

APPENDIX 21

Investing in a Portfolio of Currencies

Large financial corporations may consider investing in a portfolio of currencies, as illustrated in the following example.

Assume that MacFarland Co., a U.S. firm, needs to invest \$100,000 for one year and obtains these interest rate quotes:

- Interest rate for a one-year deposit in U.S. dollars = 11%.
- Interest rate for a one-year deposit in Singapore dollars = 14%.
- Interest rate for a one-year deposit in British pounds = 13%.

Due to the relatively high quotes for a deposit in Singapore dollars or British pounds, it is understandable that MacFarland Co. may desire to invest in a foreign currency. If the firm decides to use foreign investing, it has three choices based on the information given here:

- Invest in only Singapore dollars.
- Invest in only British pounds.
- Invest in a mixture (or portfolio) of Singapore dollars and pounds.

Assume that MacFarland Co. has established possible percentage changes in the spot rate from the time the deposit would begin until maturity for both the Singapore dollar and the British pound, as shown in the second column of Exhibit 21A.1. We shall first discuss the Singapore dollar. For each possible percentage change that might occur, a probability of that occurrence is shown in the third column. Based on the assumed interest rate of 14 percent for the Singapore dollar, the effective yield is computed for each possible percentage change in the Singapore dollar's spot rate over the loan life. In Exhibit 21A.1, there is a 20 percent chance the Singapore dollar will depreciate by 4 percent during the deposit period. If it does, the effective yield will be 9.44 percent. Furthermore, there is a 50 percent chance the effective yield will be 12.86 percent and a 30 percent chance it will be 16.28 percent. Given that the U.S. deposit rate is 11 percent, there is a 20 percent chance that investing in Singapore dollars will result in a lower effective yield than investing in a U.S. dollar deposit.

The lower section of Exhibit 21A.1 provides information on the British pound. The pound has a 30 percent chance of depreciating by 3 percent during the deposit period, and so on. Based on the 13 percent interest rate for a British pound deposit, there is a 30 percent chance the effective yield will be 9.61 percent, a 30 percent chance it will be 13 percent, and a 40 percent chance it will be 15.26 percent. Keeping in mind the 11 percent rate on a U.S. dollar deposit, there is a 30 percent chance that investing in British pounds will be less rewarding than investing in a U.S. dollar deposit.

Exhibit 21A.1 Development of Possible Effective Yields

Currency	Possible Percentage Change in the Spot Rate over the Deposit Life	Probability of That Percentage Change in the Spot Rate Occurring	Computation of Effective Yield Based on That Percentage Change in the Spot Rate
Singapore dollar	-4%	20%	$(1.14) [1 + (-4\%)] - 1 = 9.44\%$
Singapore dollar	-1	50	$(1.14) [1 + (-1\%)] - 1 = 12.86\%$
Singapore dollar	+2	30	$(1.14) [1 + (2\%)] - 1 = 16.28\%$
		<u>100%</u>	
British pound	-3	30	$(1.13) [1 + (-3\%)] - 1 = 9.61\%$
British pound	0	30	$(1.13) [1 + (0\%)] - 1 = 13.00\%$
British pound	+2	40	$(1.13) [1 + (2\%)] - 1 = 15.26\%$
		<u>100%</u>	

Before examining the third possible foreign investing strategy (the portfolio approach) available here, determine the expected value of the effective yield for each foreign currency, summing up the products of each possible effective yield and its associated probability as follows:

Currency	Computation of Expected Value of Effective Yield
Singapore dollar	$(20\%)(9.44\%) + 50\%(12.86\%) + 30\%(16.28\%) = 13.202\%$
British pound	$(30\%)(9.61\%) + 30\%(13.00\%) + 40\%(15.26\%) = 12.887\%$

The expected value of the Singapore dollar's yield is slightly higher. In addition, the individual degree of risk (the chance the return on investment will be lower than the return on a U.S. deposit) is higher for the pound. If MacFarland Co. does choose to invest in only one of these foreign currencies, it may choose the Singapore dollar since its risk and return characteristics are more favorable. Before making its decision, however, the firm should consider the possibility of investing in a currency portfolio.

The information in Exhibit 21A.1 shows three possibilities for the Singapore dollar's effective yield. The same holds true for the British pound. If MacFarland Co. invests half of its available funds in each of the foreign currencies, then there will be nine possibilities for this portfolio's effective yield. These possibilities are shown in Exhibit 21A.2. The first two columns list all possible joint effective yields. The third column computes the joint probability of each possible occurrence. The fourth column shows the computation of the portfolio's effective yield based on the possible rates for the individual currencies shown in the first two columns. The top row of the table indicates that one possible outcome of investing in both Singapore dollars and British pounds is an effective yield of 9.44 and 9.61 percent, respectively. The probability that the Singapore dollar's effective yield will occur is 20 percent, while the probability that the British pound's effective yield will occur is 30 percent. The joint probability that both of these effective yields will occur simultaneously is $(20\%)(30\%) = 6\%$. Assuming that half (50%) of the funds available are invested in each currency, the portfolio's effective yields will be $.5(9.44\%) + .5(9.61\%) = 9.525\%$ (if those individual effective yields do occur).

Exhibit 21A.2 Analysis of Investing in Two Foreign Currencies

Possible Joint Effective Yield			
Singapore Dollar	British Pound	Computation of Joint Probability	Computation of Effective Yield of Portfolio (50% of Total Funds Invested in Each Currency)
9.44%	9.61%	$(20\%)(30\%) = 6\%$	$.5(9.44\%) + .5(9.61\%) = 9.525\%$
9.44	13.00	$(20\%)(30\%) = 6$	$.5(9.44\%) + .5(13.00\%) = 11.22\%$
9.44	15.26	$(20\%)(40\%) = 8$	$.5(9.44\%) + .5(15.26\%) = 12.35\%$
12.86	9.61	$(50\%)(30\%) = 15$	$.5(12.86\%) + .5(9.61\%) = 11.235\%$
12.86	13.00	$(50\%)(30\%) = 15$	$.5(12.86\%) + .5(13.00\%) = 12.93\%$
12.86	15.26	$(50\%)(40\%) = 20$	$.5(12.86\%) + .5(15.26\%) = 14.06\%$
16.28	9.61	$(30\%)(30\%) = 9$	$.5(16.28\%) + .5(9.61\%) = 12.945\%$
16.28	13.00	$(30\%)(30\%) = 9$	$.5(16.28\%) + .5(13.00\%) = 14.64\%$
16.28	15.26	$(30\%)(40\%) = 12$	$.5(16.28\%) + .5(15.26\%) = 15.77\%$
		<u>100%</u>	

A similar procedure was used to develop the remaining eight rows in Exhibit 21A.2. There is a 6 percent chance the portfolio's effective yield will be 11.22 percent, an 8 percent chance that it will be 12.35 percent, and so on.

Exhibit 21A.2 shows that investing in the portfolio will likely be more rewarding than investing in a U.S. dollar deposit. While there is a 6 percent chance the portfolio's effective yield will be 9.525 percent, all other possible portfolio yields (see the fourth column) are more than the U.S. deposit rate of 11 percent.

Recall that investing solely in Singapore dollars has a 20 percent chance of being less rewarding than investing in the U.S. deposit, while investing solely in British pounds has a 30 percent chance of being less rewarding. The analysis in Exhibit 21A.2 suggests that investing in a portfolio (50 percent invested in Singapore dollars, with the remaining 50 percent invested in British pounds) has only a 6 percent chance of being less rewarding than domestic investing. These results will be explained.

When an investment is made in both currencies, the only time the portfolio will exhibit a lower yield than the U.S. deposit is when *both* currencies experience their maximum possible levels of depreciation (which is 4 percent depreciation for the Singapore dollar and 3 percent depreciation for the British pound). If only one of these events occurs, its severity will be somewhat offset by the other currency's not depreciating to such a large extent.

In our example, the computation of joint probabilities requires the assumption that the movements in the two currencies are independent. If movements of the two currencies were actually highly correlated, then investing in a portfolio of currencies would not be as beneficial as demonstrated here because there would be a strong likelihood that both currencies would experience a high level of depreciation simultaneously. If the two currencies are not highly correlated, they will not be expected to simultaneously depreciate to such a degree.

The current example includes two currencies in the portfolio. Investing in a more diversified portfolio of additional currencies that exhibit high interest rates can increase the probability that foreign investing will be more rewarding than the U.S. deposit. This is due to the low probability that all currencies will move in tandem and therefore simultaneously depreciate to offset their high interest rate advantages. Again, the degree to which these currencies are correlated with each other is impor-

tant. If all currencies are highly positively correlated with each other, investing in such a portfolio will not be very different from investing in a single foreign currency.

Repeated Investing in a Currency Portfolio

A firm that repeatedly invests in foreign currencies usually prefers to compose a portfolio package that will exhibit a somewhat predictable effective yield on a periodic basis. The more volatile a portfolio's effective yield over time, the more uncertainty (risk) there is about the yield that portfolio will exhibit in any period. The portfolio's variability depends on the standard deviations and paired correlations of effective yields of the individual currencies within the portfolio.

We can use the portfolio variance as a measurement for degree of volatility. The variance of a two-currency portfolio's effective yield σ_p^2 over time is computed as

$$\sigma_p^2 = w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_Aw_B\sigma_A\sigma_B\text{CORR}_{AB}$$

where w_A and w_B represent the percentage of total funds invested in currencies A and B, respectively, σ_A^2 and σ_B^2 represent the individual variances of each currency's effective yield over time, and CORR_{AB} reflects the correlation coefficient of the two currencies' effective yields. Since the percentage change in the exchange rate plays an important role in influencing the effective yield, it should not be surprising that CORR_{AB} is strongly affected by the correlation between the exchange rate fluctuations of the two currencies. A low correlation between currency fluctuations can force CORR_{AB} to be low.

To illustrate how the variance in a portfolio's effective yield is related to characteristics of the component currencies, consider the following example. The following information is based on several 3-month periods:

- Mean effective yield of British pound over 3 months = 4%.
- Mean effective yield of Singapore dollar over 3 months = 5%.
- Standard deviation of British pound's effective yield = .06.
- Standard deviation of Singapore dollar's effective yield = .10.
- Correlation coefficient of effective yields of these two currencies = .20.

Given the previous information, the mean effective yield on a portfolio (r_p) of funds invested 50 percent into British pounds and 50 percent into Singapore dollars is determined by summing up the weighted individual effective yields:

$$\begin{aligned} r_p &= .5(.04) + .5(.05) \\ &= .02 + .025 \\ &= .045, \text{ or } 4.5\% \end{aligned}$$

The variance of this portfolio's effective financing rate over time is

$$\begin{aligned} \sigma_p^2 &= .5^2(.06)^2 + .5^2(.10)^2 + 2(.5)(.5)(.06)(.10)(.20) \\ &= .25(.0036) + .25(.01) + .5(.0012) \\ &= .0009 + .0025 + .0006 \\ &= .004 \end{aligned}$$

There is no guarantee that past data will be indicative of the future. Yet, if the individual variability and paired correlations are somewhat stable over time, the historical variability of the portfolio's effective yield should be a reasonable forecast of the future portfolio variability.

