ECON 329 - Answers to HW1

1. Refer to the exchange rates from November 6, 2006, given in the table. Based on the table provided, answer the following questions.

a. Calculate the U.S. dollar–yen exchange rate, $E_{\$/¥}$, and the U.S. dollar–Canadian dollar exchange rate, $E_{\$/C\$}$, on November 6, 2005, and November 6, 2006.

Answer:

November 6, 2005: $E_{\$/¥}$ = 1 / (117.57) = \$0.008506

November 6, 2006: $E_{\$/¥}$ = 1 / (117.44) = \$0.008515

November 6, 2005: $E_{\$/C\$}$ = 1 / (1.19) = \$0.8403

November 6, 2006: $E_{\$/C\$}$ = 1 / (1.128) = \$0.8865

b. What happened to the value of the U.S. dollar relative to the Japanese yen and Canadian dollar between November 6, 2005,and November 6, 2006? Calculate the percentage change in the value of each foreign currency (Japanese yen and Canadian dollar) relative to the U.S. dollar for each country. Use your answers from (a).

Answer: Between November 6, 2005 and 2006, both the Canadian dollar and the Japanese yen appreciated relative to the U.S. dollar. The percentage appreciation in the foreign currency relative to the U.S. dollar is:

%Δ$E_{\$/¥}$ = (\$0.008515 – \$0.008506)/\$0.008506 = 0.11%

%Δ$E_{\$/¥}$ = (\$0.8865 – \$0.8403)/\$0.8403 = 5.50%

c. Using the information for November 2006 in the table, calculate the Danish krone–Canadian dollar exchange rate, $E_{krone/C\$}$.

Answer: $E_{krone/C\$}$ = $E_{krone/\$}$ / $E_{C\$/\$}$ = (5.823 /1.128) = 5.162 krone per C$

d. Visit the website of the Board of Governors of the Federal Reserve System at http://www.federalreserve.gov/. Click on "Economic Research and Data" and then "Statistical Releases and Historical Data." Download the H.10 release Foreign Exchange Rates (daily). What has happened to the value of the U.S. dollar relative to the Canadian dollar, Japanese yen, and Danish krone since November 2006?

Answer:

In the following, "now" means mid-February 2009.

US$ has appreciated relative to the Canadian dollar, from 1.13C$/US$ in 2006 to 1.24C$/US$ now.

US$ has depreciated relative to the Japanese yen, from 117 yen per $ in 2006 to 92 yen per $ now.

US$ is virtually unchanged relative to Denmark's krone (about 5.8 krone per $ in 2006 and today).

e. Using the information from (d), what has happened to the value of the U.S. dollar relative to the British pound and the euro? Note: the H.10 release quotesthese exchange rates as U.S. dollars per unit of foreign currency in line with long-standing market conventions.

Answer:

The US$ has appreciated against the pound, from $1.9 per pound in 2006 to $1.4 per pound today. The US$ is virtually unchanged relative to the euro: $1.28 per euro in 2006 vs. $1.3 per euro today.

2. Consider the United States and the countries it trades with the most (measured in trade volume): Canada, Mexico, China, and Japan. For simplicity, assume these are the only four countries with which the United States trades. Trade shares and exchange rates for these four countries are as follows: (see table in text)

a. Calculate the percentage change from 2002 to 2003 in the four U.S. bilateral exchange rates (defined as U.S. dollars per units of foreign exchange, or FX) in the table provided.

Answer:

$\%\Delta E_{\$/C\$}$ = (0.7930 – 0.641) / 0.0641 = 0.01903

$\%\Delta E_{\$/pesos}$ = (0.089 – 0.098) / 0.098 = –0.09184

$\%\Delta E_{\$/yuan}$ = (0.121 – 0.121) / 0.121 = 0.01903

$\%\Delta E_{\$/¥}$ = (0.009 – 0.008) / 0.008 = 0.125

b. Use the trade shares as weights to calculate the percentage change in the nominal effective exchange rate for the United States between 2002 and 2003 (in U.S. dollars per foreign currency basket).

Answer: The trade-weighted percentage change in the exchange rate is:

$\%\Delta E$ = 0.36($\%\Delta E_{\$/C\$}$) + 0.28($\%\Delta E_{\$/pesos}$) + 0.20($\%\Delta E_{\$/yuan}$) + 0.16($\%\Delta E_{\$/¥}$)

$\%\Delta E$ = 0.36(0.01903) + 0.28(_0.09184) + 0.20(0.01903) + 0.16(0.125) = 0.0628 = 6.28%

c. Based on your answer to (b), what happened to the value of the U.S. dollar against this basket between 2002 and 2003? How does this compare with the change in the value of the U.S. dollar relative to the Mexican peso? Explain your answer.

Answer: The value of the dollar decreased against this basket between 2002 and 2003. During this period, the dollar appreciated against the Mexican peso. However, the dollar depreciated against the other currencies in the basket.

