The Johns Hopkins University
The Paul H. Nitze School of Advanced International Studies, SAIS

Global Financial Markets and Institutions. Spring 2007
Course number 380.840

HOMEWORK # 2

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Due on Thursday, February 15th, 2007 at 11 a.m. Please deliver your homework in the box outside my office. I will not receive any other homework later than that.

The purpose of this homework is to give you a further understanding of Forwards, Futures and Options.

HEDGING FOREIGN EXCHANGE RATE RISK: FORWARDS

1. North Bank has been borrowing in the U.S. markets and lending abroad, thus incurring foreign exchange risk. In a recent transaction, it issued a one-year $2 million CD at 6 percent and funded a loan in euros at 8 percent. The spot rate for the euro was €1.45/$ at the time of the transaction.

   a. What will the Net Interest Income defined as ($Interest and principal at year-end on € loan – $Interest and principal of CDs), after one year if the euro does not change? Calculate the Net Interest Margin or SPREAD.

   b. Information received immediately after the transaction closing indicated that the euro will depreciate to €1.47/$ by year-end. If the information is correct, what will be the Net Interest Income? What will be the Net Interest Margin or SPREAD?

   c. What should have been the bank interest rate on the loan to maintain the SPREAD you found in (a)?

   d. The bank had an opportunity to sell one-year forward euros at €1.46. What would have been the spread on the loan if the bank had hedged forward its foreign exchange exposure?

   e. What would have been an appropriate change in loan rates to maintain the SPREAD found in (a) if the bank intended to hedge its exposure using the forward rates?

HEDGING FOREIGN EXCHANGE RATE RISK: FUTURES

2. An FI has assets denominated in British pound sterling of $125 million and sterling liabilities of $100 million.

   a. What is the FI's net exposure?

   b. Is the FI exposed to a dollar appreciation or depreciation?

   c. How can the FI use futures or forward contracts to hedge its FX rate risk?

   d. What is the number of futures contracts to be utilized to hedge fully the FI's currency risk exposure? Consider that the minimum contract size for British pounds is £62,500.

   e. If the British pound falls from $1.60/£ to $1.50/£, what will be the impact on the FI's cash position?

   f. If the British pound futures price falls from $1.55/£ to $1.45/£, what will be the impact on the FI's futures position?

3. On Monday morning, you sell one CME (Chicago Mercantile Exchange) yen <u>futures contract</u> containing ¥ 12,500,000 at a price of $0.009433. Suppose the broker requires an initial performance bond of $4,590 and maintenance performance bond of $3,400.[1] The settlement prices for Monday through Thursday are $0.009542, $0.009581, $0.009375, and $0.009369, respectively. On Friday, you close out the contract at a price of $0.009394.

   a. Calculate the daily cash flows on your account.

   b. Describe any necessary movements of money to avoid your account falling below the maintenance performance bond.

   c. What is your cash balance with your broker as of the close of business on Friday?

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[1] The ***initial performance bond***, which in this problem is $4,590, shows how much money must be in the account balance when the future contract is entered into. Money should be added to the account if because of losses on the futures contract –the balance in the account falls below the ***maintenance performance bond,*** which in this problem is $3,400. Example: If you start with an initial balance of $1,770 in your account on a future contract, and your contract loses, say $680 in value, your account will be $110 (1,770 – 680=1,090) below the maintenance performance bond of say $1,200. You must add $530 to your initial account to meet the initial performance bond ($1,770 - $680 + $530=$1620).

d. Assume that you begin with and initial balance of $4,590.

CREDIT RISK FORWARD CONTRACTS

4. A portfolio manager enters into a forward contract on a credit spread for company W. This contract is based on the credit spread of a newly issued bond by this company which has caused an increase in the current level of spread by 320 basis points. Suppose that the agreed forward credit spread at the time the contract is written, is 320 points (=CS_F), that the credit contract is of an amount equal to $20 million (=notional principal), and that the modified duration is 4.

a. If at the expiration date of this option the credit spread for this newly issued bond of this company W is 400 basis points, what is the dollar amount of the payoff? Who will be obtaining the gains of this contract, the buyer or the seller of the contract?

b. If at the expiration date of this option the credit spread for this newly issued bond of this company W is 200 basis points, what is the dollar amount of the payoff? Who will be obtaining the gains of this contract, the buyer or the seller of the contract?

PUT OPTIONS

5. Some people argue that:

"*Insurance companies are in the business of writing put options*".

Demonstrate that a homeowner's insurance policy acts as a put option. To facilitate your demonstration, assume the following:

- The homeowner buys a $15,000 insurance policy to compensate for any damage to his/her house. Thus, consider this $15,000 as the premium.
- The deductible is $25,000. That is, if the house suffers $4000 damage from a storm, the homeowner pays for all repairs himself/herself. If the house suffers $45,000 in damage from a storm, he/she pays $25,000 and the insurance company pays the remaining $20,000.
- Consider that the value of the house is $200,000 and this is recognized in the insurance policy and agreed by the homeowner and the insurance company.

Finally, before proceeding with your demonstration, think of (i) what will be the maximum amount that the insurance company will pay for damages; and (ii) what would be the strike price if you think the insurance policy acts as a put option.