PART 5 INTEGRATIVE PROBLEM

Short-Term Asset and Liability Management

Kent Co. is a large U.S. firm with no international business. It has two branches within the United States, an eastern branch and a western branch. Each branch currently makes investing or financing decisions independently, as if it were a separate entity. The eastern branch has excess cash of \$15 million to invest for the next year. It can invest its funds in Treasury bills denominated in dollars or in any of four foreign currencies. The only restriction enforced by the parent is that a maximum of \$5 million can be invested or financed in any foreign currency.

The western branch needs to borrow \$15 million over one year to support its U.S. operations. It can borrow funds in any of these same currencies (although any foreign funds borrowed would need to be converted to dollars to finance the U.S. operations). The only restriction enforced by the parent is that a maximum equivalent of \$5 million can be borrowed in any single currency. A large bank serving the international money market has offered Kent Co. the following terms:

Currency	Annual Interest Rate on Deposits	Annual Interest Rate Charged on Loans
U.S. dollar	6%	9%
Australian dollar	11	14
Canadian dollar	7	10
New Zealand dollar	9	12
Japanese yen	8	11

The parent of Kent Co. has created one-year forecasts of each currency for the branches to use in making their investing or financing decisions:

Currency	Today's Spot Exchange Rate	Forecasted Annual Percentage Change in Exchange Rate
Australian dollar	\$.70	-4%
Canadian dollar	.80	-2
New Zealand dollar	.60	+3
Japanese yen	.008	0

Questions

- 1** Determine the investment portfolio composition for Kent's eastern branch that would maximize the expected effective yield while satisfying the restriction imposed by the parent.
- 2** What is the expected effective yield of the investment portfolio?
- 3** Based on the expected effective yield for the portfolio and the initial investment amount of \$15 million, determine the annual interest to be earned on the portfolio.
- 4** Determine the financing portfolio composition for Kent's western branch that would minimize the expected effective financing rate while satisfying the restriction imposed by the parent.
- 5** What is the expected effective financing rate of the total amount borrowed?
- 6** Based on the expected effective financing rate for the portfolio and the total amount of \$15 million borrowed, determine the expected loan repayment amount beyond the principal borrowed.
- 7** When the expected interest received by the eastern branch and paid by the western branch of Kent Co. are consolidated, what is the net amount of interest received?
- 8** If the eastern branch and the western branch worked together, the eastern branch could loan its \$15 million to the western branch. Nevertheless, one could argue that the branches could not take advantage of interest rate differentials or expected exchange rate effects among currencies. Given the data provided in this example, would you recommend that the two branches make their short-term investment or financing decisions independently, or should the eastern branch lend its excess cash to the western branch? Explain.



Final Self Exam

Final Review

This self exam focuses on the managerial chapters (Chapters 9 through 21). Here is a brief summary of some of the key points in those chapters. Chapter 9 describes various methods that are used to forecast exchange rates. Chapter 10 explains how transaction exposure is based on transactions involving different currencies, while economic exposure is any form of exposure that can affect the value of the MNC, and translation exposure is due to the existence of foreign subsidiaries whose earnings are translated to consolidated income statements. Chapter 11 explains how transaction exposure in payables can be managed by purchasing forward or futures contracts, purchasing call options, or using a money market hedge that involves investing in the foreign currency. Transaction exposure in receivables can be managed by selling forward or futures contracts, purchasing put options, or using a money market hedge that involves borrowing the foreign currency. Chapter 12 explains how economic exposure can be hedged by restructuring operations to match foreign currency inflows and outflows. The translation exposure can be hedged by selling a forward contract on the foreign currency of the foreign subsidiary. However, while this hedge may reduce translation exposure, it may result in a cash loss.

Chapter 13 explains how direct foreign investment can be motivated by foreign market conditions that may increase demand and revenue or conditions that reflect lower costs of production. Chapter 14 explains how the net present value of a multinational project is enhanced when the foreign currency to be received in the future is expected to appreciate and reduced when that currency is expected to depreciate. It explains how financing with a foreign currency can offset inflows and reduce exchange rate risk. Chapter 15 explains how the net present value framework can be applied to acquisitions, divestitures, or other forms of restructuring. Chapter 16 explains how the net present value framework can be used to incorporate country risk conditions when assessing a project's feasibility. Chapter 17 explains how an MNC's cost of capital is influenced by its home country's risk-free interest rate and its risk premium. The MNC's capital structure decision will likely result in a heavier emphasis toward debt if it has stable cash flows, has less retained earnings available, and has more assets that it can use as collateral.

Chapter 18 explains how the cost of long-term financing with foreign currency-denominated debt is subject to exchange rate movements. If the debt payments are not offset by cash inflows in the same currency, the cost of financing increases if the foreign currency denominating the debt increases over time.

Chapter 19 explains how international trade can be facilitated by various forms of payment and financing. Chapter 20 explains how an MNC's short-term financing in foreign currencies can reduce exchange rate risk if it is offset by foreign currency inflows

at the end of the financing period. When there are not offsetting currency inflows, the effective financing rate of a foreign currency is more favorable (lower) when its interest rate is low and when the currency depreciates over the financing period.

Chapter 21 explains how an MNC's short-term investment in foreign currencies can reduce exchange rate risk if the proceeds can be used at the end of the period to cover foreign currency outflows. When there are not offsetting currency outflows, the effective yield from investing in a foreign currency is more favorable (higher) when its interest rate is high and when the currency appreciates over the investment period.

This self exam allows you to test your understanding of some of the key concepts covered in the managerial chapters. This is a good opportunity to assess your understanding of the managerial concepts. This final self exam does not replace all the end-of-chapter self tests, nor does it cover all the concepts. It is simply intended to let you test yourself on a general overview of key concepts. Try to simulate taking an exam by answering all questions without using your book and your notes. The answers to this exam are provided just after the exam questions. If you have any wrong answers, you should reread the related material and then redo any exam questions that you had wrong.

This exam may not necessarily match the level of rigor in your course. Your instructor may offer you specific information about how this final self exam relates to the coverage and rigor of the final exam in your course.

Final Self Exam

1. New Hampshire Co. expects that monthly capital flows between the United States and Japan will be the major factor that affects the monthly exchange rate movements of the Japanese yen in the future, as money will flow to whichever country has the higher nominal interest rate. At the beginning of each month, New Hampshire Co. will use either the spot rate or the forward rate to forecast the future spot rate that will exist at the end of the month. Will the spot rate result in smaller, larger, or the same mean absolute forecast error as the forward rate when forecasting the future spot rate of the yen on a monthly basis? Explain.
2. California Co. will need 1 million Polish zloty in 2 years to purchase imports. Assume interest rate parity holds. Assume that the spot rate of the Polish zloty is \$.30. The 2-year annualized interest rate in the United States is 5 percent, and the 2-year annualized interest rate in Poland is 11 percent. If California Co. uses a forward contract to hedge its payables, how many dollars will it need in 2 years?
3. Minnesota Co. uses regression analysis to assess its economic exposure to fluctuations in the Canadian dollar, whereby the dependent variable is the monthly percentage change in its stock price, and the independent variable is the monthly percentage change in the Canadian dollar. The analysis estimated the intercept to be zero and the coefficient of the monthly percentage change in the Canadian dollar to be -0.6 . Assume the interest rate in Canada is consistently higher than the interest rate in the United States. Assume that interest rate parity exists. You use the forward rate to forecast future exchange rates of the Canadian dollar. Do you think Minnesota's stock price will be (a) favorably affected, (b) adversely affected, or (c) not affected by the expected movement in the Canadian dollar? Explain the logic behind your answer.
4. Iowa Co. has most of its business in the United States, except that it exports to Portugal. Its exports were invoiced in euros (Portugal's currency) last year. It has no other economic exposure to exchange rate risk. Its main competition when selling to Portugal's customers is a company in Portugal that sells similar products, denominated in euros. Starting today, it plans to adjust its pricing strategy to invoice its exports in U.S. dollars instead of euros. Based on the new strategy, will Iowa Co. be subject to economic exposure to exchange rate risk in the future? Briefly explain.

5. Maine Co. has a facility that produces basic clothing in Indonesia (where labor costs are very low), and the clothes produced there are sold in the United States. Its facility is subject to a tax in Indonesia because it is not owned by local citizens. This tax increases its cost of production by 20 percent, but its cost is still 40 percent less than what it would be if it produced the clothing in the United States (because of the low cost of labor there). Maine wants to achieve geographical diversification and decides to sell its clothing in Indonesia. Its competition would be from several existing local firms in Indonesia. Briefly explain whether you think Maine's strategy for direct foreign investment is feasible.
6. Assume that interest rate parity exists and it will continue to exist in the future. The U.S. and Mexican interest rates are the same regardless of the maturity of the interest rate, and they will continue to be the same in the future. Tucson Co. and Phoenix Co. will each receive 1 million Mexican pesos in 1 year and will receive 1 million Mexican pesos in 2 years. Today, Tucson uses a 1-year forward contract to hedge its receivables that will arrive in 1 year. Today it also uses a 2-year forward contract to hedge its receivables that will arrive in 2 years.
- Phoenix uses a 1-year forward contract to hedge the receivables that will arrive in 1 year. A year from today, Phoenix will use a 1-year forward contract to hedge the receivables that will arrive 2 years from today. The Mexican peso is expected to consistently depreciate substantially over the next 2 years.
- Will Tucson receive more, less, or the same amount of dollars as Phoenix? Explain.
7. Assume that Jarret Co. (a U.S. firm) expects to receive 1 million euros in one year. The existing spot rate of the euro is \$1.20. The one-year forward rate of the euro is \$1.21. Jarret expects the spot rate of the euro to be \$1.22 in one year.
- Assume that one-year put options on euros are available, with an exercise price of \$1.23 and a premium of \$.04 per unit. Assume the following money market rates:

	United States	Euro Zone
Deposit rate	8%	5%
Borrowing rate	9%	6%

- a. Determine the dollar cash flows to be received if Jarret uses a money market hedge. (Assume Jarret does not have any cash on hand when answering this question.)
- b. Determine the dollar cash flows to be received if Jarret uses a put option hedge.
8. a. Portland Co. is a U.S. firm with no foreign subsidiaries. In addition to much business in the United States, its exporting business results in annual cash inflows of 20 million euros. Briefly explain how Portland Co. is subject to translation exposure (if at all).
- b. Topeka Co. is a U.S. firm with no exports or imports. It has a subsidiary in Germany that typically generates earnings of 10 million euros each year, and none of the earnings are remitted to the United States. Briefly explain how Topeka Co. is subject to translation exposure (if at all).
9. Lexington Co. is a U.S. firm. It has a subsidiary in India that produces computer chips and sells them to European countries. The chips are invoiced in dollars. The subsidiary pays wages, rent, and other operating costs in India's currency (rupee). Every month, the subsidiary remits a large amount of earnings to the U.S. parent. This is the only international business that Lexington Co. has. The subsidiary wants to borrow funds to expand its facilities, and can borrow dollars at 9 percent annually or borrow rupee at 9 percent annually. Which currency should the parent tell the subsidiary to borrow, if the parent's main goal is to minimize exchange rate risk? Explain.
10. Illinois Co. (of the United States) and Franco Co. (based in France) are separately considering the acquisition of Podansk Co. (of Poland). Illinois Co. and Franco Co.

have similar estimates of cash flows (in the Polish currency, the zloty) to be generated by Podansk in the future. The U.S. long-term risk-free interest rate is presently 8 percent, while the long-term risk-free rate of the euro is presently 3 percent. Illinois Co. and Franco Co. expect that the return of the U.S. stock market will be much better than the return of the French market. Illinois Co. has about the same amount of risk as a typical firm in the United States. Franco Co. has about the same amount of risk as a typical firm in France. The zloty is expected to depreciate against the euro by 1.2 percent per year, and against the dollar by 1.4 percent per year. Which firm will likely have a higher valuation of the target Podansk? Explain.

