1. (2 points) Traders in asset markets suddenly learn that the interest rate on dollars will decline in the near future. Use the diagrammatic analysis in Chapter 13 to determine the effects of the current dollar/euro exchange rate, assuming current interest rates on dollar and euro deposits do not change.

**ANSWER:** Traders will anticipate the effect of the interest rate in the future as described in Fig 1A. If the interest rate falls, the demand for dollar assets also falls and leads to the depreciation of US$ from E1 to E2. Knowing this will happen traders will change their expectations about foreign exchange right away. They will increase their future expectations $E_{t+1}^e$ as illustrated by the upward shift in the dollar return of euro assets in Fig 1B. Note that the interest rate remains unchanged in Fig 1B. In fact if traders have perfect foresight and know exactly how much the interest rate will rise, then E3=E2.

2. (2 points) Suppose the European Central Bank (ECB) does not like the movements in the dollar/euro exchange rate in Question 1. What can the ECB do to undo the movements in Question 1? Explain using a diagram.

**ANSWER:** The ECB has two options

(a) The ECB can announce the same news, i.e. that future interest rate in the Euro zone $R_e$ will fall in the same scale too. The announcement will shift the expectations of future exchange rates from $E_{t+1}^{e',t}$ back to $E_{t+1}^e$ in Fig 1B.

(b) The ECB can immediately reduce the euro interest rate $R_e$.

Both options will bring the downward sloping curve in Fig 1B back to the original schedule.

3. (2 points) Imagine that everyone in the world pays a tax of $\tau$ percent on interest earnings and on any capital gains due to exchange rate changes. How would such a
tax alter the analysis of the interest parity condition? How does the answer change if the tax applies to interest earnings but not to capital gains, which are untaxed? **ANSWER:** Interest rate parity states that:

\[ R_S = R_e + \frac{E_{t+1}^e - E_t}{E_t} \]  

(1)

When we tax interest earnings, \( R_S \) and \( R_e \) and the capital gain \( \frac{E_{t+1}^e - E_t}{E_t} \) at the same rate then we get the same parity.

\[ (1 - \frac{\tau}{100}) R_S = (1 - \frac{\tau}{100}) R_e + (1 - \frac{\tau}{100}) \frac{E_{t+1}^e - E_t}{E_t} \]  

(2)

What the tax does is reduce the rate of return on the two assets across board by \( \tau \) percent. Equation 2 is still the same as the original parity equation 1.b

However when we do not tax capital gain the rate of return on the euro asset becomes: \( (1 - \frac{\tau}{100}) R_e + \frac{E_{t+1}^e - E_t}{E_t} \), and the rate of return on the dollar asset is \( (1 - \frac{\tau}{100}) R_S \). The foreign exchange market equilibrium implies

\[ (1 - \frac{\tau}{100}) R_S = (1 - \frac{\tau}{100}) R_e + \frac{E_{t+1}^e - E_t}{E_t} \]  

(3)

which is no longer the same parity equation as equation 1.

4. (2 points) What is the short-run effect on the exchange rate of an unexpected increase in domestic real GNP, given expectations about future exchange rates? Discuss using a diagram displaying foreign exchange market and money market. **ANSWER:** In Fig 4 an increase in real output (GNP) raises the real demand for money. People will sell bonds to obtain more money. As a result bond markets will have to pay higher interest rate to reduce excess supply of bonds. So, The interest rate in the US rises. The equilibrium in the money market moves from 1’ to 2’ while that in the foreign exchange market moves from 1 to 2. Hence an increase in real money demand causes US$ to appreciate given that future expectations are unchanged.

5. (2 points) Suppose the central bank dislikes the movements in exchange rate in Question 4. What kind of monetary policy can the central bank implement in the short-run in order to remove the exchange change movements? Explain using a
ANSWER: We can think about what either the FED or the ECB can do:

(a) The Fed: To prevent exchange rate from changing, the Fed can undo the change in $R_s$. How? The Fed can accomplish this by expanding money supply in the short run. That way the equilibrium in the money market will be point 3’. $R_s$ is invariant. $E$ remains at $E_1$.

(b) The ECB: The ECB can raise its interest rate $R_e$. That will raise the rate of return on the euro asset and make the foreign exchange market clear at point 4. This can be done by contracting money supply in the euro zone.
Figure 1 A: Anticipated effects of a future fall in interest rate

\[ R_e = E_{t+1, S/e} - E_{t, S/e} \]

Return in $
Figure 1 B: Effects of an expected fall in interest rate on today’s exchange rate

\[ R_e + \frac{E_{t+1}^e - E_t}{E_t} \]

\[ R_e \]

\[ R_s \]

Return in $
Figure 4: Unanticipated increase in real money demand

\[ R_e + \frac{E_{t+1}^e - E_t}{E_t} \]

\[ L(R,Y) \]