

**Final Exam**

No points will be given by simply writing down formulas, and writing down definitions or irrelevant statements from the book, or saying "yes," will get you zero points. Justify all your answers. If you cannot prove something give some intuition. Good luck. Reminder: this is an open book exam, but no open notes.

Estimated Time: 2 hrs 30 minutes.

I. Problems (10 points each).

1.- (1) Bank of Kramerica, a U.S. bank, is quoting  $S_t = 1.20$  CHF/USD,  $S_t = 5.85$  PLZ/USD (PLZ=Polish Zloty). Calculate Bank of Kramerica's PLZ/CHF cross-rate.

(2) Suppose Kramerica is quoting  $S_t = 5.50$  PLZ/CHF. Construct a trading strategy (i.e., triangular arbitrage) to take advantage of Bank of Kramerica's quotes.

(3) Calculate the arbitrage profits.

2.- Mendy's, a Canadian company, sells frozen food to Japan. Every month Mendy's receives a payment of JPY 15,000,000. The exchange rate is .01 CAD/JPY. The volatility (i.e., standard deviation) of the CAD/JPY exchange rate is .002. Provide a range for Mendy's exposure, measured in CAD? Without using futures, options, or a money market hedge, how would you recommend Mendy's to reduce its FX exposure.

3.- Pendant Co., a U.S. publishing house, is paying an advance of GBP 250,000 to an English writer. Payment is due in mid-March 2005. Pendant wants to hedge their exposure with options. The exchange rate is  $S_t=1.636$  USD/GBP. You have the following information (taken from the Wall Street Journal).

**PHILADELPHIA OPTIONS**

Wednesday, December 7, 2005

		Calls		Puts	
		Vol.	Last	Vol.	Last
<b>British Pound</b>					<b>163.60</b>
<b>31,250 British Pounds-cents per unit.</b>					
150	March	...	...	161	0.16
152½	March	240	10.28	20	0.35
155	March	...	...	100	0.75
157½	June	...	...	60	0.38
157½	March	240	6.35	140	1.02
163½	June	88	1.95	...	...
165	March	3	3.00	55	3.81
167½	March	80	1.75	...	...

- A. Specify type of option contract (call or put).
- B. Specify number of contracts bought.
- C. Using the information given in the WSJ, construct:
  - i) in-the-money March hedge.
  - ii) out-of-the money March hedge.

Briefly discuss the advantages and disadvantages of each strategy. Which one would you recommend to Pendant? (Why?)

4.- The annual Indonesian rupiah (INR) interest rate is 20%, while the annual USD interest rate is 5%. Pitman Co., a U.S. firm, has entered into a currency swap where it receives 9.0% annually in USD and pays 25% annually in INR. The principals in the two currencies are USD 1 million and INR 5000 million. The swap will last for another three years. The exchange rate is .0002 USD/INR. For simplicity, assume the term structure in Indonesia and in the U.S. is flat.

A. Draw a diagram showing the annual swap cash flows (in INR and in USD).

B. Value this currency swap for Pitman Co.

C. A year from now, the exchange rate is .00015 USD/INR. Use the forward rate decomposition approach to calculate the new value of the swap. Has the value of the swap increased for Pitman Co.? Why?

5.- Assume the spot rate is 3.9 NZD/GBP (NZD=New Zealand Dollar). One-year interest rates are:  $i_{\text{GBP}}=6.5\%$  and  $i_{\text{NZD}}=5.8\%$ .

(1) Calculate the IRP one-year forward NZD/GBP rate.

(2) Suppose a bank offers a one-year forward rate equal to 4.1 NZD/GBP. Design a trading strategy to take advantage of the mispricing.

(3) Calculate the arbitrage profits.

6.- Elaine Corporation sold equipment to a Swiss firm. Elaine Corp. will receive CHF 2,000,000 in 90 days. It considers using (1) a forward hedge, (2) an option hedge, (3) a money market hedge, or (4) no hedge. Its analysts develop the following information, which can be used to assess the alternative solutions:

- Spot rate .50 USD/CHF
- 90-day forward rate .52 USD/CHF.
- Annual interest rates are as follows:
  - deposit rate: 7% in the CHF, and 5% in the U.S.
  - borrowing rate: 7.5% in Switzerland, and 5.5% in the U.S.
- A call option on CHF that expires in 90 days has an exercise price of USD .52 and a premium of USD .02.
- A put option on CHF that expires in 90 days has an exercise price of USD .51 and a premium of USD .04.
- Elaine Corporation forecasted the future spot rate in 90 days as follows:

Possible Outcomes	Probability
.48 USD/CHF	20%
.51 USD/CHF	60%
.55 USD/CHF	20%

Which strategy would you recommend to Elaine Corporation? Why? Be explicit.