11. A year ago, the spot exchange rate of the euro was \$1.20. At that time, Talen Co. (a U.S. firm) invested \$4 million to establish a project in the Netherlands. It expected that this project would generate cash flows of 3 million euros at the end of the first and second years.

Talen Co. always uses the spot rate as its forecast of future exchange rates. It uses a required rate of return of 20 percent on international projects.

Because conditions in the Netherlands are weaker than expected, the cash flows in the first year of the project were 2 million euros, and Talen now believes the expected cash flows for next year will be 1 million euros. A company offers to buy the project from Talen today for \$1.25 million. Assume no tax effects. Today, the spot rate of the euro is \$1.30. Should Talen accept the offer? Show your work.

12. Everhart, Inc., is a U.S. firm with no international business. It issues debt in the United States at an interest rate of 10 percent per year. The risk-free rate in the United States is 8 percent. The stock market return in the United States is expected to be 14 percent annually. Everhart's beta is 1.2. Its target capital structure is 30 percent debt and 70 percent equity. Everhart is subject to a 25 percent corporate tax rate. Everhart plans a project in the Philippines in which it would receive net cash flows in Philippine pesos on an annual basis. The risk of the project would be similar to the risk of its other businesses. The existing risk-free rate in the Philippines is 21 percent and the stock market return there is expected to be 28 percent annually. Everhart plans to finance this project with either its existing equity or by borrowing Philippine pesos.
- Estimate the cost to Everhart if it uses dollar-denominated equity. Show your work.
 - Assume that Everhart believes that the Philippine peso will appreciate substantially each year against the dollar. Do you think it should finance this project with its dollar-denominated equity or by borrowing Philippine pesos? Explain.
 - Assume that Everhart receives an offer from a Philippine investor who is willing to provide equity financing in Philippine pesos to Everhart. Do you think this form of financing would be more preferable to Everhart than financing with debt denominated in Philippine pesos? Explain.
13. Assume that a euro is equal to \$1.00 today. A U.S. firm could engage in a parallel loan today in which it borrows 1 million euros from a firm in Belgium and provides a \$1 million loan to the Belgian firm. The loans will be repaid in one year with interest. Which of the following U.S. firms could most effectively use this parallel loan in order to reduce its exposure to exchange rate risk? (Assume that these U.S. firms have no other international business than what is described here.) Explain.
- Sacramento Co. will receive a payment of 1 million euros from a French company in one year.
- Stanislaus Co. needs to make a payment of 1 million euros to a German supplier in one year.
- Los Angeles Co. will receive 1 million euros from the Netherlands government in one year. It just engaged in a forward contract in which it sold 1 million euros one year forward.
- San Mateo Co. will receive a payment of 1 million euros today and will owe a supplier 1 million euros in one year.

San Francisco Co. will make a payment of 1 million euros to a firm in Spain today and will receive \$1 million from a firm in Spain for some consulting work in one year.

14. Assume the following direct exchange rate of the Swiss franc and Argentine peso at the beginning of each of the last 7 years.

Beginning of Year	Swiss Franc (SF)	Argentine Peso (AP)
1	\$.60	\$.35
2	\$.64	\$.36
3	\$.60	\$.38
4	\$.66	\$.40
5	\$.68	\$.39
6	\$.72	\$.37
7	\$.76	\$.36

- a.** Assume that you forecast that the Swiss franc will appreciate by 3 percent over the next year, but you realize that there is much uncertainty surrounding your forecast. Use the value-at-risk method to estimate (based on a 95 percent confidence level) the maximum level of depreciation in the Swiss franc over the next year, based on the data you were provided.
- b.** Assume that you forecast that the Argentine peso will depreciate by 2 percent over the next year, but you realize that there is much uncertainty surrounding your forecast. Use the value-at-risk method to estimate (based on a 95 percent confidence level) the maximum level of depreciation in the Argentine peso over the next year, based on the data you were provided.
15. Brooks Co. (a U.S. firm) considers a project in which it will have computer software developed. It would sell the software to Razon Co., an Australian company, and would receive payment of 10 million Australian dollars (A\$) at the end of one year. To obtain the software, Brooks would have to pay a local software producer \$4 million today.
- Brooks Co. might also receive an order for the same software from Zug Co. in Australia. It would receive A\$4 million at the end of this year if it receives this order, and it would not incur any additional costs because it is the same software that would be created for Razon Co.
- The spot rate of the Australian dollar is \$.50, and the spot rate is expected to depreciate by 8 percent over the next year. The one-year forward rate of the Australian dollar is \$.47.
- If Brooks decides to pursue this project (have the software developed), it would hedge the expected receivables due to the order from Razon Co. with a one-year forward contract, but it would not hedge the order from Zug Co. Brooks would require a 24 percent rate of return in order to accept the project.
- a.** Determine the net present value of this project under the conditions that Brooks receives the order from Zug and from Razon, and that it receives payments from these orders in one year.
- b.** Brooks recognizes there are some country risk conditions that could cause Razon Co. to go bankrupt. Determine the net present value of this project under the conditions that Brooks receives both orders, but that Razon goes bankrupt and defaults on its payment to Brooks.
16. Austin Co. needs to borrow \$10 million for the next year to support its U.S. operations. It can borrow U.S. dollars at 7 percent or Japanese yen at 1 percent. It has no other cash flows in Japanese yen. Assume that interest rate parity holds, so the one-year forward rate of the yen exhibits a premium in this case. Austin expects that the

- spot rate of the yen will appreciate but not as much as suggested by the one-year forward rate of the yen.
- Should Austin consider financing with yen and simultaneously purchasing yen one year forward to cover its position? Explain.
 - If Austin finances with yen without covering this position, is the effective financing rate expected to be above, below, or equal to the Japanese interest rate of 1 percent? Is the effective financing rate expected to be above, below, or equal to the U.S. interest rate of 7 percent?
 - Explain the implications if Austin finances with yen without covering its position, and the future spot rate of the yen in one year turns out to be higher than today's one-year forward rate on the yen.
17. Provo Co. has \$15 million that it will not need until one year from now. It can invest the funds in U.S. dollar-denominated securities and earn 6 percent or in New Zealand dollars (NZ\$) at 11 percent. It has no other cash flows in New Zealand dollars. Assume that interest rate parity holds, so the one-year forward rate of the NZ\$ exhibits a discount in this case. Provo expects that the spot rate of the NZ\$ will depreciate but not as much as suggested by the one-year forward rate of the NZ\$.
- Should Provo consider investing in NZ\$ and simultaneously selling NZ\$ one year forward to cover its position? Explain.
 - If Provo invests in NZ\$ without covering this position, is the effective yield expected to be above, below, or equal to the U.S. interest rate of 6 percent? Is the effective yield expected to be above, below, or equal to the New Zealand interest rate of 11 percent?
 - Explain the implications if Provo invests in NZ\$ without covering its position, and the future spot rate of the NZ\$ in one year turns out to be lower than today's one-year forward rate on the NZ\$.

Answers to Final Self Exam

- The accuracy from forecasting with the spot rate will be better. The forward rate is higher than the spot rate (it has a premium) when the interest rate is lower. So if the forward rate is used as a forecast, it would suggest that a currency with the lower interest rate will appreciate (in accordance with the international Fisher effect). Yet, since money is assumed to flow where interest rates are higher, this implies that the spot rate will rise when a currency has a relatively high interest rate. This relationship is in contrast to the IFE. Thus, a forward rate will suggest depreciation of the currencies that should appreciate (and vice versa) based on the info in the question. The spot rate as a forecast reflects a forecast of no change in the exchange rate. The forecast of no change in a currency value (when the spot rate is used as the forecast) is better than a forecast of depreciation for a currency that appreciates. The spot rate forecast results in a smaller mean absolute forecast error.
- The 2-year forward premium is $1.1025/1.2321 - 1 = -.10518$. The 2-year forward rate is $$.30 \times (1 - .10518) = $.26844$. The amount of dollars needed is $$.26844 \times 1,000,000 \text{ zloty} = \$268,440$.
- Minnesota's stock price will be favorably affected. When the U.S. interest rate is higher, the forward rate of the Canadian dollar will exhibit a discount, which implies depreciation of the C\$. The negative coefficient in the regression model suggests that the firm's stock price will be inversely related to the forecast. Thus, the expected depreciation of the C\$ will result in a higher stock price.
- Iowa will still be subject to economic exposure because Portugal's demand for its products would decline if the euro weakens against the dollar. Thus, Iowa's cash flows are still affected by exchange rate movements.

5. Maine Co. does not have an advantage over the other producers in Indonesia because the competitors also capitalize on cheap land and labor.
6. Tucson will receive more cash flows. The 1-year and 2-year forward rates today are equal to today's spot rate. Thus, it hedges receivables at the same exchange rate as today's spot rate. Phoenix also hedges the receivables 1 year from now at that same exchange rate. But 1 year from now, it will hedge the receivables in the following year. In 1 year, the spot rate will be lower, so the 1-year forward rate at that time will be lower than today's forward rate. Thus, the receivables in 2 years will convert to a smaller amount of dollars for Phoenix than for Tucson.
7. a. Money market hedge:

Borrow euros:

$$1,000,000/(1.06) = 943,396 \text{ euros to be borrowed}$$

Convert the euros to dollars:

$$943,396 \text{ euros} \times \$1.20 = \$1,132,075$$

Invest the dollars:

$$\$1,132,075 \times (1.08) = \$1,222,641$$

b. Put option: Pay premium of

$$\$0.04 \times 1,000,000 = \$40,000$$

If spot rate in one year = \$1.22 as expected, then the put option would be exercised at the strike price of \$1.23. The cash flows would be

$$1,000,000 \times (1.23 - \$0.04 \text{ premium}) = \$1,190,000$$

Thus, the money market hedge would be most appropriate.

8. a. Portland Co. is not subject to translation exposure since it has no foreign subsidiaries.
- b. Topeka's consolidated earnings will increase if the euro appreciates against the dollar over the reporting period.
9. The subsidiary should borrow dollars because it already has a new cash outflow position in rupee so that borrowing rupee would increase exposure.
10. Franco Co. will offer a higher bid because its existing valuation of Podansk should be higher (since its risk-free rate is much lower).
11. As of today, the *NPV* from selling the project is:
 Proceeds received from selling the project – Present value of the forgone cash flows.
 Proceeds = \$1.25 million.
 PV of forgone cash flows = $(1,000,000 \times \$1.30)/1.2 = \$1,083,333$.
 The *NPV* from selling the project is $\$1,250,000 - \$1,083,333 = \$166,667$. Therefore, selling the project is feasible.
12. a. Based on the CAPM, Everhart's cost of equity = $8\% + 1.2(14\% - 8\%) = 15.2\%$.
- b. Philippine debt has high interest rate. Also, the peso will appreciate so the debt is even more expensive. Everhart should finance with dollar-denominated debt.
- c. Philippine debt is cheaper than Philippine equity. The Philippine investor would require a higher return than if Everhart uses debt. Also, there is no tax advantage if Everhart accepted an equity investment.
13. Sacramento could benefit from the parallel loan because its receivables in one year could be used to pay off the loan principal in euros.

