Practice questions: Set #1

What should you do with this set?
To help students prepare for the exams and group cases, several problem sets with solutions shall be handed out. They shall not be graded: the number of "points" for a question solely indicates the time/difficulty of that question.

Students are strongly encouraged to try hard to solve them and to use office hours to discuss any problems they may have doing so. The best self-test for a student of his or her command of the material before an exam is whether he or she can handle the questions of the relevant practice sets. To reflect this close association between practice sets and exams, the final exam shall include at least a part of a question from the relevant practice sets.

Question 1. (10 points)

a. Cite 2 major reasons why multinational corporations may be riskier than companies that operate on the domestic market only. Explain briefly.

b. Argue briefly why, by going multinational, corporations can decrease their total business risk. Give the name of a company whose international operations clearly have such an effect.

c. On the basis of your answers on a. and b., would you expect multinational corporations to be more or less risky than domestic ones? (Hint: the world is not always in black and white.)

Question 2. (5 points)

a. Cite the currencies that make up most of the worldwide currency trading.

b. Norway has fewer than 10 million residents. Give 2 potential reasons for its currency to be among the main currencies traded on foreign exchange markets, as evidenced by the fact that futures contracts on the Norwegian Kr are actively traded in Chicago (CME).

Question 3. (5 points)

Suppose that, today, the SF is quoted in European terms at 1.6203 against the $. What would be the rate of the SF against the $ in American terms (give 4 decimals)?
**Question 4. (10 points)**

Suppose the direct quote for the pound sterling in NY is 2.2220-30.

a. What is the direct quote for dollars in London?

b. Compute the percentage bid-ask spread in NY.

**Question 5. (20 points)**

You are given the following exchange rates: SF in Zurich: 1.6000-35 SF/1$

£ in NY: 1.9810-50 $/1£

a. As a banker in London, you would like to quote a £ cross-rate for the SF (i.e., #£/1SF). If you anticipate to be the sole banker in the world quoting this cross-rate, what is your quote going to be? Explain.

(Hint: if you are the sole banker quoting cross-rates, you have no competition on that market and you can set your bid-asked spread to maximize your profit. Your constraint, however, is that you must still entice customers to trade with you, i.e., you must be so expensive that they prefer using the vehicle currency).

b. Now suppose that you have 200 competitors who want to quote this cross-rate, and that all those banks have operating costs of 0.05% of volume. Would this affect your answer? Show your work.

(Hint: you now have serious competition on the cross-rates market, which will force you to narrow the spread that was your answer in a. The question is: how will you set your bid-asked spread?).

c. Suppose one of your competitors in London quotes the following: 0.3160-80 £/1SF. Assume that you can trade with him up to a maximum of $2,000,000. Could you take advantage of that competitor? Is there any risk in doing so? Explain.

d. In answering c, did you need to own the $2,000,000? Explain briefly.
**Question 6. (20 points)**

**a.** Using Bloomberg you find that, in March 2005, the 3-month annualized euro-currency rates (used for interbank transactions, and at the time almost risk-free) were about: USD 5.34%, JPY 0.59%. Based on this information, should the Yen then have been trading at a forward discount or premium against the $? Explain briefly.

**b.** Suppose that, on the same day, the Yen traded around 108 against the US dollar. Precisely:

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Using the above quotes, compute the forward premia or discounts (“swap rates” in points) and the corresponding annualized percentage premia or discounts.

**c.** Is there a relationship between any of the (actual) percentage premia or discounts that you computed in part (b) and the (implied) percentage figure you found in part (a)? Explain briefly.
Question 1. (10 points)

a. Cite 2 major reasons why multinational corporations may be riskier than companies that operate on the domestic market only. Explain briefly.

Answer.

Among many risks faced when operating in foreign markets, two stand out:

* **exchange rate risk**: for a company, the earnings from operations in a foreign market depend as much on the internal efficiency of the foreign affiliate as on the exchange rate at which those earnings can be repatriated. Fluctuations in this exchange rate will dramatically affect the profitability of such operations.