3. Go to the website for Federal Reserve Economic Data (FRED), http://research .stlouisfed.org/fred2/. Locate the monthly exchange rate data for the following. Look at the graphs and decide whether each currency was fixed (peg or band), crawling (peg or band), or floating relative to the U.S. dollar during each time frame given.

a. Canada (dollar), 1980–2006

Answer: Floating exchange rate

b. China (yuan), 1999–2005

Answer: Fixed exchange rate (with occasional adjustment)

c. Mexico (peso), 1993–1995 and 1995–2006

Answer: 1993–1995: crawl; 1995–2006: floating (with some evidence of a managed float)

d. Thailand (baht), 1986–1997 and 1997–2006

Answer: 1986–1997: fixed exchange rate; 1997–2006: floating

e. Venezuela (bolivar), 2003–2006

Answer: Fixed exchange rate (with occasional adjustment)

4. Describe the different ways in which the government may intervene in the foreign exchange market.Why does the government have the ability to intervene in this way whereas private actors do not?

Answer: The government may participate in the forex market in a number of ways: capital controls, official market (with fixed rates), and intervention. The government has the ability to intervene in a way that private actors do not because (1) it can impose regulations on the foreign exchange market, and (2) it can implement large-scale transactions that influence exchange rates.

5. Suppose quotes for the dollar–euro exchange rate, $E_{\$/€}$, are as follows: in New York, $1.50 per euro; and in Tokyo, $1.55 per euro. Describe how investors use arbitrage to take advantage of the difference in exchange rates. Explain how this process will affect the dollar price of the euro in New York and Tokyo.

Answer: Investors will buy euros in New York at a price of $1.50 each because this is relatively cheaper than the price in Tokyo. They will then sell these euros in Tokyo at a price of $1.55, earning a $0.05 profit on each euro. With the influx of buyers in New York, the price of euros in New York will increase. With the influx of traders selling euros in Toyko, the price of euros in Tokyo will decrease. This price adjustment continues until the exchange rates are equal in both markets.

6. Consider a Dutch investor with 1,000 euros to place in a bank deposit in either the Netherlands or Great Britain. The (one-year) interest rate on bank deposits is 2% in Britain and 4.04% in the Netherlands. The (one-year) forward euro–pound exchange rate is 1.575 euros per pound and the spot rate is 1.5 euros per pound. Answer the following questions, using the *exact* equations for UIP and CIP as necessary.

a. What is the euro-denominated return on Dutch deposits for this investor?
Answer: The investor's return on euro-denominated Dutch deposits is equal to €1,040.04 (= €1,000 x (1 + 0.0404)).

b. What is the (riskless) euro-denominated return on British deposits for this investor using forward cover?
Answer: The euro-denominated return on British deposits using forward cover is equal to €1,071 (= €1,000 x (1.575/1.5) x (1+0.02)).

c. Is there an arbitrage opportunity here? Explain why or why not. Is this an equilibrium in the forward exchange rate market?
Answer: Yes, there is an arbitrage opportunity. The euro-denominated return on British deposits is higher than that on Dutch deposits. The net return on each euro deposit in a Dutch bank is equal to 4.04% versus 7.1% (= (1.575 / 1.5) x (1 + 0.02)) on a British deposit (using forward cover).

d. If the spot rate is 1.5 euros per pound, and interest rates are as stated previously, what is the equilibrium forward rate, according to CIP?
Answer: CIP implies: $F_{€/£} = E_{€/£} (1 + i_{€}) / (1 + i_{£})$ = 1.5 x 1.0404 / 1.02 = €1.53 per £.

e. Suppose the forward rate takes the value given by your answer to (d). Calculate the forward premium on the British pound for the Dutch investor (where exchange rates are in euros per pound). Is it positive or negative? Why do investors require this premium/discount in equilibrium?
Answer: Forward premium = ($F_{€/£} / E_{€/£}$ – 1) = (1.53 / 1.50) – 1 = 0.03 = 3%.
The existence of a positive forward premium would imply that investors expect the euro to depreciate relative to the British pound. Therefore, when establishing forward contracts, the forward rate is higher than the current spot rate.

f. If UIP holds, what is the expected depreciation of the euro against the pound over one year?

Answer: According to the UIP approximation, $\Delta E^{e}_{£/€} / E_{£/€} = i_{£} - i_{€}$ = 2.04%.

Therefore, the euro is expected to depreciate by 2.04%. Using the exact UIP condition, we first need to convert the exchange rates into pound–euro terms to calculate the depreciation in the euro.

From UIP:

$\Delta E^{e}_{£/€} / E_{£/€}$ x (1 + $i_{£}$)/(1 + $i_{€}$) = (1/1.5) x (1 + 0.02) / (1 + 0.0404) = £0.654 per €.

Therefore, the depreciation in the euro is equal to 1.34% (= 0.654 – 0.667).

g. Based on your answer to (f), what is the expected euro–pound exchange rate one year ahead?

Answer: Using the exact UIP (not the approximation), we know that the following is true:

$E^{e}_{£/€}$ = $E_{£/€}$ x (1 + $i_{€}$) / (1 + $i_{£}$) = 1.5 x 1.0404 / 1.02 = €1.53 per £.

Using the approximation, $E_{£/€}$ decreases by 2.04% from 0.667 to 0.653. This implies the new spot rate, $E_{€/£}$ = 1.53.