14. **a.** The standard deviation of the annual movements in the Swiss franc is .0557, or 5.57 percent. It is necessary to focus on the volatility of the movements, not the actual values.

The maximum level of annual depreciation of the Swiss franc is:

$$3\% - (1.65 \times .0557) = -.0619, \text{ or } -6.19\%$$

- b.** The standard deviation of the annual movements in the Argentine peso is .0458, or 4.58 percent.

The maximum level of annual depreciation of the Argentine peso is:

$$-.02 - (1.65 \times .0458) = -.0956, \text{ or } -9.56\%$$

15. **a.** Order from Razon:

$$\$.47 \times \text{A\$}10 \text{ million} = \$4,700,000$$

Order from Zug:

$$\begin{aligned} & \$.46 \times \text{A\$}4 \text{ million} = \$1,840,000 \\ \text{Present value} & = \$6,540,000/1.24 = \$5,274,193 \\ \text{NPV} & = \$5,274,193 - \$4,000,000 = \$1,274,193 \end{aligned}$$

- b.** Order from Zug is \$1,840,000 as shown above.

The expected cost of offsetting the hedged cash flows is \$100,000 as shown below:

Brooks sold A\$1 million forward. It will purchase them in the spot market and then will fulfill its forward contract. The expected future spot rate in one year is (\$.46), so it would be expected to pay \$.46 and sell A\$ at forward rate (\$.47) for a \$.01 profit per unit. For A\$1 million, the profit is \$.01 \times 1 million = \$100,000.

$$\begin{aligned} \text{Cash flows in one year} & = \$1,840,000 + \$100,000 = \$1,940,000 \\ \text{Present value} & = \$1,940,000/1.24 = \$1,564,516 \\ \text{NPV} & = \$1,564,516 - \$4,000,000 = -\$2,435,484 \end{aligned}$$

(An alternative method would be to apply the \$.47 to Zug for A\$4 million, which would leave a net of A\$6 million to fulfill on the forward contract. The answer will be the same for either method.)

16. **a.** Austin should not consider financing with yen and simultaneously purchasing yen one year forward since the effective financing rate would be 7 percent, the same as the financing rate in the United States.
- b.** If Austin finances with yen without covering this position, its effective financing rate is expected to exceed the interest rate on the yen because of the expected appreciation of the yen over the financing period. However, the effective financing rate is not expected to be as high as the interest rate on the dollar.
- c.** If the yen's spot rate in one year is higher than today's forward rate, the effective financing rate will be higher than the U.S. interest rate of 7 percent.
17. **a.** Provo should not consider investing in NZ\$ and simultaneously selling NZ\$ one year forward since the effective yield would be 6 percent, the same as the yield in the United States.
- b.** If Provo invests in NZ\$, its yield is expected to exceed the U.S. interest rate but be less than the NZ\$ interest rate.
- c.** If the NZ\$ spot rate in one year is lower than today's forward rate, the effective yield will be lower than the U.S. interest rate of 6 percent.

Answers to Self Test Questions

Chapter 1

1. MNCs can capitalize on comparative advantages (such as a technology or cost of labor) that they have relative to firms in other countries, which allows them to penetrate those other countries' markets. Given a world of imperfect markets, comparative advantages across countries are not freely transferable. Therefore, MNCs may be able to capitalize on comparative advantages. Many MNCs initially penetrate markets by exporting but ultimately establish a subsidiary in foreign markets and attempt to differentiate their products as other firms enter those markets (product cycle theory).
2. Weak economic conditions or unstable political conditions in a foreign country can reduce cash flows received by the MNC, or they can result in a higher required rate of return for the MNC. Either of these effects results in a lower valuation of the MNC.
3. First, there is the risk of poor economic conditions in the foreign country. Second, there is country risk, which reflects the risk of changing government or public attitudes toward the MNC. Third, there is exchange rate risk, which can affect the performance of the MNC in the foreign country.

Chapter 2

1. Each of the economic factors is described, holding other factors constant.
 - a. *Inflation*. A relatively high U.S. inflation rate relative to other countries can make U.S. goods less attractive to U.S. and non-U.S. consumers, which results in fewer U.S. exports, more U.S. imports, and a lower (or more negative) current account balance. A relatively low U.S. inflation rate would have the opposite effect.
 - b. *National income*. A relatively high increase in the U.S. national income (compared to other countries) tends to cause a large increase in demand for imports and can cause a lower (or more negative) current account balance. A relatively low increase in the U.S. national income would have the opposite effect.
 - c. *Exchange rates*. A weaker dollar tends to make U.S. products cheaper to non-U.S. firms and makes non-U.S. products expensive to U.S. firms. Thus, U.S. exports are expected to increase, while U.S. imports are expected to decrease. However, some conditions can prevent these effects from occurring, as explained in the chapter. Normally, a stronger dollar causes U.S. exports to decrease and U.S. imports to increase because it makes U.S. goods more expensive to non-U.S. firms and makes non-U.S. goods less expensive to U.S. firms.

- d. *Government restrictions.* When the U.S. government imposes new barriers on imports, U.S. imports decline, causing the U.S. balance of trade to increase (or be less negative). When non-U.S. governments impose new barriers on imports from the United States, the U.S. balance of trade may decrease (or be more negative). When governments remove trade barriers, the opposite effects are expected.
- When the United States imposes tariffs on imported goods, foreign countries may retaliate by imposing tariffs on goods exported by the United States. Thus, there is a decline in U.S. exports that may offset any decline in U.S. imports.
 - The Asian crisis caused a decline in Asian income levels and therefore resulted in a reduced demand for U.S. exports. In addition, Asian exporters experienced problems, and some U.S. importers discontinued their relationships with the Asian exporters.

Chapter 3

- $(\$.80 - \$.784) / \$.80 = .02$, or 2%
- $(\$.19 - \$.188) / \$.19 = .0105$, or 1.05%
- MNCs use the spot foreign exchange market to exchange currencies for immediate delivery. They use the forward foreign exchange market and the currency futures market to lock in the exchange rate at which currencies will be exchanged at a future point in time. They use the currency options market when they wish to lock in the maximum (minimum) amount to be paid (received) in a future currency transaction but maintain flexibility in the event of favorable exchange rate movements.

MNCs use the Eurocurrency market to engage in short-term investing or financing or the Eurocredit market to engage in medium-term financing. They can obtain long-term financing by issuing bonds in the Eurobond market or by issuing stock in the international markets.

Chapter 4

- Economic factors affect the yen's value as follows:
 - If U.S. inflation is higher than Japanese inflation, the U.S. demand for Japanese goods may increase (to avoid the higher U.S. prices), and the Japanese demand for U.S. goods may decrease (to avoid the higher U.S. prices). Consequently, there is upward pressure on the value of the yen.
 - If U.S. interest rates increase and exceed Japanese interest rates, the U.S. demand for Japanese interest-bearing securities may decline (since U.S. interest-bearing securities are more attractive), while the Japanese demand for U.S. interest-bearing securities may rise. Both forces place downward pressure on the yen's value.
 - If U.S. national income increases more than Japanese national income, the U.S. demand for Japanese goods may increase more than the Japanese demand for U.S. goods. Assuming that the change in national income levels does not affect exchange rates indirectly through effects on relative interest rates, the forces should place upward pressure on the yen's value.
 - If government controls reduce the U.S. demand for Japanese goods, they place downward pressure on the yen's value. If the controls reduce the Japanese demand for U.S. goods, they place upward pressure on the yen's value.

The opposite scenarios of those described here would cause the expected pressure to be in the opposite direction.

2. U.S. capital flows with Country A may be larger than U.S. capital flows with Country B. Therefore, the change in the interest rate differential has a larger effect on the capital flows with Country A, causing the exchange rate to change. If the capital flows with Country B are nonexistent, interest rate changes do not change the capital flows and therefore do not change the demand and supply conditions in the foreign exchange market.
3. Smart Banking Corp. should not pursue the strategy because a loss would result, as shown here.
 - a. Borrow \$5 million.
 - b. Convert \$5 million to C\$5,263,158 (based on the spot exchange rate of \$.95 per C\$).
 - c. Invest the C\$ at 9 percent annualized, which represents a return of .15 percent over 6 days, so the C\$ received after 6 days = C\$5,271,053 (computed as $C\$5,263,158 \times [1 + .0015]$).
 - d. Convert the C\$ received back to U.S. dollars after 6 days: $C\$5,271,053 = \$4,954,789$ (based on anticipated exchange rate of \$.94 per C\$ after 6 days).
 - e. The interest rate owed on the U.S. dollar loan is .10 percent over the 6-day period. Thus, the amount owed as a result of the loan is \$5,005,000 [computed as $\$5,000,000 \times (1 + .001)$].
 - f. The strategy is expected to cause a gain of $\$4,954,789 - \$5,005,000 = -\$50,211$.

Chapter 5

1. The net profit to the speculator is $-\$.01$ per unit.
 The net profit to the speculator for one contract is $-\$500$ (computed as $-\$.01 \times 50,000$ units).
 The spot rate would need to be \$.66 for the speculator to break even.
 The net profit to the seller of the call option is \$.01 per unit.
2. The speculator should exercise the option.
 The net profit to the speculator is \$.04 per unit.
 The net profit to the seller of the put option is $-\$.04$ per unit.
3. The premium paid is higher for options with longer expiration dates (other things being equal). Firms may prefer not to pay such high premiums.

Chapter 6

1. Market forces cause the demand and supply of yen in the foreign exchange market to change, which causes a change in the equilibrium exchange rate. The central banks could intervene to affect the demand or supply conditions in the foreign exchange market, but they would not always be able to offset the changing market forces. For example, if there were a large increase in the U.S. demand for yen and no increase in the supply of yen for sale, the central banks would have to increase the supply of yen in the foreign exchange market to offset the increased demand.
2. The Fed could use direct intervention by selling some of its dollar reserves in exchange for pesos in the foreign exchange market. It could also use indirect intervention by attempting to reduce U.S. interest rates through monetary policy.

Specifically, it could increase the U.S. money supply, which places downward pressure on U.S. interest rates (assuming that inflationary expectations do not change). The lower U.S. interest rates should discourage foreign investment in the United States and encourage increased investment by U.S. investors in foreign securities. Both forces tend to weaken the dollar's value.

3. A weaker dollar tends to increase the demand for U.S. goods because the price paid for a specified amount in dollars by non-U.S. firms is reduced. In addition, the U.S. demand for foreign goods is reduced because it takes more dollars to obtain a specified amount in foreign currency once the dollar weakens. Both forces tend to stimulate the U.S. economy and therefore improve productivity and reduce unemployment in the United States.

