Problem set 2 - Answer Key

1. (a) LOOP will hold and \( q_{B/G} = 1 \), since there is no restriction to trade.
(b) LOOP will not hold, \( q_{M/F} < 1 \), due to import quota on tomato in the EU.
(c) LOOP will not hold, \( q_{M/S} < 1 \), due to imperfect competition.
(d) LOOP will not hold, due to nontraded goods.

2. In this exercise we will consider China as the home country.

(a) \( \mu_{Ch} = \pi_{Ch} + g_{Ch} = 0.015 + 0.105 = 0.12 = 12\% \)
\( \mu_{US} = \pi_{US} + g_{US} = 0.043 + 0.02 = 0.063 = 6.3\%\)

(b) We apply relative PPP,
\( \frac{\Delta E_{Yuan/\$}^{\mu}}{E_{Yuan/\$}} = \pi_{Ch} - \pi_{US} = 0.015 - 0.043 = -0.028 = -2.8\% \), that is, the Yuan is expected to appreciate against the US dollar.

(c) To maintain an exchange rate peg with the US dollar the PBOC needs to set \( \frac{\Delta E_{Yuan/\$}^{\mu}}{E_{Yuan/\$}} = 0 \), using the fundamental equation of the monetary approach for exchange rates expressed in rates of growth, we have
\( \frac{\Delta E_{Yuan/\$}^{\mu}}{E_{Yuan/\$}} = (\mu_{Ch} - g_{Ch}) - (\mu_{US} - g_{US}) = 0 \), from here we can solve for \( \mu_{Ch} \). We get
\[ \mu_{Ch} = g_{Ch} + (\mu_{US} - g_{US}) = 0.105 + (0.063 - 0.02) = 0.148 = 14.8\% \], that is, the PBOC needs to print money at a 14.8\% rate.

(d)
(e) In this case, the PBOC needs to print money at a rate larger than 14.8%.

3. (a) In the long run, we know nominal interest rates are determined by the Fisher effect, that is,
   
   \[ i_{Ch} - i_{US} = \pi_{Ch} - \pi_{US} \]
   
   furthermore we know that
   
   \[ i_{Ch} = r + \pi_{Ch} = 0.03 + 0.015 = 0.045 = 4.5\% \]
   
   \[ i_{US} = r + \pi_{US} = 0.03 + 0.043 = 0.073 = 7.3\% \]
   
   (b) Keeping everything else constant, we have
   
   \[ \pi_{Ch}^{new} = \mu_{Ch} - g_{Ch} = 0.15 - 0.105 = 0.045 = 4.5\% \]
   
   then
   
   \[ i_{Ch} = r + \pi_{Ch}^{new} = 0.03 + 0.045 = 0.075 = 7.5\% \]

   (c) Figures

4. (a) \( q_{I/P} = 1 \) since PPP holds

   (b) UIP and CIP hold, then \( E_{IR/PR}^* = F_{IR/PR} = 1 \) Indian rupees per Pakistan rupee

   (c) We know \( r_{IND} = i_{IND} - \pi_{IND} \) but we need information either on the inflation rate in India or in Pakistan.

   (d) From UIP and given the result in b) we have
   
   \[ E_{IR/PR} = \frac{E_{IR/PR}^*}{1+i_{IND}-i_{PAK}} = \frac{1}{1+0.05} = 0.94 \]
   
   Indian rupees per Pakistan rupee.