

Homework 2

2.1 (Ch. 11) Forward versus Money Market Hedge on Receivables. Assume the following information:

- 180-day U.S. interest rate = 8%
- 180-day British interest rate = 9%
- $F_{t,180\text{-day}} = 1.50 \text{ USD/GBP}$
- $S_t = 1.48 \text{ USD/GBP}$

Assume that Riverside Corp. from the United States will receive GBP 400,000 in 180 days. Would it be better off using a forward hedge or a money market hedge? Substantiate your answer with estimated revenue for each type of hedge.

2.2 (Ch. 11) Hedging With Put Options. As treasurer of Tucson Corp. (a U.S. exporter to New Zealand), you must decide how to hedge (if at all) future receivables of NZD 250,000 (NZD=New Zealand dollar) 90 days from now. Put options are available for a premium of USD .03 per unit and an exercise price of .49 USD/NZD. The forecasted (USD/NZD) spot rate in 90 days follows:

<u>Future Spot Rate (USD/NZD)</u>	<u>Probability</u>
.44	30%
.40	50
.38	20

Given that you hedge your position with options, create a probability distribution for USD to be received in 90 days.

2.3 (Ch. 11) Comparison of Techniques for Hedging Receivables. SMU Corp. has future receivables of NZD 4,000,000 (NZD=New Zealand dollar) in one year. It must decide whether to use options or a money market hedge to hedge this position. Use any of the following information to make the decision. Verify your answer by determining the estimate (or probability distribution) of dollar revenue to be received in one year for each type of hedge.

$$S_t (\text{NZD/USD}) = .54 \text{ USD/NZD}$$

One-year call option: Exercise price = .50 USD/NZD; premium = USD .07

One-year put option: Exercise price = .52 USD/NZD; premium = USD .03

	<u>U.S.</u>	<u>New Zealand</u>
One-year deposit rate	9%	6%
One-year borrowing rate	11%	8%

	<u>Rate</u>	<u>Probability</u>
Forecasted S_t (USD/NZD)	.50	20%
	.51	50 %
	.53	30%

2.4 (Ch. 11) Hedging with Forward versus Option Contracts. As treasurer of Tempe Corp., you are confronted with the following problem. You plan to receive GBP 1 million in one year. Assume the one-year forward rate is 1.59 USD/GBP. A one-year put option is available. It has an exercise price of 1.61 USD/GBP. Today, the spot rate is 1.62 USD/GBP, and the option premium is USD .04 per unit. Your forecast of the percentage change in the spot rate was determined from the following regression model:

$$e_{f,t} = a_0 + a_1 \text{DINF}_{t-1} + a_2 \text{DINT}_t + \varepsilon_t$$

where $e_{f,t}$ = percentage change in the USD/GBP exchange rate value over period t
 DINF_{t-1} = inflation rate differential between the U.S. and the U.K. in period $t-1$
 DINT_t = interest rate differential between the U.S. and the U.K. over period t
 $a_0, a_1,$ and a_2 = regression coefficients
 ε_t = error term

The regression model was applied to historical annual data, and the regression coefficients were estimated as follows:

$$a_0 = 0.0, \quad a_1 = 1.1, \quad a_2 = 0.6$$

Assume last year's inflation rates were 3% for the U.S. and 8% for the U.K. Also assume that the interest rate differential (DINT_t) is forecasted as follows for this year:

<u>Forecast of DINT_t</u>	<u>Probability</u>
1%	40%
2%	50%
3%	10%

Using any of the available information, should the treasurer choose the forward hedge or the put option hedge? Show your work.

2.5 (Ch. 12) Comparing Degrees of Economic Exposure. Carlton Co. and Palmer, Inc., are U.S.-based MNCs with subsidiaries in Mexico that distribute medical supplies (produced in the United States) to customers throughout Latin America. Both subsidiaries purchase the products at cost and sell the products at 90 percent markup. The other operating costs of the subsidiaries are very low. Carlton Co. has a research and development center in the United States that focuses on improving its medical technology. Palmer, Inc., has a similar center based in Mexico. The parent of each firm subsidizes its respective research and development center on an annual basis. Which firm is subject to a higher degree of economic exposure? Explain.