* **political risk**: while a company can face strikes even in US- or EU-based operations, more severe disruptions such as civil wars, revolutions or nationalizations are a serious issue mostly in less financially developed countries. Even in those emerging markets that are considered safe for foreign investments, investors can be caught unawares. To wit, the Thai stock market index dropped by over 15% in December 2006 when, following a coup, the military junta in charge adopted measures that would have reinforced restrictions on foreign ownership of Thai assets. By contrast, political risks such as those have not been relevant in recent US history. Even in Western Europe, nationalizations have not been seen for 25 years (1981-1982 in France).

b. Argue briefly why, by going multinational, corporations can decrease their total business risk. Give the name of a company whose international operations clearly have such an effect.

Answer.

In spite of political risks, going international can be a good strategy to reduce general business risk – e.g., when the U.S. car market goes down, its West European is generally looking up. Note that reducing risk is only one of many reasons to invest abroad. Other motivations include exploiting foreign growth opportunities (e.g., setting up a computer subsidiary in India may help overcome trade restrictions against imported computers), accessing natural resources (e.g., operating in Kuwait may enable you to obtain Kuwaiti oil), and minimizing production or regulatory costs.

c. On the basis of on your answers on a. and b., would you expect multinational corporations to be more or less risky than domestic ones? (Hint: the world is not always in black and white.)

Answer.

The answers to parts a. and b. highlight the fact that a worldwide business carries risks as well as advantages. It is therefore hopeless to offer a peremptory answer to the dilemma: “Should I or not operate abroad?” The answer will depend on the size of the company asking this question, on the relative sizes of the domestic and foreign markets for its products, and on the extent to which the countries considered are subject to political instability.
Question 2. (5 points)

a. Cite the currencies that make up most of the worldwide currency trading.

Answer.
US Dollar, Euro, Japanese Yen, Pound Sterling, Swiss Franc, Canadian Dollar, Australian Dollar. Rounding up the list of so-called “G10” currencies are the Kiwi dollar (NZ), Norwegian Krone and Swedish Krona.

b. Norway has fewer than 10 million residents. Give 2 potential reasons for its currency to be among the main currencies traded on foreign exchange markets, as evidenced by the fact that futures contracts on the Norwegian Kr. are actively traded in Chicago (CME).

Answer.
First, this country has a large GNP, and a significant fraction thereof is generated by foreign trade (oil, fish, electricity, etc.). Thus, Norway occupies a fairly prominent place in international trade. Since most or all the earning from foreign trade must eventually be converted into local currency, the country also occupies a prominent place in international finance.
Second, Norway does not restrict the flow of currency through its borders. Money can be easily deposited in a Norwegian bank, and it can be easily withdrawn -- a big plus for investors weary of political instability.

Question 3. (5 points)

Suppose that, today, the SF is quoted in European terms at 1.6203 against the $. What would be the rate of the SF against the $ in American terms (give 4 decimals)?

Answer.
If the European quote is SF 1.6203/ $1, then the corresponding American quote is:

$ (1/1.6203) = $ 0.6172/ 1SF.

Question 4. (10 points)

Suppose the direct quote for the pound sterling in NY is 2.2220-30.

a. What is the direct quote for the US dollar in London?

Answer.
The direct quote in NY is the number of US$ (the local currency) per 1 Pound Sterling, i.e.:

$ 2.2220-30 / £1
Similarly, the direct quote in London will be the number of £ (the local currency) per 1 US Dollar:

\[ \frac{\frac{1}{2.2230} - \frac{1}{2.2220}}{1} / \$1, \text{ i.e., } \£ 0.4498 - 0.4500 / \$1 \]

Notice how the numbers are "inverted". This is because the direct asked price for the $ in London is the inverse of the direct bid price for the £ in NY, and similarly the direct bid price for the $ in London is the inverse of the direct asked price for the £ in NY (to see this, think about who is selling which currency and buying the other).

b. Compute the percentage bid-asked spread in NY.