Chapter 7

1. No. The cross exchange rate between the pound and the C\$ is appropriate, based on the other exchange rates. There is no discrepancy to capitalize on.
2. No. Covered interest arbitrage involves the exchange of dollars for pounds. Assuming that the investors begin with \$1 million (the starting amount will not affect the final conclusion), the dollars would be converted to pounds as shown here:

$$\text{\$1 million} / \text{\$1.60 per } \text{£} = \text{£625,000}$$

The British investment would accumulate interest over the 180-day period, resulting in

$$\text{£625,000} \times 1.04 = \text{£650,000}$$

After 180 days, the pounds would be converted to dollars:

$$\text{£650,000} \times \text{\$1.56 per pound} = \text{\$1,014,000}$$

This amount reflects a return of 1.4 percent above the amount with which U.S. investors initially started. The investors could simply invest the funds in the United States at 3 percent. Thus, U.S. investors would earn less using the covered interest arbitrage strategy than investing in the United States.

3. No. The forward rate discount on the pound does not perfectly offset the interest rate differential. In fact, the discount is 2.5 percent, which is larger than the interest rate differential. U.S. investors do worse when attempting covered interest arbitrage than when investing their funds in the United States because the interest rate advantage on the British investment is more than offset by the forward discount.

Further clarification may be helpful here. While the U.S. investors could not benefit from covered interest arbitrage, British investors could capitalize on covered interest arbitrage. While British investors would earn 1 percent interest less on the U.S. investment, they would be purchasing pounds forward at a discount of 2.5 percent at the end of the investment period. When interest rate parity does not exist, investors from only one of the two countries of concern could benefit from using covered interest arbitrage.

4. If there is a discrepancy in the pricing of a currency, one may capitalize on it by using the various forms of arbitrage described in the chapter. As arbitrage occurs, the exchange rates will be pushed toward their appropriate levels because arbitrageurs will buy an underpriced currency in the foreign exchange market (increase in demand for currency places upward pressure on its value) and will sell an

overpriced currency in the foreign exchange market (increase in the supply of currency for sale places downward pressure on its value).

- The one-year forward discount on pounds would become more pronounced (by about one percentage point more than before) because the spread between the British interest rates and U.S. interest rates would increase.

Chapter 8

- If the Japanese prices rise because of Japanese inflation, the value of the yen should decline. Thus, even though the importer might need to pay more yen, it would benefit from a weaker yen value (it would pay fewer dollars for a given amount in yen). Thus, there could be an offsetting effect if PPP holds.
- Purchasing power parity does not necessarily hold. In our example, Japanese inflation could rise (causing the importer to pay more yen), and yet the Japanese yen would not necessarily depreciate by an offsetting amount, or at all. Therefore, the dollar amount to be paid for Japanese supplies could increase over time.
- High inflation will cause a balance-of-trade adjustment, whereby the United States will reduce its purchases of goods in these countries, while the demand for U.S. goods by these countries should increase (according to PPP). Consequently, there will be downward pressure on the values of these currencies.

$$\begin{aligned}
 4. \quad e_f &= I_h - I_f \\
 &= 3\% - 4\% \\
 &= -.01, \text{ or } -1\% \\
 S_{t+1} &= S(1 + e_f) \\
 &= \$.85[1 + (-.01)] \\
 &= \$.8415
 \end{aligned}$$

$$\begin{aligned}
 5. \quad e_f &= \frac{1 + i_h}{1 + i_f} - 1 \\
 &= \frac{1 + .06}{1 + .11} - 1 \\
 &\cong -.045, \text{ or } -4.5\% \\
 S_{t+1} &= S(1 + e_f) \\
 &= \$.90[1 + (-.045)] \\
 &= \$.8595
 \end{aligned}$$

- According to the IFE, the increase in interest rates by 5 percentage points reflects an increase in expected inflation by 5 percentage points.

If the inflation adjustment occurs, the balance of trade should be affected, as Australian demand for U.S. goods rises while the U.S. demand for Australian goods declines. Thus, the Australian dollar should weaken.

If U.S. investors believed in the IFE, they would not attempt to capitalize on higher Australian interest rates because they would expect the Australian dollar to depreciate over time.

Chapter 9

- U.S. 4-year interest rate = $(1 + .07)^4 = 131.08\%$, or 1.3108. Mexican 4-year interest rate = $(1 + .20)^4 = 207.36\%$, or 2.0736.

$$\begin{aligned}
 p &= \frac{1 + i_h}{1 + i_f} - 1 = \frac{1.3108}{2.0736} - 1 \\
 &= -.3679, \text{ or } -36.79\%
 \end{aligned}$$

$$2. \text{ Canadian dollar } \frac{|\$.80 - \$.82|}{\$.82} = 2.44\%$$

$$\text{ Japanese yen } \frac{|\$.012 - \$.011|}{\$.011} = 9.09\%$$

The forecast error was larger for the Japanese yen.

3. The forward rate of the peso would have overestimated the future spot rate because the spot rate would have declined by the end of each month.
4. Semistrong-form efficiency would be refuted since the currency values do not adjust immediately to useful public information.
5. The peso would be expected to depreciate because the forward rate of the peso would exhibit a discount (be less than the spot rate). Thus, the forecast derived from the forward rate is less than the spot rate, which implies anticipated depreciation of the peso.
6. As the chapter suggests, forecasts of currencies are subject to a high degree of error. Thus, if a project's success is very sensitive to the future value of the bolivar, there is much uncertainty. This project could easily backfire because the future value of the bolivar is very uncertain.

Chapter 10

1. Managers have more information about the firm's exposure to exchange rate risk than do shareholders and may be able to hedge it more easily than shareholders could. Shareholders may prefer that the managers hedge for them. Also, cash flows may be stabilized as a result of hedging, which can reduce the firm's cost of financing.
2. The Canadian supplies would have less exposure to exchange rate risk because the Canadian dollar is less volatile than the Mexican peso.
3. The Mexican source would be preferable because the firm could use peso inflows to make payments for material that is imported.
4. No. If exports are priced in dollars, the dollar cash flows received from exporting will depend on Mexico's demand, which will be influenced by the peso's value. If the peso depreciates, Mexican demand for the exports would likely decrease.
5. The earnings generated by the European subsidiaries will be translated to a smaller amount in dollar earnings if the dollar strengthens. Thus, the consolidated earnings of the U.S.-based MNCs will be reduced.

Chapter 11

1. Amount of A\$ to be invested today = $A\$3,000,000 / (1 + .12)$
 $= A\$2,678,571$
 Amount of U.S.\$ to be borrowed to convert to A\$ = $A\$2,678,571 \times \$.85$
 $= \$2,276,785$
 Amount of U.S.\$ needed in one year to pay off loan = $\$2,276,785 \times (1 + .07)$
 $= \$2,436,160$
2. The forward hedge would be more appropriate. Given a forward rate of \$.81, Montclair would need \$2,430,000 in one year (computed as $A\$3,000,000 \times \$.81$) when using a forward hedge.

3. Montclair could purchase currency call options in Australian dollars. The option could hedge against the possible appreciation of the Australian dollar. Yet, if the Australian dollar depreciates, Montclair could let the option expire and purchase the Australian dollars at the spot rate at the time it needs to send payment. A disadvantage of the currency call option is that a premium must be paid for it. Thus, if Montclair expects the Australian dollar to appreciate over the year, the money market hedge would probably be a better choice since the flexibility provided by the option would not be useful in this case.
4. Even though Sanibel Co. is insulated from the beginning of a month to the end of the month, the forward rate will become higher each month because the forward rate moves with the spot rate. Thus, the firm will pay more dollars each month, even though it is hedged during the month. Sanibel will be adversely affected by the consistent appreciation of the pound.
5. Sanibel Co. could engage in a series of forward contracts today to cover the payments in each successive month. In this way, it locks in the future payments today and does not have to agree to the higher forward rates that may exist in future months.
6. A put option on SF2 million would cost \$60,000. If the spot rate of the SF reached \$.68 as expected, the put option would be exercised, which would yield \$1,380,000 (computed as SF2,000,000 \times \$.69). Accounting for the premium costs of \$60,000, the receivables amount would convert to \$1,320,000. If Hopkins remains unhedged, it expects to receive \$1,360,000 (computed as SF2,000,000 \times \$.68). Thus, the unhedged strategy is preferable.

Chapter 12

1. Salem could attempt to purchase its chemicals from Canadian sources. Then, if the C\$ depreciates, the reduction in dollar inflows resulting from its exports to Canada will be partially offset by a reduction in dollar outflows needed to pay for the Canadian imports.
An alternative possibility for Salem is to finance its business with Canadian dollars, but this would probably be a less efficient solution.
2. A possible disadvantage is that Salem would forgo some of the benefits if the C\$ appreciated over time.
3. The consolidated earnings of Coastal Corp. will be adversely affected if the pound depreciates because the British earnings will be translated into dollar earnings for the consolidated income statement at a lower exchange rate. Coastal could attempt to hedge its translation exposure by selling pounds forward. If the pound depreciates, it will benefit from its forward position, which could help offset the translation effect.
4. This argument has no perfect solution. It appears that shareholders penalize the firm for poor earnings even when the reason for poor earnings is a weak euro that has adverse translation effects. It is possible that translation effects could be hedged to stabilize earnings, but Arlington may consider informing the shareholders that the major earnings changes have been due to translation effects and not to changes in consumer demand or other factors. Perhaps shareholders would not respond so strongly to earnings changes if they were well aware that the changes were primarily caused by translation effects.
5. Lincolnshire has no translation exposure since it has no foreign subsidiaries. Kafafa has translation exposure resulting from its subsidiary in Spain.

Chapter 13

1. Possible reasons may include
 - More demand for the product (depending on the product)
 - Better technology in Canada
 - Fewer restrictions (less political interference)
2. Possible reasons may include
 - More demand for the product (depending on the product)
 - Greater probability of earning superior profits (since many goods have not been marketed in Mexico in the past)
 - Cheaper factors of production (such as land and labor)
 - Possible exploitation of monopolistic advantages
3. U.S. firms prefer to enter a country when the foreign country's currency is weak. U.S. firms normally would prefer that the foreign currency appreciate after they invest their dollars to develop the subsidiary. The executive's comment suggests that the euro is too strong, so any U.S. investment of dollars into Europe will not convert into enough euros to make the investment worthwhile.
4. It may be easier to engage in a joint venture with a Chinese firm, which is already well established in China, to circumvent barriers.
5. The government may attempt to stimulate the economy in this way.

Chapter 14

1. In addition to earnings generated in Jamaica, the *NPV* is based on some factors not controlled by the firm, such as the expected host government tax on profits, the withholding tax imposed by the host government, and the salvage value to be received when the project is terminated. Furthermore, the exchange rate projections will affect the estimates of dollar cash flows received by the parent as earnings are remitted.
2. The most obvious effect is on the cash flows that will be generated by the sales distribution center in Ireland. These cash flow estimates will likely be revised downward (due to lower sales estimates). It is also possible that the estimated salvage value could be reduced. Exchange rate estimates could be revised as a result of revised economic conditions. Estimated tax rates imposed on the center by the Irish government could also be affected by the revised economic conditions.
3. New Orleans Exporting Co. must account for the cash flows that will be forgone as a result of the plant because some of the cash flows that used to be received by the parent through its exporting operation will be eliminated. The *NPV* estimate will be reduced after this factor is accounted for.
4.
 - a. An increase in the risk will cause an increase in the required rate of return on the subsidiary, which results in a lower discounted value of the subsidiary's salvage value.
 - b. If the rupiah depreciates over time, the subsidiary's salvage value will be reduced because the proceeds will convert to fewer dollars.
5. The dollar cash flows of Wilmette Co. would be affected more because the periodic remitted earnings from Thailand to be converted to dollars would be larger. The dollar cash flows of Niles would not be affected so much because interest payments would be made on the Thai loans before earnings could be remitted to the United States. Thus, a smaller amount in earnings would be remitted.

6. The demand for the product in the foreign country may be very uncertain, causing the total revenue to be uncertain. The exchange rates can be very uncertain, creating uncertainty about the dollar cash flows received by the U.S. parent. The salvage value may be very uncertain; this will have a larger effect if the lifetime of the project is short (for projects with a very long life, the discounted value of the salvage value is small anyway).

Chapter 15

1. Acquisitions have increased in Europe to capitalize on the inception of the euro, which created a single European currency for many European countries. This has not only eliminated the exchange rate risk on transactions between the participating European countries, but it has also made it easier to compare valuations among European countries to determine where targets are undervalued.
2. Common restrictions include government regulations, such as antitrust restrictions, environmental restrictions, and red tape.
3. The establishment of a new subsidiary allows an MNC to create the subsidiary it desires without assuming existing facilities or employees. However, the process of building a new subsidiary and hiring employees will normally take longer than the process of acquiring an existing foreign firm.
4. The divestiture is now more feasible because the dollar cash flows to be received by the U.S. parent are reduced as a result of the revised projections of the krona's value.

Chapter 16

1. First, consumers on the islands could develop a philosophy of purchasing homemade goods. Second, they could discontinue their purchases of exports by Key West Co. as a form of protest against specific U.S. government actions. Third, the host governments could impose severe restrictions on the subsidiary shops owned by Key West Co. (including the blockage of funds to be remitted to the U.S. parent).
2. First, the islands could experience poor economic conditions, which would cause lower income for some residents. Second, residents could be subject to higher inflation or higher interest rates, which would reduce the income that they could allocate toward exports. Depreciation of the local currencies could also raise the local prices to be paid for goods exported from the United States. All factors described here could reduce the demand for goods exported by Key West Co.
3. Financial risk is probably a bigger concern. The political risk factors are unlikely, based on the product produced by Key West Co. and the absence of substitute products available in other countries. The financial risk factors deserve serious consideration.
4. This event has heightened the perceived country risk for any firms that have offices in populated areas (especially next to government or military offices). It has also heightened the risk for firms whose employees commonly travel to other countries and for firms that provide office services or travel services.
5. Rockford Co. could estimate the net present value (*NPV*) of the project under three scenarios: (1) include a special tax when estimating cash flows back to the parent (probability of scenario = 15%), (2) assume the project ends in 2 years and

include a salvage value when estimating the *NPV* (probability of scenario = 15%), and (3) assume no Canadian government intervention (probability = 70%). This results in three estimates of *NPV*, one for each scenario. This method is less arbitrary than the one considered by Rockford's executives.

Chapter 17

1. Growth may have caused Goshen to require a large amount for financing that could not be completely provided by retained earnings. In addition, the interest rates may have been low in these foreign countries to make debt financing an attractive alternative. Finally, the use of foreign debt can reduce the exchange rate risk since the amount in periodic remitted earnings is reduced when interest payments are required on foreign debt.
2. If country risk has increased, Lynde can attempt to reduce its exposure to that risk by removing its equity investment from the subsidiary. When the subsidiary is financed with local funds, the local creditors have more to lose than the parent if the host government imposes any severe restrictions on the subsidiary.
3. Not necessarily. German and Japanese firms tend to have more support from other firms or from the government if they experience cash flow problems and can therefore afford to use a higher degree of financial leverage than firms from the same industry in the United States.
4. Local debt financing is favorable because it can reduce the MNC's exposure to country risk and exchange rate risk. However, the high interest rates will make the local debt very expensive. If the parent makes an equity investment in the subsidiary to avoid the high cost of local debt, it will be more exposed to country risk and exchange rate risk.
5. The answer to this question is dependent on whether you believe unsystematic risk is relevant. If the CAPM is used as a framework for measuring the risk of a project, the risk of the foreign project is determined to be low, because the systematic risk is low. That is, the risk is specific to the host country and is not related to U.S. market conditions. However, if the project's unsystematic risk is relevant, the project is considered to have a high degree of risk. The project's cash flows are very uncertain, even though the systematic risk is low.

Chapter 18

1. A firm may be able to obtain a lower coupon rate by issuing bonds denominated in a different currency. The firm converts the proceeds from issuing the bond to its local currency to finance local operations. Yet, there is exchange rate risk because the firm will need to make coupon payments and the principal payment in the currency denominating the bond. If that currency appreciates against the firm's local currency, the financing costs could become larger than expected.
2. The risk is that the Swiss franc would appreciate against the pound over time since the British subsidiary will periodically convert some of its pound cash flows to francs to make the coupon payments.

The risk here is less than it would be if the proceeds were used to finance U.S. operations. The Swiss franc's movement against the dollar is much more volatile than the Swiss franc's movement against the pound. The Swiss franc and the pound have historically moved in tandem to some degree against the dollar, which means that there is a somewhat stable exchange rate between the two currencies.

3. If these firms borrow U.S. dollars and convert them to finance local projects, they will need to use their own currencies to obtain dollars and make coupon payments. These firms would be highly exposed to exchange rate risk.
4. Paxson Co. is exposed to exchange rate risk. If the yen appreciates, the number of dollars needed for conversion into yen will increase. To the extent that the yen strengthens, Paxson's cost of financing when financing with yen could be higher than when financing with dollars.
5. The nominal interest rate incorporates expected inflation (according to the so-called Fisher effect). Therefore, the high interest rates reflect high expected inflation. Cash flows can be enhanced by inflation because a given profit margin converts into larger profits as a result of inflation, even if costs increase at the same rate as revenues.

Chapter 19

1. The exporter may not trust the importer or may be concerned that the government will impose exchange controls that prevent payment to the exporter. Meanwhile, the importer may not trust that the exporter will ship the goods ordered and therefore may not pay until the goods are received. Commercial banks can help by providing guarantees to the exporter in case the importer does not pay.
2. In accounts receivable financing, the bank provides a loan to the exporter secured by the accounts receivable. If the importer fails to pay the exporter, the exporter is still responsible to repay the bank. Factoring involves the sales of accounts receivable by the exporter to a so-called factor, so that the exporter is no longer responsible for the importer's payment.
3. The guarantee programs of the Export-Import Bank provide medium-term protection against the risk of nonpayment by the foreign buyer due to political risk.

Chapter 20

1. $r_f = (1 + i_f)(1 + e_f) - 1$
 If $e_f = -6\%$, $r_f = (1 + .09)[1 + (-.06)] - 1$
 $= .0246$, or 2.46%
 If $e_f = 3\%$, $r_f = (1 + .09)(1 + .03) - 1$
 $= .1227$, or 12.27%
2. $E(r_f) = 50\%(2.46\%) + 50\%(12.27\%)$
 $= 1.23\% + 6.135\%$
 $= 7.365\%$
3. $e_f = \frac{1 + r_f}{1 + i} - 1$
 $= \frac{1 + .08}{1 + .05} - 1$
 $= .0286$, or 2.86%
4. $E(e_f) = (\text{Forward rate} - \text{Spot rate})/\text{Spot rate}$
 $= (\$.60 - \$.62)/\$.62$
 $= -.0322$, or -3.22%
 $E(r_f) = (1 + i_f)[1 + E(e_f)] - 1$
 $= (1 + .09)[1 + (-.0322)] - 1$
 $= .0548$, or 5.48%

5. The two-currency portfolio will not exhibit much lower variance than either individual currency because the currencies tend to move together. Thus, the diversification effect is limited.

Chapter 21

1. The subsidiary in Country Y should be more adversely affected because the blocked funds will not earn as much interest over time. In addition, the funds will likely be converted to dollars at an unfavorable exchange rate because the currency is expected to weaken over time.

$$\begin{aligned} 2. E(r) &= (1 + i_f)[1 + E(e_f)] - 1 \\ &= (1 + .14)(1 + .08) - 1 \\ &= .2312, \text{ or } 23.12\% \end{aligned}$$

$$\begin{aligned} 3. E(e_f) &= (\text{Forward rate} - \text{Spot rate})/\text{Spot rate} \\ &= (\$.19 - \$.20)/\$.20 \\ &= -.05, \text{ or } -5\% \end{aligned}$$

$$\begin{aligned} E(r) &= (1 + i_f)[1 + E(e_f)] - 1 \\ &= (1 + .11)[1 + (-.05)] - 1 \\ &= .0545, \text{ or } 5.45\% \end{aligned}$$

$$\begin{aligned} 4. e_f &= \frac{1 + r}{1 + i_f} - 1 \\ &= \frac{1 + .06}{1 + .90} - 1 \\ &= -.4421, \text{ or } -44.21\% \end{aligned}$$

If the bolivar depreciates by less than 44.21 percent against the dollar over the one-year period, a one-year deposit in Venezuela will generate a higher effective yield than a one-year U.S. deposit.

5. Yes. Interest rate parity would discourage U.S. firms only from covering their investments in foreign deposits by using forward contracts. As long as the firms believe that the currency will not depreciate to offset the interest rate advantage, they may consider investing in countries with high interest rates.

APPENDIX B



Chapter 1 Ranger Supply Company

Motivation for International Business

Ranger Supply Company is a large manufacturer and distributor of office supplies. It is based in New York but sends supplies to firms throughout the United States. It markets its supplies through periodic mass mailings of catalogues to those firms. Its clients can make orders over the phone, and Ranger ships the supplies upon demand. Ranger has had very high production efficiency in the past. This is attributed partly to low employee turnover and high morale, as employees are guaranteed job security until retirement.

Ranger already holds a large proportion of the market share in distributing office supplies in the United States. Its main competition in the United States comes from one U.S. firm and one Canadian firm. A British firm has a small share of the U.S. market but is at a disadvantage because of its distance. The British firm's marketing and transportation costs in the U.S. market are relatively high.

Although Ranger's office supplies are somewhat similar to those of its competitors, it has been able to capture most of the U.S. market because its high efficiency enables it to charge low prices to retail stores. It expects a decline in the aggregate demand for office supplies in the United States in future years. However, it anticipates strong demand for office supplies in Canada and in Eastern Europe over the next several years. Ranger's executives have begun to consider exporting as a method of offsetting the possible decline in domestic demand for its products.

- a. Ranger Supply Company plans to attempt penetrating either the Canadian market or the Eastern European market through exporting. What factors deserve to be considered in deciding which market is more feasible?
- b. One financial manager has been responsible for developing a contingency plan in case whichever market is chosen imposes export barriers over time. This manager proposed that Ranger should establish a subsidiary in the country of concern under such conditions. Is this a reasonable strategy? Are there any obvious reasons why this strategy could fail?

Chapter 2 MapleLeaf Paper Company

Assessing the Effects of Changing Trade Barriers

MapleLeaf Paper Company is a Canadian firm that produces a particular type of paper not produced in the United States. It focuses most of its sales in the United States. In the past year, for example, 180,000 of its 200,000 rolls of paper were sold to the

United States, and the remaining 20,000 rolls were sold in Canada. It has a niche in the United States, but because there are some substitutes, the U.S. demand for the product is sensitive to any changes in price. In fact, MapleLeaf has estimated that the U.S. demand rises (declines) 3 percent for every 1 percent decrease (increase) in the price paid by U.S. consumers, other things held constant.

A 12 percent tariff had historically been imposed on exports to the United States. Then on January 2, a free trade agreement between the United States and Canada was implemented, eliminating the tariff. MapleLeaf was ecstatic about the news, as it had been lobbying for the free trade agreement for several years.

At that time, the Canadian dollar was worth \$.76. MapleLeaf hired a consulting firm to forecast the value of the Canadian dollar in the future. The firm expects the Canadian dollar to be worth about \$.86 by the end of the year and then stabilize after that. The expectations of a stronger Canadian dollar are driven by an anticipation that Canadian firms will capitalize on the free trade agreement more than U.S. firms, which will cause the increase in the U.S. demand for Canadian goods to be much higher than the increase in the Canadian demand for U.S. goods. (However, no other Canadian firms are expected to penetrate the U.S. paper market.) MapleLeaf expects no major changes in the aggregate demand for paper in the U.S. paper industry. It is also confident that its only competition will continue to be two U.S. manufacturers that produce imperfect substitutes for its paper. Its sales in Canada are expected to grow by about 20 percent by the end of the year because of an increase in the overall Canadian demand for paper and then remain level after that. MapleLeaf invoices its exports in Canadian dollars and plans to maintain its present pricing schedule, since its costs of production are relatively stable. Its U.S. competitors will also continue their pricing schedule. MapleLeaf is confident that the free trade agreement will be permanent. It immediately begins to assess its long-run prospects in the United States.

- a. Based on the information provided, develop a forecast of MapleLeaf's annual production (in rolls) needed to accommodate demand in the future. Since orders for this year have already occurred, focus on the years following this year.
- b. Explain the underlying reasons for the change in the demand and the implications.
- c. Will the general effects on MapleLeaf be similar to the effects on a U.S. paper producer that exports paper to Canada? Explain.

Chapter 3 Gretz Tool Company

Using International Financial Markets

Gretz Tool Company is a large U.S.-based multinational corporation with subsidiaries in eight different countries. The parent of Gretz provided an initial cash infusion to establish each subsidiary. However, each subsidiary has had to finance its own growth since then. The parent and subsidiaries of Gretz typically use Citicorp (the largest bank in the United States, with branches in numerous countries) when possible to facilitate any flow of funds necessary.

- a. Explain the various ways in which Citicorp could facilitate Gretz's flow of funds, and identify the type of financial market where that flow of funds occurs. For each type of financing transaction, specify whether Citicorp would serve as the creditor or would simply be facilitating the flow of funds to Gretz.

- b. Recently, the British subsidiary called on Citicorp for a medium-term loan and was offered the following alternatives:

Loan Denominated In	Annualized Rate
British pounds	13%
U.S. dollars	11%
Canadian dollars	10%
Japanese yen	8%

What characteristics do you think would help the British subsidiary determine which currency to borrow?

Chapter 4 Bruin Aircraft, Inc.

Factors Affecting Exchange Rates

Bruin Aircraft, Inc., is a designer and manufacturer of airplane parts. Its production plant is based in California. About one-third of its sales are exports to the United Kingdom. Though Bruin invoices its exports in dollars, the demand for its exports is highly sensitive to the value of the British pound. In order to maintain its parts inventory at a proper level, it must forecast the total demand for its parts, which is somewhat dependent on the forecasted value of the pound. The treasurer of Bruin was assigned the task of forecasting the value of the pound (against the dollar) for each of the next 5 years. He was planning to request from the firm's chief economist forecasts on all the relevant factors that could affect the pound's future exchange rate. He decided to organize his worksheet by separating demand-related factors from the supply-related factors, as illustrated by the headings below:

Factors that can affect the value of the pound	Check (✓) here if the factor influences the U.S. demand for pounds	Check (✓) here if the factor influences the supply of pounds for sale
--	--	---

Help the treasurer by identifying the factors in the first column and then checking the second or third (or both) columns. Include any possible government-related factors and be specific (tie your description to the specific case background provided here).

Chapter 5 Capital Crystal, Inc.

Using Currency Futures and Options

Capital Crystal, Inc., is a major importer of crystal from the United Kingdom. The crystal is sold to prestigious retail stores throughout the United States. The imports are denominated in British pounds (£). Every quarter, Capital needs £500 million. It is currently attempting to determine whether it should use currency futures or currency options to hedge imports 3 months from now, if it will hedge at all. The spot rate of the pound is \$1.60. A 3-month futures contract on the pound is available for \$1.59 per unit. A call option on the pound is available with a 3-month expiration date

and an exercise price of \$1.60. The premium to be paid on the call option is \$.01 per unit.

Capital is very confident that the value of the pound will rise to at least \$1.62 in 3 months. Its previous forecasts of the pound's value have been very accurate. The management style of Capital is very risk averse. Managers receive a bonus at the end of the year if they satisfy minimal performance standards. The bonus is fixed, regardless of how high above the minimum level one's performance is. If performance is below the minimum, there is no bonus, and future advancement within the company is unlikely.

- a. As a financial manager of Capital, you have been assigned the task of choosing among three possible strategies: (1) hedge the pound's position by purchasing futures, (2) hedge the pound's position by purchasing call options, or (3) do not hedge. Offer your recommendation and justify it.
- b. Assume the previous information that was provided, except for this difference: Capital has revised its forecast of the pound to be worth \$1.57 3 months from now. Given this revision, recommend whether Capital should (1) hedge the pound's position by purchasing futures, (2) hedge the pound's position by purchasing call options, or (3) not hedge. Justify your recommendation. Is your recommendation consistent with maximizing shareholder wealth?

Chapter 6 Hull Importing Company

Effects of Intervention on Import Expenses

Hull Importing Company is a U.S.-based firm that imports small gift items and sells them to retail gift shops across the United States. About half of the value of Hull's purchases comes from the United Kingdom, while the remaining purchases are from Mexico. The imported goods are denominated in the currency of the country where they are produced. Hull normally does not hedge its purchases.

In previous years, the Mexican peso and pound fluctuated substantially against the dollar (although not by the same degree). Hull's expenses are directly tied to these currency values because all of its products are imported. It has been successful because the imported gift items are somewhat unique and are attractive to U.S. consumers. However, Hull has been unable to pass on higher costs (due to a weaker dollar) to its consumers, because consumers would then switch to different gift items sold at other stores.

- a. Hull expects that Mexico's central bank will increase interest rates and that Mexico's inflation will not be affected. Offer any insight on how the peso's value may change and how Hull's profits would be affected as a result.
- b. Hull used to closely monitor government intervention by the Bank of England (the British central bank) on the value of the pound. Assume that the Bank of England intervenes to strengthen the pound's value with respect to the dollar by 5 percent. Would this have a favorable or unfavorable effect on Hull's business?

Chapter 7 Zuber, Inc.

Using Covered Interest Arbitrage

Zuber, Inc., is a U.S.-based MNC that has been aggressively pursuing business in Eastern Europe since the Iron Curtain was lifted in 1989. Poland has allowed its currency's value to be market determined. The spot rate of the Polish zloty is \$.40.

Poland also has begun to allow investments by foreign investors, as a method of attracting funds to help build its economy. Its interest rate on one-year securities issued by the federal government is 14 percent, which is substantially higher than the 9 percent rate currently offered on one-year U.S. Treasury securities.

A local bank has begun to create a forward market for the zloty. This bank was recently privatized and has been trying to make a name for itself in international business. The bank has quoted a one-year forward rate of \$.39 for the zloty. As an employee in Zuber's international money market division, you have been asked to assess the possibility of investing short-term funds in Poland. You are in charge of investing \$10 million over the next year. Your objective is to earn the highest return possible while maintaining safety (since the firm will need the funds next year).

Since the exchange rate has just become market determined, there is a high probability that the zloty's value will be very volatile for several years as it seeks its true equilibrium value. The expected value of the zloty in one year is \$.40, but there is a high degree of uncertainty about this. The actual value in one year may be as much as 40 percent above or below this expected value.

- a. Would you be willing to invest the funds in Poland without covering your position? Explain.
- b. Suggest how you could attempt covered interest arbitrage. What is the expected return from using covered interest arbitrage?
- c. What risks are involved in using covered interest arbitrage here?
- d. If you had to choose between investing your funds in U.S. Treasury bills at 9 percent or using covered interest arbitrage, what would be your choice? Defend your answer.

Chapter 8 Flame Fixtures, Inc.

Business Application of Purchasing Power Parity

Flame Fixtures, Inc., is a small U.S. business in Arizona that produces and sells lamp fixtures. Its costs and revenues have been very stable over time. Its profits have been adequate, but Flame has been searching for means of increasing profits in the future. It has recently been negotiating with a Mexican firm called Corón Company, from which it will purchase some of the necessary parts. Every 3 months, Corón Company will send a specified number of parts with the bill invoiced in Mexican pesos. By having the parts produced by Corón, Flame expects to save about 20 percent on production costs. Corón is only willing to work out a deal if it is assured that it will receive a minimum specified amount of orders every 3 months over the next 10 years, for a minimum specified amount. Flame will be required to use its assets to serve as collateral in case it does not fulfill its obligation.

The price of the parts will change over time in response to the costs of production. Flame recognizes that the cost to Corón will increase substantially over time as a result of the very high inflation rate in Mexico. Therefore, the price charged in pesos likely will rise substantially every 3 months. However, Flame feels that, because of the concept of purchasing power parity (PPP), its dollar payments to Corón will be very stable. According to PPP, if Mexican inflation is much higher than U.S. inflation, the peso will weaken against the dollar by that difference. Since Flame does not have much liquidity, it could experience a severe cash shortage if its expenses are much higher than anticipated.

The demand for Flame's product has been very stable and is expected to continue that way. Since the U.S. inflation rate is expected to be very low, Flame likely will con-

tinue pricing its lamps at today's prices (in dollars). It believes that by saving 20 percent on production costs it will substantially increase its profits. It is about ready to sign a contract with Corón Company.

- Describe a scenario that could cause Flame to save even more than 20 percent on production costs.
- Describe a scenario that could cause Flame to actually incur higher production costs than if it simply had the parts produced in the United States.
- Do you think that Flame will experience stable dollar outflow payments to Corón over time? Explain. (Assume that the number of parts ordered is constant over time.)
- Do you think that Flame's risk changes at all as a result of its new relationship with Corón Company? Explain.

Chapter 9 Whaler Publishing Company

Forecasting Exchange Rates

Whaler Publishing Company specializes in producing textbooks in the United States and marketing these books in foreign universities where the English language is used. Its sales are invoiced in the currency of the country where the textbooks are sold. The expected revenues from textbooks sold to university bookstores are shown in Exhibit B.1.