2.6 (Ch. 11) It is March 3, 2011. Malone, a U.S. company, exports baseball equipment to Taiwan. Malone expects to receive a payment of TWD 50 million in August 1, 2011, say a 5-month maturity for the payment (TWD=Taiwanese Dollar). Malone decides to hedge this exposure using an August forward contract, which expires on August 1, 2011. The 5-month Taiwanese interest rate is 4%, while the 5-month U.S. interest rate is 1.3%. On March 3, the spot exchange rate is 29.78 TWD/USD and the August 1 forward trades at 30.12 TWD/USD.

(A) Use the information given in the attached Excel output (based on 10 years of monthly changes) to calculate:

i) The VAR associated with Malone's open position (use a 97.5% C.I.).

- ii) The worst case scenario for Malone.
 (B) Calculate the amount to be received on August 1, using a forward hedge.
 (C) Calculate the amount to be received on August 1, using a money market hedge.

Notes: 1) Note: Data is in terms of TWD/USD, but question is in terms of USD –i.e, USD=DC!
 2) The data is based on monthly changes, you need to bring it to the appropriate 5-mo. change. (You can use the logarithmic approximation for returns and standard deviations.)

● **DATA**

The information below is based on monthly percentage changes from 2001:1 to 2010:12.

1-mo % change TWD/USD	
Mean	-0.077%
Standard Error	0.1329%
Median	-0.029%
Mode
Standard Deviation	1.4495%
Sample Variance	2.1
Kurtosis	0.561619
Skewness	-0.26282
Range	8.2225
Minimum	-4.365%
Maximum	3.8576%
Sum	-9.202
Count	119

2.7 (Ch. 12) Managing Economic Exposure. St. Paul Co. does business in the United States and New Zealand. In attempting to assess its economic exposure, it compiled the following information.

- a. St. Paul’s U.S. sales are somewhat affected by the value of the New Zealand dollar (NZD), because it faces competition from New Zealand exporters. It forecasts the U.S. sales based on the following three exchange rate scenarios:

<u>Exchange Rate of NZD</u>	<u>Revenue from U.S. Business (in millions)</u>
.48 USD/NZD	USD 100
.50 USD/NZD	USD 105
.54 USD/NZD	USD 110

- b. Its New Zealand dollar revenues on sales to New Zealand invoiced in New Zealand dollars are expected to be NZD 600 million.
 c. Its anticipated cost of goods sold is estimated at USD 200 million from the purchase of U.S. materials and NZD 100 million from the purchase of New Zealand materials.
 d. Fixed operating expenses are estimated at USD 30 million.
 e. Variable operating expenses are estimated at 20 percent of total sales (after including New Zealand sales, translated to a dollar amount).

f. Interest expense is estimated at USD 20 million on existing U.S. loans, and the company has no existing New Zealand loans.

Create a forecasted income statement for St. Paul Co. under each of the three exchange rate scenarios. Explain how St. Paul's projected earnings before taxes are affected by possible exchange rate movements. Explain how it can restructure its operations to reduce the sensitivity of its earnings to exchange rate movements without reducing its volume of business in New Zealand.

2.8 (Ch. 13) DFI to Reduce Cash Flow Volatility. Raider Chemical Co. and Ram, Inc., had similar intentions to reduce the volatility of their cash flows. Raider implemented a long-range plan to establish 40 percent of its business in Canada. Ram, Inc., implemented a long-range plan to establish 30 percent of its business in Europe and Asia, scattered among 12 different countries. Which company will more effectively reduce cash flow volatility once the plans are achieved?

2.9 (Ch. 13) Capitalizing on Low-Cost Labor. Some MNCs establish a manufacturing facility where there is a relatively low cost of labor. Yet, they sometimes close the facility later because the cost advantage dissipates. Why do you think the relative cost advantage of these countries is reduced over time? (Ignore possible exchange rate effects.)