**Answer.**

The percentage bid-asked spread is given by:

\[ \frac{\text{Asked} - \text{Bid}}{\text{Asked}} \times 100\% = \frac{2.2230 - 2.2220}{2.2230} \times 100\% = .045\% \]

**Question 5. (20 points)**

You are given the following exchange rates: SF in Zurich: 1.6000-35 SF/$

\[ £ \text{ in NY: 1.9810-50 $/£} \]

a. As a banker in London, you would like to quote a £ cross-rate for the SF (i.e., #£/1SF). If you anticipate to be the sole banker in the world quoting this cross-rate, what is your quote going to be? Show your work.

**Answer.**

1) **Bid (B):** as a banker in London, your bid is the price at which you will buy customers' SF, i.e., it is the # of £ that you will give them for 1 SF (direct quotation).

Now remember that, even though my question states that you have no competition in the cross-rate business, your customers can always obtain their £ by changing their SF into $, then their $ into £. If they do so, they will get:

\[ 1 \text{ SF} \rightarrow 1/1.6035 = 0.6236$ \rightarrow 0.6236/1.9850 = 0.3142 £ \]

Therefore, the lowest price at which you can propose to buy their SF in exchange for £ and still get their business is 0.3142 £/1 SF. Since you have no competitor in the cross-rate business, you should indeed be able to quote that price and still get customers.

2) **Asked (A):** as a banker in London, your asked price is the £ price at which you will sell 1 SF to your customers (direct quotation).
Now remember that, even though you have no competition in the cross-rate business, your customers can always obtain their SF by selling their £ for $, then selling these $ for SF. If they do so, they need the following # of £ to get 1 SF:

\[
1 \text{ £} \rightarrow 1 * 1.9810 = $1.981 \rightarrow 1.9810 * 1.6000 = 3.1696 \text{ SF}
\]

or (rescaling to end up with 1 SF)

\[
0.3155 \text{ £} \rightarrow 0.3155 * 1.9810 = $0.625 \rightarrow 0.625 * 1.6000 = 1 \text{ SF}
\]

Therefore, the highest price at which you can propose to sell them 1 SF in exchange for £ and still get their business is given by 0.3155 £/1 SF. Since you have no competitor in the cross-rate business, you can indeed quote that price and get customers.

The answer is thus: 0.3142-55 £/1 SF.

b. Now suppose that you have 200 competitors who want to quote this cross-rate, and that all those banks have operating costs of 0.05% of volume. Would this affect your answer? Explain.

**Answer.**

In case a., when you had no competition for cross-rates, you could quote: 0.3142-55 £/1 SF. The reason why you were able to quote such prices is that your customers could do no better by doing the transactions via the $ in NY and Zurich, and so might as well trade with you.

Unfortunately, you now do have competition in the cross-rates sector. Competition in the cross-rates market will ensure that B is strictly greater than 0.3142 £/1 SF, and that A is strictly lower than 0.3155 £/1 SF. To see why, suppose you quote B=0.3142 £/1 SF and that a competitor quotes 0.3143 £/1 SF. Her quote is such that she is not subject to triangular arbitrage. Yet, she will get all your business, since she is buying SF from customers at a more interesting rate for them. A similar argument shows that A<0.3155 £/1 SF.

To summarize, the spread that you will be able to quote is narrower than 0.3142-55 £/1 SF.

In the absence of any risk and transactions costs -- i.e., if buildings, trading infrastructure (terminals, phones, subscriptions,...), support staff, etc. were free and you needed neither food nor shelter-- but in the presence of heavy competition, you would quote the same price for buying and selling (i.e., A would be equal to B): this is because, since you have no costs to cover and there is no risk that the exchange rate will change abruptly, competition would ensure you make no revenues.

Since you have costs equal to approximately 0.05% of your transactions volume, however, you must find a bid-asked spread which is high enough to cover those costs, yet still attract customers.