7. You work for Pitts Corp., a U.S. company. Pitts Corp. has subsidiaries in Singapore and Hong Kong. You are given the following projections for next year:

Currency	Total inflows	Total outflows	Current Exchange rate
HKD	HKD 700,000	HKD 800,000	.13 USD/HKD
SGD	SGD 200,000	SGD 90,000	.65 USD/SGD

a.- What is the net transaction exposure for Pitts Inc.(in USD)?

b.- Suppose the Hong Kong dollar (HKD) and the Singapore dollar (SGD) are positively and perfectly correlated ( $\rho=1$ ). A year from now, the USD/HKD rate changes to .20 USD/HKD. What is the new net transaction exposure of Pitts Inc. (in USD)?

c.- Go back to part a. Now, suppose that the HKD and the SGD are independent ( $\rho=0$ ). A year from now, the USD/HKD rate changes to .10 USD/HKD. What is the new net transaction exposure of Pitts Inc. (in USD)?

8.- Vandelay Corporation presently has an existing business in New Zealand but is considering an additional plant there. The following information has been gathered to assess this project:

- The initial investment required is NZD 10 million. The current spot rate is .63 USD/NZD.
- The project will be terminated at the end of Year 2, when the subsidiary will be sold.
- The price, demand, and variable cost of the product in the New Zealand are as follows:

Year	Price	Demand	Variable cost
1	NZD 20	650,000	NZD 8
2	NZD 15	700,000	NZD 7

- The exchange rate is forecasted to be .61 USD/NZD at the end of Year 1, and .60 USD/NZD at the end of year 2.
- The New Zealand government will impose an income tax of 20% on income. In addition, the U.S. government will impose a tax of 10% on earnings remitted by the subsidiary. New Zealand imposes a 20% withholding tax on all remittances to foreign countries.
- All cash flows received by the subsidiary are sent to the parent at the end of each year.
- The annual depreciation expense is 10% of initial outlay.
- In two years the subsidiary is to be sold. Vandelay expects to receive NZD 2.0 million. This amount will be taxed at the usual withholding rate in New Zealand. (It will not be taxed in the U.S. at the 10% rate.)
- Vandelay requires a 20% rate of return on this project.

Should Vandelay accept this project? Calculate the decision from the perspective of the subsidiary and the parent.

## II. WSJ CASE (30 points)

Read the attached Bloomberg article (December 7, 2005) and briefly answer the following questions:

Note: No points will be given by simply writing lines from the article.

1) According to the article, the USD appreciated against the euro and the yen on speculation the Fed will increase interest rates. Show the effects of an increase in USD interest rates on the EUR/USD. Draw a graph.

2) Draw a graph showing how the ECB could intervene to stop the appreciation of the USD against the EUR. Also, show the effects of this intervention on European money markets.

3) Assume the Fed will increase U.S. interest rates to 4.25%. Using relative IFE, provide a 90-day forecast for the USD/EUR exchange rate and for the USD/JPY?



4) According to Akihiro Tanaka, the dollar will stay on an up trend and the yen on a down trend. Do you agree with Mr. Tanaka's assessment? Why?

5) Assume that the inflation rates for this year are 4.3%, 2.7% and -0.7% for the U.S., Europe and Japan. Are the changes in the USD/EUR and USD/JPY consistent with PPP? And with IFE? Justify your answer.

6) Suppose yesterday's  $S_t = 121$  JPY/USD. Mr. Kato mentions a confidence interval for the JPY/USD: 121.50 JPY/USD, 120.50 JPY/USD. Based on the normal distribution and a 95% confidence interval, derive the standard deviation ( $\sigma$ ) for changes in the JPY/USD implicit in Mr. Kato's formula. (Hint: use the formula for the 95% C.I. for  $e_f$ .)