2.10 (Ch. 13) Benefits of International Diversification. Boyd Inc., a U.S. firm, plans to invest in a new project that will be located either in Venezuela or in Colombia. If the Venezuelan project is selected, it will constitute 45% of the firm's total funds invested in itself. If the Colombian project is selected, it will constitute only 15% of the firm's total funds. Assume the U.S. risk free rate is 4%. You have the following data on expected returns for each project:

	Boyd	Venezuela	Colombia
Expected return	11%	25%	35%
Standard deviation	20%	30%	55%
Correlation with existing Boyd's portfolio	1.00	.40	.10
Weight on overall portfolio	-	.45	.15
Beta	.90	1.20	1.40

- Based on the Sharpe Ratio, which project would you recommend to Boyd?
- Based on the Treynor Ratio, which project would you recommend to Boyd?
- Is Boyd, under both criteria, better off without adding any project?

2.11 (Ch. 14) Capital Budgeting Analysis. Wolverine Corp. currently has no existing business in New Zealand but is considering establishing a subsidiary there. The following information has been gathered to assess this project:

- The initial investment required is USD 50 million in NZDs (NZD). Given the existing spot rate of USD .50 per NZD, the initial investment in USDs is USD 25 million. In addition to the NZD 50 million initial investment for plant and equipment, NZD 20 million is needed for working capital and will be borrowed by the subsidiary from a New

- Zealand bank. The New Zealand subsidiary will pay interest only on the loan each year, at an interest rate of 14 percent. The loan principal is to be paid in 10 years.
- The project will be terminated at the end of Year 3, when the subsidiary will be sold.
 - The price, demand, and variable cost of the product in New Zealand are as follows:

<u>Year</u>	<u>Price</u>	<u>Demand</u>	<u>Variable Cost</u>
1	NZD 500	40,000 units	NZD 30
2	NZD 511	50,000 units	NZD 35
3	NZD 530	60,000 units	NZD 40

- The fixed costs, such as overhead expenses, are estimated to be NZD 6 million per year.
 - The exchange rate of the NZD is expected to be USD .52 at the end of Year 1, USD .54 at the end of Year 2, and USD .56 at the end of Year 3.
 - The New Zealand government will impose an income tax of 30 percent on income. In addition, it will impose a withholding tax of 10 percent on earnings remitted by the subsidiary. The U.S. government will allow a tax credit on the remitted earnings and will not impose any additional taxes.
 - All cash flows received by the subsidiary are to be sent to the parent at the end of each year. The subsidiary will use its working capital to support ongoing operations.
 - The plant and equipment are depreciated over 10 years using the straight-line depreciation method. Since the plant and equipment are initially valued at NZD 50 million, the annual depreciation expense is NZD 5 million.
 - In three years, the subsidiary is to be sold. Wolverine plans to let the acquiring firm assume the existing New Zealand loan. The working capital will not be liquidated but will be used by the acquiring firm when it sells the subsidiary. Wolverine expects to receive NZD 52 million after subtracting capital gains taxes. Assume that this amount is not subject to a withholding tax.
 - Wolverine requires a 20 percent rate of return on this project.
- Determine the net present value of this project. Should Wolverine accept this project?
 - Assume that Wolverine is also considering an alternative financing arrangement, in which the parent would invest an additional USD 10 million to cover the working capital requirements so that the subsidiary would avoid the New Zealand loan. If this arrangement is used, the selling price of the subsidiary (after subtracting any capital gains taxes) is expected to be NZD 18 million higher. Is this alternative financing arrangement more feasible for the parent than the original proposal? Explain.
 - From the parent's perspective, would the *NPV* of this project be more sensitive to exchange rate movements if the subsidiary uses New Zealand financing to cover the working capital or if the parent invests more of its own funds to cover the working capital? Explain.
 - Assume Wolverine used the original financing proposal and that funds are blocked until the subsidiary is sold. The funds to be remitted are reinvested at a rate of 6 percent (after taxes) until the end of Year 3. How is the project's *NPV* affected?
 - What is the break-even salvage value of this project if Wolverine uses the original financing proposal and funds are not blocked?