It is impossible, with the information in the problem, to say more about B and A. If we let X be the "true spot rate", i.e., the spot rate that would be quoted in a competitive market in the absence of transactions costs, we would get: 0.3142 < B \leq X(1-.025%) < X(1+.025%) \leq A < 0.3155. But there is no information in the question that enables us to figure out what X is, and thus this is as far as we can go.
One final note is in order. Your B-A spread is not only meant to cover your transactions costs, it is also supposed to adequately compensate you for risk (in this case, the risk of taking the opposite side of a trade, either at the B or the A cross-rate, and being stuck with the trade while the market moves away from where it previously stood). If the cross-rate market is too thin (i.e., not liquid enough), then it may well be that, by narrowing down your spread too much in light of competitive pressures to do so, you would not earn an appropriate return for taking this risk. In that case, you may well decide to not compete.

c. Suppose one of your competitors in London quotes the following prices: 0.3160-.80 £/1 SF. Assume that you can trade with him up to a maximum of $2,000,000. Could you take advantage of that competitor? Is there any risk in doing so? Explain.

**Answer.**

Notice that the bid of that guy is higher than 0.3155 £/1 SF, which is the price that 1 SF will cost you if you do 2 transactions via the $. In other words, he's willing to pay too much for SF, which means that I need to sell him SF in order to exploit his mistake.

To do so, suppose that you have $ 2m.

- Sell $ 2m for SF in Zurich at a bid of 1.6000 SF/1$: this gives you SF 3.2 m.
- Now re-sell these SF 3.2 m to that "competitor" in London, at his bid of 0.3160£/1 SF: you get 1,011,200£.
- Finally, exchange those £ for $ in NY the bid of 1.9810: this gives you 2,003,187$.

Your profit is $3,187. Of course, you must be fast to catch the opportunity because a lot of people will notice it and it will not last for long. It is riskless, except that within the 2 days before delivery takes place, one of your intermediaries in NY or Zurich could default (most unlikely).

d. In answering c, did you need to own the $2,000,000? Explain briefly.

**Answer.**

Nope, you could have borrowed them. Since you borrow them until delivery takes place (i.e., for maximum 2 days), the cost of borrowing is likely to be very small.
Question 6. (20 points)

a. Using Bloomberg you find that, in March 2007, the 3-month annualized euro-currency rates (used for interbank transactions, and at the time almost risk-free) were about: USD 5.34%, JPY 0.59%. Based on this information, should the Yen then have been trading at a forward discount or premium against the $? Explain briefly.

Answer.
The average 3-month euro-currency rates differential stood at 4.75% in favor of the USD. According to interest rate parity, which must hold if arbitrage is to be ruled out, the ¥ must thus have been trading at a forward premium vs. the $. Intuitively, the ¥ must have been at a forward premium against the $ to compensate for lower interest rates in Japan (the annualized 3-month interest rate differential in favor of the US$ is 4.75%).

b. Suppose that, on the same day, the Yen traded around 108 against the US dollar. Precisely:

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<td>.009461</td>
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Using the above quotes, compute the forward premia or discounts (“swap rates” in points) and the corresponding annualized percentage premia or discounts.

Answer.

<table>
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<td>30-day fwd</td>
<td>.009258</td>
<td>+39</td>
<td>5.08% = (.000039/.009219)*(360/30)</td>
</tr>
<tr>
<td>90-day fwd</td>
<td>.009336</td>
<td>+117</td>
<td>5.08% = (.000117/.009219)*(360/90)</td>
</tr>
<tr>
<td>180-day fwd</td>
<td>.009461</td>
<td>+242</td>
<td>5.25% = (.000242/.009219)*(360/180)</td>
</tr>
</tbody>
</table>

c. Is there a relationship between any of the (actual) percentage premia or discounts that you computed in part (b) and the (implied) percentage figure you found in part (a)? Explain briefly.

Answer.
Yes: the ¥ is at a forward premium for 90-day delivery, which is what the 3-month interest rate differential predicted in part a. Although the numbers do not exactly match up (the quotes are not exactly contemporaneous), the direction of the premium/discount is unmistakable.