1. Krugman’s textbook (9th edition), 14-7:

Traders in asset markets suddenly learn that the interest rate on dollars will decline in the near future. Use the diagrammatic analysis of chapter 14 to determine the effect on the current dollar/euro exchange rate, assuming current interest rates on dollar and euro deposits do not change.

**Answer:** According to the interest parity condition in the next period, t+1,

\[ R_{\$,t+1} = R_{\$e,t+1} + \frac{E_e^{e,t+1} - E_{t+1}}{E_{t+1}}, \]

if \( R_{\$,t+1} \) declines, given \( R_{\$e,t+1} \) and \( E_e^{e,t+1} \) (\( E_e^{e,t+1} \) depends on the traders’ expectation in the next period), \( E_{t+1} \) will increase. An increase in \( E_{t+1} \) implies that \( E_e^{e} \) increases, thus the \((E,R)\) curve shifts upward due to a higher expectation. Given the current interest rates, the \( E_{\$}/e \) increases or dollar depreciates.

2. Suppose there is a reduction in aggregate real money demand in U.S., that is, a negative shift in the U.S. aggregate real money demand function. Trace the short-run and the long-run effects on the exchange rate \( E_{\$}/e \), interest rate \( R_{\$} \) and price \( P_{\$} \). Assume that output in U.S. is fixed. (Hint: in the long run, the price level would adjust to keep the interest rate unchanged).
**Answer:** A decrease in the US aggregate real money demand shifts the $L(R, Y)$ curve leftward. In the short run ($P_\$ \text{ is fixed}$), as real money supply does not change ($M^*/P_\$ \text{ does not shift}$), equilibrium US interest rate $R_\$ \text{ declines}$ (see $R_1$ in the Figure 2). Interest Parity condition implies that exchange rate increases (see $E_1$ in Figure 2). In the long run, as price level $P_\$ \text{ must adjust}$ to keep the long-run interest rate unchanged (compared to the original one), the value of $P_\$ \text{ is given by}$

$$P_\$ = L(R_0, Y) / M^*.$$ 

Suppose that the expectation about future exchange rate is unchanged, the exchange rate is equal to the original level, namely $E_0$.

3. What is the short-run effect on the exchange rate of an increase in domestic real GNP, given expectations about future exchange rates? Assume that domestic real GNP is exogenous (use dollar and euro as an example).

**Answer:** An increase in US GNP $Y_\$ \text{ raises}$ the US real money demand, in the short run, real money supply is unchanged, therefore the US interest rate $R_\$ \text{ increases}$. According to the interest parity condition, the exchange rate $E_\$/e \text{ declines}$.

4. The velocity of money, $V$, is defined as the ratio of real GNP to real money holdings, $V = Y/(M/P)$. Suppose the money demand function takes the form $L(R, Y) = R^{-\theta} Y^{\phi}$, where $\theta \in (0, 1)$, $\phi \in (0, 1)$, and money supply is fixed.
(a). Given the velocity $V$ and the money supply $M^s/P$, use the money market equilibrium condition $M^s/P = L(R,Y)$ to derive an expression for equilibrium interest rate as a function of $M^s/P$ and $V$.

(b). Does an increase in velocity lead to an appreciation or a depreciation of the exchange rate in the short run? Use diagram to explain. (Hint: think about how will the output $Y$ change if $V$ changes)

Answer:

(a). Money market equilibrium implies that

$$M^s/P = R^{-\delta} Y^\phi,$$

where $Y = V/(M/P)$. The interest rate $R$ can be solved as

$$R = \frac{[V/(M^s/P)]^\phi}{M^s/P}$$

$$= V^\phi \left( \frac{M^s}{P} \right)^{\frac{\phi-1}{\delta}}.$$

(b). In the short run, an increase in $V$ implies that output $Y$ increases given the real money supply unchanged. A higher output $Y$ further raises $R$ because of a higher demand of real money. Graphically, an increase in $V$ shift the real money demand curve $L(R,Y)$ toward right.