2.12 (Ch. 15) Valuing a Foreign Target. Blore Inc., a U.S.-based MNC, has screened several targets. Based on economic and political considerations, only one eligible target remains in Malaysia. Blore would like you to value this target and has provided you with the following information:

- Blore expects to keep the target for three years, at which time it expects to sell the firm for 300 million Malaysian ringgit (MYR) after any taxes.
- Blore expects a strong Malaysian economy. The estimates for revenue for the next year are MYR 200 million. Revenues are expected to increase by 8% in each of the following two years.
- Cost of goods sold are expected to be 50% of revenue.
- Selling and administrative expenses are expected to be MYR30 million in each of the next three years.
- The Malaysian tax rate on the target's earnings is expected to be 35 percent.
- Depreciation expenses are expected to be MYR 20 million per year for each of the next three years.
- The target will need MYR 7 million in cash each year to support existing operations.
- The target's stock price is currently MYR 30 per share. The target has 9 million shares outstanding.
- Any remaining cash flows will be remitted by the target to Blore Inc. Blore uses the prevailing exchange rate of the MYR as the expected exchange rate for the next three years. This exchange rate is currently .25 USD/MYR
- Blore's required rate of return on similar projects is 20 percent.

a. Prepare a worksheet to estimate the value of the Malaysian target based on the information provided.

b. Will Blore Inc. be able to acquire the Malaysian target for a price lower than its valuation of the target?

2.13 (Ch. 16) How Country Risk Affects NPV. Hoosier, Inc., is planning a project in the United Kingdom. It would lease space for one year in a shopping mall to sell expensive clothes manufactured in the U.S. The project would end in one year, when all earnings would be remitted to Hoosier, Inc. Assume that no additional corporate taxes are incurred beyond those imposed by the British government. Since Hoosier, Inc., would rent space, it would not have any long-term assets in the United Kingdom, and expects the salvage (terminal) value of the project to be about zero.

Assume that the project's required rate of return is 18 percent. Also assume that the initial outlay required by the parent to fill the store with clothes is USD 200,000. The pretax earnings are expected to be GBP 300,000 at the end of one year. The British GBP is expected to be worth USD 1.60 at the end of one year, when the after-tax earnings are converted to dollars and remitted to the United States. The following forms of country risk must be considered:

- The British economy may weaken (probability = 30%), which would cause the expected pretax earnings to be GBP 200,000.
- The British corporate tax rate on income earned by U.S. firms may increase from 40 percent to 50 percent (probability = 20 percent).

These two forms of country risk are independent. Calculate the expected value of the project's net present value (*NPV*) and determine the probability that the project will have a negative *NPV*.

2.14 (Ch. 17) Target Capital Structure. LaSalle Corp. is a U.S.-based MNC with subsidiaries in various less developed countries where stock markets are not well established. How can LaSalle still achieve its “global” target capital structure of 50 percent debt and 50 percent equity, if it plans to use only debt financing for the subsidiaries in these countries?

2.15 (Ch. 17) Interaction between Financing and Investment. Charleston Corp. is considering establishing a subsidiary in either Germany or the United Kingdom. The subsidiary will be mostly financed with loans from the local banks in the host country chosen. Charleston has determined that the revenue generated from the British subsidiary will be slightly more favorable than the revenue generated by the German subsidiary, even after considering tax and exchange rate effects. The initial outlay will be the same, and both countries appear to be politically stable. Charleston decides to establish the subsidiary in the United Kingdom because of the revenue advantage. Do you agree with its decision? Explain.

2.16 (Ch. 18) Cost of Financing. Assume that Seminole, Inc., considers issuing a SGD-denominated (SGD=Singapore dollar) bond at its present coupon rate of 7 percent, even though it has no incoming cash flows to cover the bond payments. It is attracted to the low financing rate, since U. S. dollar-denominated bonds issued in the United States would have a coupon rate of 12 percent. Assume that either type of bond would have a four-year maturity and could be issued at par value. Seminole needs to borrow USD 10 million. Therefore, it will either issue USG-denominated bonds with a par value of USD 10 million or bonds denominated in Singapore dollars with a par value of SGD 20 million. The spot rate of the Singapore dollar is USD .50. Seminole has forecasted the Singapore dollar's value at the end of each of the next four years, when coupon payments are to be paid:

<u>End of Year</u>	<u>Exchange Rate (USD/SGD)</u>
1	.52 USD/SGD
2	.56
3	.58
4	.53

Determine the expected annual cost of financing with SGD. Should Seminole, Inc., issue bonds denominated in USDs or SGD? Explain.

