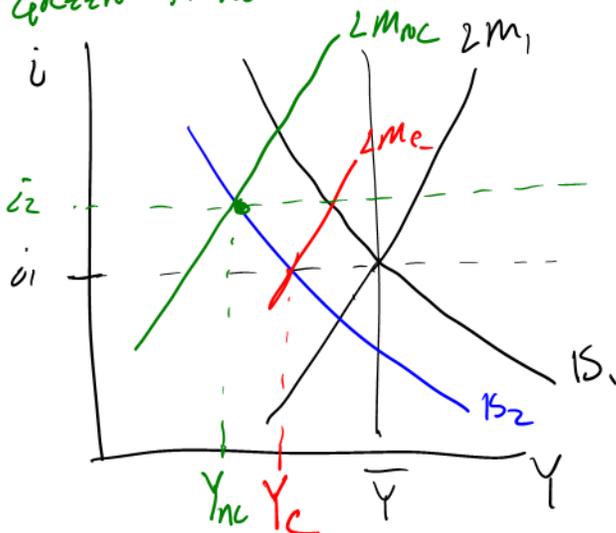
②  $M_F$  contracts to keep  $i = i_1 = i^*$

Q4



Q9:

Red = if credible  
Green = if no credible



Q13:

