Foreign Exchange

Part 1: Travel Expenses

You are traveling internationally for business. Here is a list of your expenses. Note that the expenses are in the local currencies: Euros (EUR), Indian Rupees (INR), and Chinese Yuan (CNY).

	Stop 1: Frankfurt, Germany		Stop 2: Mumbai, India		Stop 3: Beijing, China	
Currency	**EUR**		**INR**		**CNY**	
Lodging	455.75		18,750.00		4,320.72	
Food	615.90		9,606.83		2,009.50	
Misc.	195.00		5,230.00		1,730.00	

The exchange rates at the time of your trip were as follows. Note that USD means U.S. Dollars.

Exchange rate	1.3491	USD/EUR	0.01598	USD/INR	0.1637	USD/CNY

1) How much, in terms of U.S. Dollars, did you spend on **Food** in **Germany**?

2) How much, in terms of U.S. Dollars, did you spend on miscellaneous expenses (**Misc.**) in **China**?

3) In which country did you spend the most on **Lodging**? How much was that expense, in USD?

4) In which country did you spend the most money on your trip? How much did you spend in that country, in USD?

5) Using the rates in the table:
   a. If you bought a present for your host for 50 CNY, how many USD would that be?

   b. If you had a limit of 100 USD to spend on a hotel room per night, how many CNY would that be?

Part 2: Less Favorable Rates

The exchange rates shown in Part 1 are the rates available to your company because it exchanges large amounts of currency. If you went to a bank or an exchange counter at a hotel or an airport, the rates for you would be less favorable.

1) If the rate at which you can exchange EUR for USD is 10% **worse** than the rate shown in Part 1 (i.e., EUR is 10% weaker relative to USD), how many USD can you get for 1 EUR?

    _____ USD/EUR

2) If the rate at which you can exchange INR for USD is 15% **worse** than the rate shown in Part 1 (i.e., INR is 15% weaker relative to USD), how many USD can you get for 1 INR?

    _____ USD/INR

3) If you change money at a tourist location, like an exchange counter at an airport, you may see "service charges" in addition to unfavorable rates. Say, on your trip, you decide to change some money at the Mumbai Airport. You want to change the 325 EUR you still have in your pocket to INR.

    a. Based on the exchange rates given in Part 1, how many INR could you get for 325 EUR? (Assume the rates are "as if" you exchanged EUR for USD and then USD for INR.)

    b. The exchange from part a reflects what rate?

    _____ INR/EUR

    c. If, however, the INR/EUR exchange rate at the airport is 17% worse than the rate you calculated in part b, how many INR could you get for 325 EUR?

    d. Now assume that in addition to the "worse" rate from part c, there is a 100 INR service charge. How many INR will you be left with after you exchange your 325 EUR?

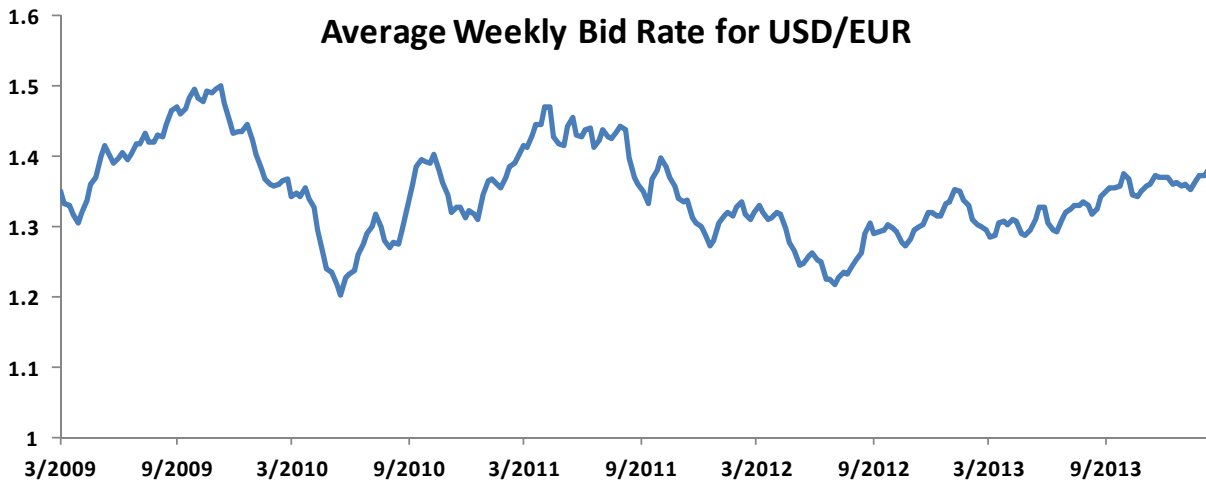e. The net exchange from part d is equivalent to what rate?

_____ INR/EUR

f. The rate calculated in part e is *what percent worse* than the rate in part b? (Hint: it has to be more than 17% worse—because the service charge comes on top of the 17% hit from part b.)

Part 3: Current Rates

1) Use a foreign exchange website (such as www.oanda.com: try searching for the currency converter on that site) to find current exchange rates. In looking up this data, you may find two rates, both a "selling" (bid) price and a "buying" (ask) price. If you see two rates, report your answers as the average of the two rates. Report the rate with the same amount of precision as you see on the website.

    a. Find the exchange rate between EUR and USD
    Note that conventions vary about whether this is referred to as USD/EUR or EUR/USD. We use USD/EUR to denote the quantity of USD that is "equivalent" to 1 EUR.

    _____ USD/EUR

    b. Find the exchange rate between INR and USD.

    _____ USD/INR

    c. Find the exchange rate between CNY and USD.

    _____ USD/CNY

    d. Where did you find your data? (What is the URL?)

Depending on which website you look at, and the time you look it up, the exact rates may differ from what your classmates found. However, they should be approximately the same.

2) Using the current rates you found from the website and the expense tables from Part 1, answer the following questions.
    a. How much, in terms of U.S. Dollars, did you spend on **Food** in **China**?

    b. How much, in terms of U.S. Dollars, did you spend on miscellaneous expenses (**Misc.**) in **Germany**?

    c. What was the total amount you spent, in USD, on the whole trip?

Part 4: Trends in Rates

Here is a graph of the average weekly rates for exchanging EUR for USD from March 2009 to March 2014.

Remember that conventions vary about the use of USD/EUR vs. EUR/USD. We use USD/EUR to denote the quantity of USD that is "equivalent" to 1 EUR.

Average Weekly Bid Rate for USD/EUR

1) Looking at the graph above, in approximately which month was the EUR the "strongest" compared to the USD? That is, in which month could one buy the most USD with EUR?

2) In approximately which month was the USD the "strongest" compared to the EUR? That is, in which month could one buy the most EUR with USD?

Now use a foreign exchange data website (such as www.oanda.com) and find past exchange rates between USD and other currencies. Although the details of sites will vary, you may be able to find this data by looking for a "Historical Exchange Rates" feature.

3) Find the rates for exchanging CNY for USD. Download the current data, going back five years, or the longest time period available on the website you are looking at.
   a. Create a graph like the one above, except show the rates for exchanging CNY for USD (instead of EUR for USD). (**You may be able to answer the next questions from graphing tools available on the website, but you will need to download the data to answer Question 5. And you also need to know how to create a trend chart like the one above.**)

b. Over the last **five** years, in approximately which month was the CNY the strongest compared to the USD?

c. In the **last year**, is there a trend: is the CNY getting stronger or weaker compared to the USD? Or is the relationship pretty flat?

4) Find the rates for exchanging INR for USD. Download the current data, going back five years, or the longest time period available on the website you are looking at.
   a. Create a graph like the one above, except show the rates for exchanging INR for USD.

   b. Over the last **five** years, in approximately which month was the INR the strongest compared to the USD?

   c. In the **last year**, is there a trend: is the INR getting stronger or weaker compared to the USD? Or is the relationship pretty flat?

5) When the USD got weaker compared to CNY, was it also weaker compared to INR? To answer that question, you will look at the correspondence in the two sets of historical rates you downloaded.
   a. Create a scatter plot of the rates for exchanging CNY for USD and the rates for exchanging INR for USD. (Make sure that the dates line up in the two data sets.)

   b. What is ***the correlation coefficient*** for the two sets of rates from part a? (Make sure that the dates line up in the two data sets.) For this question, use the full five years, or the longest amount of time you were able to download.

   Note: A <u>correlation coefficient</u> is a value that gives the <u>strength of the linear relationship between two quantities</u>. Correlation is a real number between -1 and 1. A relatively large positive number (like .8) would mean that there is a strong positive linear relationship between two sets of rates—the higher one rate, the higher the other. And a relatively large negative number would mean that the higher one rate, the lower the other. A number near 0 would mean that there is virtually no relationship.

   c. Just looking at the most recent year's worth of data, what is the correlation (i.e., the correlation coefficient) between the two sets of rates?

   d. Is the correlation stronger or weaker for the most recent year or for the longer data set?

Part 5: Buying and Selling Currencies

In looking up rates in Part 3, you may have noticed that there are different buying rates and selling rates for currency. These rates are not very far apart, but the small difference in the rates is how the foreign exchange broker makes money. A foreign exchange broker is a company that trades currencies for clients.

For example, say that for "small" exchanges, the rate for selling 1 EUR for USD is 1.30150. And the rate for buying 1 EUR with USD is 1.39261.

So, if I start with 1000 EUR and sell them (hand them over to the broker) in exchange for USD, I will receive 1,301.50 USD. Then, if I take the 1,301.50 USD and use them to buy EUR back from the broker, I get (1,301.50/1.39261) = 934.58 EUR. I ended up with less than I started with (by 65.42 EUR), and that difference is one of the ways the broker makes money.

1) The rate for selling 1 CNY for INR is 10.2089. The rate for buying 1 CNY with INR is 11.2009.
   a. If you start with 1000 CNY and sell them to buy INR, how many INR do you have?

   b. If you then take those INR and buy CNY, how many CNY do you have?

   c. How much money did the broker make? What currency is your answer in?

2) Use the same rates as in Question 1.
   a. If you start with 1000 INR and sell them to buy CNY, how many CNY do you have?

   b. If you then take those CNY and buy INR, how many INR do you have?

   c. How much money did the broker make? What currency is your answer in?

In theory, all the foreign exchange rates in the global economy should be exactly the same at every moment. In reality, the rates are constantly moving, so they aren't all in synch at every moment. Discrepancies can't last too long because currency traders would buy at the relatively low prices, closing any gap between different prices. But at any given moment, one might see different rates from different dealers.

3) Below, see "bid" and "ask" prices for three currencies (Euros, EUR; Japanese Yen, JPY; and Mexican Pesos MXN) in terms of the U.S. Dollar (USD) for two dealers. (This information is in the tab called 2 Dealers.)

	Dealer 1				**Dealer 2**			
	Bid	Ask			Bid	Ask		
USD/EUR	1.3501	1.3835		USD/EUR	1.3547	1.4102		
USD/JPY	0.009836	0.009877		USD/JPY	0.009875	0.010056		
USD/MXN	0.07511	0.07657		USD/MXN	0.07582	0.07746		
The bid price shown is the amount you would receive, in USD, if you sell one unit of the other currency.								
The ask price shown is the amount you would pay, in USD, to buy one unit the other currency.								

    a. For Dealer 1:

        i. If you had 1 JPY, how many USD can you get?

        ii. If you had 1 USD, how many JPY can you get?

        iii. If you had 1 JPY, how many EUR can you get (assuming you convert via USD)?

        iv. If you had 1 EUR, how many JPY can you get (assuming you convert via USD)?

    b. For Dealer 2: answer the same questions as you did for Dealer 1.

    c. Comparisons

        i. If you had 1000 MXN, from which dealer can you get more EUR? How many EUR?

        ii. If I use both dealers instead of just one, can you get more EUR for your 1000 MXN than you can from one dealer alone? If so, how many EUR can you get?

Part 6: Revenues and Expenses

Suppose your company has international operations and is generating revenue in CNY but has to pay expenses in USD.

In the questions below, you will compute a profit margin, which is the profit as a percentage of revenue. In other words the profit margin answers the question: of all the revenue a company makes, what percentage of that is profit?

Profit margin = (revenue – expenses) / revenue

1) If the revenue last quarter was 10 million CNY and the expenses were 1.2 million USD, what was the profit margin, using the USD/CNY rate from Part 1? (You can ignore the difference between bid and ask prices and just use the rate given in Part 1.)

_____%

2) If the revenue last quarter was 10 million CNY and the expenses were 1.2 million USD, what would the exchange rate have to be for the profit margin to be 20%?

_____ USD/CNY

3) If the revenue last quarter was 10 million CNY and the expenses were 1.2 million USD, what would the exchange rate have to be for the profit margin to be 12%?

_____ USD/CNY

4) Create a graph in Excel that shows the profit margin (%) as a function of the exchange rate (USD/CNY). Show USD/CNY rates from 0.1 to 0.2 in your graph.

5) If the USD gets stronger compared to the CNY, does that increase or decrease the profit margin?