2.17 (Ch. 18) Swap Agreement. Grant, Inc., is a well-known U.S. firm that needs to borrow GBP 10 million to support a new business in the United Kingdom. However, it cannot obtain financing from British banks because it is not yet established within the United Kingdom. It decides to issue dollar-denominated debt (at par value) in the U.S., for which it will pay an annual coupon rate of 10%. It then will convert the dollar proceeds from the debt issue into British GBP at the prevailing spot rate (the prevailing spot rate is GBP 1 = USD 1.70). Over each of the next three years, it plans to use the revenue in GBP from the new business in the United Kingdom to make its annual debt payment. Grant, Inc., engages in a currency swap in

which it will convert GBP to USD at an exchange rate of USD 1.70 per GBP at the end of each of the next three years. How many dollars must be borrowed initially to support the new business in the United Kingdom? How many GBP should Grant, Inc., specify in the swap agreement that it will swap over each of the next three years in exchange for dollars so that it can make its annual coupon payments to the U.S. creditors?

2.18. (Ch. 18) Value of a Swap. The annual Indian rupee (INR) interest rate is 10% (s.a.), while the annual USD interest rate is 2% (s.a.). Tortelli Co., a U.S. firm, entered into a currency swap with a swap dealer, where Tortelli receives 3.0% semi-annually in USD and pays 8% semi-annually in INR. The principals in the two currencies are USD 2 million and INR 100 million. Notional principals are exchanged at the end of the swap. The swap will last for another two years. The exchange rate is .02 USD/INR. For simplicity, assume the term structure in India and in the U.S. is flat.

- A. Draw a diagram showing the semi-annual swap cash flows (in INR and in USD).
- B. Value this currency swap for Tortelli Co.

2.19 (Ch. 20) Probability Distribution of Financing Costs. Missoula, Inc., decides to borrow Japanese yen for one year. The interest rate on the borrowed yen is 8 percent. Missoula has developed the following probability distribution for the yen's degree of fluctuation against the dollar:

<u>Percentage change (USD/JPY)</u>	<u>Probability</u>
- 4%	20%
- 1%	30%
0%	10%
3%	40%

Given this information, what is the expected value of the effective financing rate of the Japanese yen from the U.S. corporation's perspective?

2.20 (Ch. 20) Analysis of Short-term Financing. Jacksonville Corp. is a U.S.-based firm that needs USD 600,000. It has no business in Japan but is considering one-year financing with Japanese yen, because the annual interest rate would be 5 percent versus 9 percent in the United States. Assume that interest rate parity exists.

- a. Can Jacksonville benefit from borrowing Japanese yen and simultaneously purchasing yen one year forward to avoid exchange rate risk? Explain.
- b. Assume that Jacksonville does not cover its exposure and uses the forward rate to forecast the future spot rate. Determine the expected effective financing rate. Should Jacksonville finance with Japanese yen? Explain.
- c. Assume that Jacksonville does not cover its exposure and expects that the Japanese yen will appreciate by either 5%, 3%, or 2%, and with equal probability of each occurrence. Use this information to determine the probability distribution of the effective financing rate. Should Jacksonville finance with Japanese yen? Explain.

2.21 (Ch. 20) Financing with a Portfolio. Pepperdine, Inc., considers obtaining 40 percent of its one-year financing in Canadian dollars and 60 percent in Japanese yen. The forecasts of appreciation in the CAD and JPY for the next year are as follows:

<u>Currency</u>	<u>Change in the S_t Over the Loan Life(e_r)</u>	<u>Probability</u>
CAD	4%	70%
CAD	7%	30%
JPY	6%	50%
JPY	9%	50%

The interest rate on the CAD is 9 percent, and the interest rate on the Japanese yen is 7 percent. Develop the possible effective financing rates of the overall portfolio and the probability of each possibility based on the use of joint probabilities.