[Key]
Practice Problems: Foreign Exchange

1. Let P_{US} be U.S. CPI, P_{MX} be the CPI in Mexico, and $s_{\$/Peso}$ be the exchange rate.

   a. Write out an expression that must hold for there to be Purchasing Power Parity between the U.S. and Mexico.

   $$P_{US} = s_{\$/Peso} P_{MX}$$

   b. Suppose that the price level in Mexico decreases and the price level in the U.S. increases. What should happen to the exchange rate?

   The Dollar should depreciate against the Mexican Peso.

   c. Write out an expression for the real exchange rate between the U.S. and Mexico. What does this measure? What kinds of problems might there be with this measure?

   $$rer_{US/MX} = \frac{s_{\$/Peso} P_{MX}}{P_{US}}$$

   The real exchange rate measures the amount of "American consumption baskets" one has to give up to get one "Mexican consumption basket." In other words, the real exchange rate measures the relative cost of living in the two countries. A common problem with this measure is that the basket of goods consumed in two countries may differ.

   Note to students: how would parts a and b change is the question asked for relative PPP?

2. Draw a supply and demand curve for Yuan on the axis below. The y-axis should be the Dollar price of Yuan, and the x-axis should be the quantity of Yuan. Assume that China has chosen a floating exchange regime.

s

$\overline{s}_{\$/Yuan}$

$s_{\$/Yuan}$

S

D

Qd   Q*   Qs
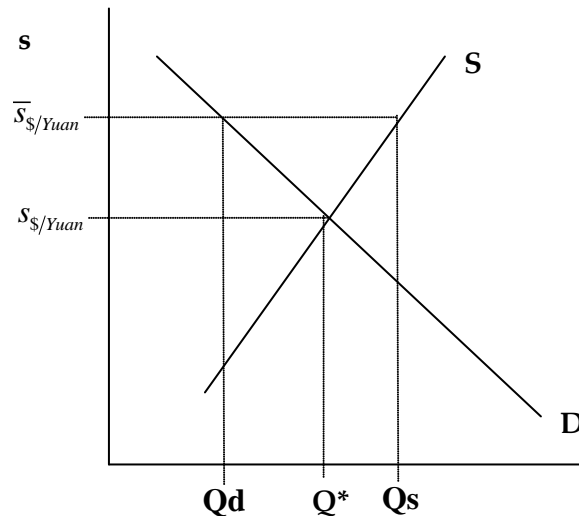
3. Now suppose that China decides to choose a fixed exchange rate, and that the rate makes the Yuan **overvalued** compared to the equilibrium exchange rate in part 2. (i.e., the number of dollars needed to buy a Yuan is greater than the floating exchange rate price) Label the new exchange rate, the amount of Yuan demanded and the amount of Yuan supplied on the graph in part 2.

4. How can the Chinese government support this exchange rate? How might this affect the price level in China?

To support the overvalued exchange rate, the government must buy Yuan using its international reserve assets. By pulling money out of the economy, this would slow down the rate of inflation in the economy, or, if the amount of money that had to be purchased was large enough, be deflationary.

5. Your company has contracted to buy 400 tons of cement from Cemex, a Mexican cement company. One year from now, your company has to make a 2000 Peso payment to Cemex. As the head of a large construction company, you would rather not take on any exchange rate risk.

    a. Your economic consultant suggests contracting in the forward market to buy Pesos and investing enough money today in T-bills to make the payment. If the one year forward rate is $f_{\$/Peso} = 0.10$ and the one year T-bill return is 3%, how much money should you invest today, to make your Peso payment next year?

$$2000\,Pesos \times 0.10\,(\$/Peso) = \$x_1 \times (1+.03)$$

$$\frac{2000\,Pesos \times 0.10\,(\$/Peso)}{1.03} = \$194.17$$

    b. Suppose that one year later, when you take delivery of your Pesos, the spot exchange rate is $s_{\$/Peso} = 0.12$. Was the hedge helpful?

    The hedge paid off. You paid $200 for the Pesos with the forward contract, but you would have had to pay $240 if you had waited and bought Pesos in the spot market one year later.

    Note: how would this answer have changed if the rate turned out to be 0.08?

6. What is the difference between *uncovered interest parity* and *covered interest parity*? Do these parities exist in the data?

Covered interest parity (CIP) demands that the return from investing in the U.S. must equal the covered return from investing abroad. This means that investing abroad by buying a foreign currency today and simultaneously contracting at the forward rate to sell the currency in the future must equal the domestic return. For example, between the U.S. and the U.K. we would have

$$1 + i_{US} = \left(1 + i_{UK}\right) \times f_{\$/£} \big/ s_{\$/£} \, .$$

In contrast, uncovered interest parity (UIP) demands that the return from investing in the U.S. must equal the uncovered return from investing abroad. This means that investing abroad by buying a foreign currency today and **selling the currency in the future spot market** must equal the domestic return. For example, between the U.S. and the U.K. we would have

$$1 + i_{US} = \left(1 + i_{UK}\right) \times E\left(s_{\$/£,t+1}\right) \big/ s_{\$/£,t} \, .$$

In the data, we see that CIP almost always holds (the key exception being extreme financial disturbances such as the 2007-2009 crisis), while UIP tends not to hold. Instead of UIP, which anticipates that high-interest-rate currencies will depreciate, empirical observation suggests that high-interest-rate currencies tend to appreciate.

7. Give two reasons why a country might want to fix the exchange rate. For each reason, give a sentence or two of explanation.

   1. The government may have a problem with central bank credibility. By fixing the exchange rate, the central bank must use monetary policy to fix the exchange rate, which does not allow it to print money to finance government deficits. If successful, the exchange rate peg allows a country to import the anti-inflation credibility of the central bank that manages the currency to which it has pegged.

   2. Fixing the exchange rate can increase the amount of trade between countries. A fixed exchange rate that is credible removes the foreign currency risk from international transactions.

8. Give two reasons why a country might *not* want to fix the exchange rate. For each reason, give a sentence or two of explanation.

1. A country may prefer to have an independent monetary policy and free flow of capital. If so, it would not be able to fix an exchange rate over the long run.

2. A country may prefer a floating exchange rate that cushions the economy during cyclical swings (appreciating during upturns and depreciating during recessions).