Whaler is comfortable with the estimated foreign currency revenues in each country. However, it is very uncertain about the U.S. dollar revenues to be received from each country. At this time (which is the beginning of Year 16), Whaler is using today's spot rate as its best guess of the exchange rate at which the revenues from each country will be converted into U.S. dollars at the end of this year (which implies a zero percentage change in the value of each currency). Yet, it recognizes the potential error associated with this type of forecast. Therefore, it desires to incorporate the risk surrounding each currency forecast by creating confidence intervals for each currency. First, it must derive the annual percentage change in the exchange rate over each of the last 15 years for each currency to derive a standard deviation in the percentage change of each foreign currency. By assuming that the percentage changes in exchange rates are normally distributed, it plans to develop two ranges of forecasts for the annual percentage change in each currency: (1) one standard deviation in each direction from its best guess to develop a 68 percent confidence interval, and (2) two standard deviations in each direction from its best guess to develop a 95 percent confidence interval. These confidence intervals can then be applied to today's spot rates to develop confidence intervals for the future spot rate one year from today.

Exhibit B.1 Expected Revenues from Textbooks Sold to University Bookstores

University Bookstores in	Local Currency	Today's Spot Exchange Rate	Expected Revenues from Bookstores This Year
Australia	Australian dollars (A\$)	\$.7671	A\$38,000,000
Canada	Canadian dollars (C\$)	.8625	C\$35,000,000
New Zealand	New Zealand dollars (NZ\$)	.5985	NZ\$33,000,000
United Kingdom	Pounds (£)	1.9382	£34,000,000

The exchange rates at the beginning of each of the last 16 years for each currency (with respect to the U.S. dollar) are shown here:

Beginning of Year	Australian \$	Canadian \$	New Zealand \$	British Pound
1	\$1.2571	\$.9839	\$1.0437	£2.0235
2	1.0864	.9908	.9500	1.7024
3	1.1414	.9137	1.0197	1.9060
4	1.1505	.8432	1.0666	2.0345
5	1.1055	.8561	.9862	2.2240
6	1.1807	.8370	.9623	2.3850
7	1.1279	.8432	.8244	1.9080
8	.9806	.8137	.7325	1.6145
9	.9020	.8038	.6546	1.4506
10	.8278	.7570	.4776	1.1565
11	.6809	.7153	.4985	1.4445
12	.6648	.7241	.5235	1.4745
13	.7225	.8130	.6575	1.8715
14	.8555	.8382	.6283	1.8095
15	.7831	.8518	.5876	1.5772
16	.7671	.8625	.5985	1.9382

The confidence intervals for each currency can be applied to the expected book revenues to derive confidence intervals in U.S. dollars to be received from each country. Complete this assignment for Whaler Publishing Company, and also rank the currencies in terms of uncertainty (degree of volatility). Since the exchange rate data provided are real, the analysis will indicate (1) how volatile currencies can be, (2) how much more volatile some currencies are than others, and (3) how estimated revenues can be subject to a high degree of uncertainty as a result of uncertain exchange rates. (If you use a spreadsheet to do this case, you may want to retain it since the case in the following chapter is an extension of this case.)

Chapter 10 Whaler Publishing Company

Measuring Exposure to Exchange Rate Risk

Recall the situation of Whaler Publishing Company from the previous chapter. Whaler needed to develop confidence intervals of four exchange rates in order to derive confidence intervals for U.S. dollar cash flows to be received from four different countries. Each confidence interval was isolated on a particular country.

Assume that Whaler would like to estimate the range of its aggregate dollar cash flows to be generated from other countries. A computer spreadsheet should be developed to facilitate this exercise. Whaler plans to simulate the conversion of the expected currency cash flows to dollars, using each of the previous years as a possible scenario (recall that exchange rate data are provided in the original case in Chapter 9).

Specifically, Whaler will determine the annual percentage change in the spot rate of each currency for a given year. Then, it will apply that percentage to the respective existing spot rates to determine a possible spot rate in one year for each currency. Recall that today's spot rates are assumed to be as follows:

- Australian dollar = \$.7671
- Canadian dollar = \$.8625
- New Zealand dollar = \$.5985
- British pound = £1.9382

Once the spot rate is forecasted for one year ahead for each currency, the U.S. dollar revenues received from each country can be forecasted. For example, from Year 1 to Year 2, the Australian dollar declined by about 13.6 percent. If this percentage change occurs this year, the spot rate of the Australian dollar will decline from today's rate of \$.7671 to about \$.6629. In this case, the A\$38 million to be received would convert to \$25,190,200. The same tasks must be done for the other three currencies as well in order to estimate the aggregate dollar cash flows under this scenario.

This process can be repeated, using each of the previous years as a possible future scenario. There will be 15 possible scenarios, or 15 forecasts of the aggregate U.S. dollar cash flows. Each of these scenarios is expected to have an equal probability of occurring. By assuming that these cash flows are normally distributed, Whaler uses the standard deviation of the possible aggregate cash flows for all 15 scenarios to develop 68 and 95 percent confidence intervals surrounding the "expected value" of the aggregate level of U.S. dollar cash flows to be received in one year.

- a. Perform these tasks for Whaler in order to determine these confidence intervals on the aggregate level of U.S. dollar cash flows to be received. Whaler uses the methodology described here, rather than simply combining the results for individual countries (from the previous chapter) because exchange rate movements may be correlated.
- b. Review the annual percentage changes in the four exchange rates. Do they appear to be positively correlated? Estimate the correlation coefficient between exchange rate movements with either a calculator or a spreadsheet package. Based on this analysis, you can fill out the following correlation coefficient matrix:

	A\$	C\$	NZ\$	£
A\$	1.00			
C\$		1.00		
NZ\$			1.00	
£				1.00

Would aggregate dollar cash flows to be received by Whaler be more risky than they would if the exchange rate movements were completely independent? Explain.

- c. One Whaler executive has suggested that a more efficient way of deriving the confidence intervals would be to use the exchange rates instead of the percentage changes as the scenarios and derive U.S. dollar cash flow estimates directly from them. Do you think this method would be as accurate as the method now used by Whaler? Explain.

Chapter 11 Blackhawk Company

Forecasting Exchange Rates and the Hedging Decision

This case is intended to illustrate how forecasting exchange rates and hedging decisions are related. Blackhawk Company imports goods from New Zealand and plans to purchase NZ\$800,000 one quarter from now to pay for imports. As the treasurer of Blackhawk, you are responsible for determining whether and how to hedge this payables position. Several tasks will need to be completed before you can make these decisions. The entire analysis can be performed using LOTUS or Excel spreadsheets.

- Your first goal is to assess three different models for forecasting the value of NZ\$ at the end of the quarter (also called the future spot rate, or FSR).
- Using the forward rate (FR) at the beginning of the quarter. Using the spot rate (SR) at the beginning of the quarter.
- Estimating the historical influence of the inflation differential during each quarter on the percentage change in the NZ\$ (which leads to a forecast of the FSR of the NZ\$).

The historical data to be used for this analysis are provided in Exhibit B.2.

- a. Use regression analysis to determine whether the forward rate is an unbiased estimator of the spot rate at the end of the quarter.
- b. Use the simplified approach of assessing the signs of forecast errors over time. Do you detect any bias when using the FR to forecast? Explain.
- c. Determine the average absolute forecast error when using the forward rate to forecast.
- d. Determine whether the spot rate of the NZ\$ at the beginning of the quarter is an unbiased estimator of the spot rate at the end of the quarter using regression analysis.
- e. Use the simplified approach of assessing the signs of forecast errors over time. Do you detect any bias when using the SR to forecast? Explain.
- f. Determine the average absolute forecast error when using the spot rate to forecast. Is the spot rate or the forward rate a more accurate forecast of the future spot rate (FSR)? Explain.
- g. Use the following regression model to determine the relationship between the inflation differential (called *DIFF* and defined as the U.S. inflation minus New Zealand inflation) and the percentage change in the NZ\$ (called *PNZ\$*):

$$PNZ\$ = b_0 + b_1 DIFF$$

Once you have determined the coefficients b_0 and b_1 , use them to forecast *PNZ\$* based on a forecast of 2 percent for *DIFF* in the upcoming quarter. Then, apply your forecast for *PNZ\$* to the prevailing spot rate (which is \$.589) to derive the expected FSR of the NZ\$.

- h. Blackhawk plans to develop a probability distribution for the FSR. First, it will assign a 40 percent probability to the forecast of FSR derived from the regression analysis in the previous question. Second, it will assign a 40 percent probability to the forecast of FSR based on either the forward rate or the spot rate (whichever was more accurate according to your earlier analysis). Third, it will assign a 20 percent probability to the forecast of FSR based on either the forward

Exhibit B.2 Historical Data for Analysis

Quarter	Spot Rate of NZ\$ at Beginning of Quarter	90-Day Forward Rate of NZ\$ at Beginning of Quarter	Spot Rate of NZ\$ at End of Quarter	Last Quarter's Inflation Differential	Percentage Change in NZ\$ over Quarter
1	\$.3177	\$.3250	\$.3233	-.05%	1.76%
2	.3233	.3272	.3267	-.46	1.05
3	.3267	.3285	.3746	.66	14.66
4	.3746	.3778	.4063	.94	8.46
5	.4063	.4093	.4315	.58	6.20
6	.4315	.4344	.4548	.23	5.40
7	.4548	.4572	.4949	.02	8.82
8	.4949	.4966	.5153	1.26	4.12
9	.5153	.5169	.5540	.86	7.51
10	.5540	.5574	.5465	.54	-1.35
11	.5465	.5510	.5440	1.00	-.46
12	.5440	.5488	.6309	1.09	15.97
13	.6309	.6365	.6027	.78	-4.47
14	.6027	.6081	.5409	.23	-10.25
15	.5491	.5538	.5320	.71	-3.11
16	.5320	.5365	.5617	1.18	5.58
17	.5617	.5667	.5283	.70	-5.95
18	.5283	.5334	.5122	-.31	-3.05
19	.5122	.5149	.5352	.62	4.49
20	.5352	.5372	.5890	.87	10.05
21 (Now)	.5890	.5878	(to be forecasted)	.28	(to be forecasted)

rate or the spot rate (whichever was less accurate according to your earlier analysis).

Fill in the table that follows:

Probability	FSR
40%	
40	
20	

i. Assuming that Blackhawk does not hedge, fill in the following table:

Probability	Forecasted Dollar Amount Needed to Pay for Imports in 90 Days
40%	
40	
20	

- j. Based on the probability distribution for the FSR, use the table that follows to determine the probability distribution for the real cost of hedging if a forward contract is used for hedging (recall that the prevailing 90-day forward rate is \$.5878).

Probability	Forecasted Dollar Amount Needed If Hedged with a Forward Contract	Forecasted Amount Needed If Unhedged	Forecasted Real Cost of Hedging Payables
40%			
40			
20			

- k. If Blackhawk hedges its position, it will use either a 90-day forward rate, a money market hedge, or a call option. The following data are available at the time of its decision.

- Spot rate = \$.589.
- 90-day forward rate = \$.5878.
- 90-day U.S. borrowing rate = 2.5%.
- 90-day U.S. investing rate = 2.3%.
- 90-day New Zealand borrowing rate = 2.4%.
- 90-day New Zealand investing rate = 2.1%.
- Call option on NZ\$ has a premium of \$.01 per unit.
- Call option on NZ\$ has an exercise price of \$.60.

Determine the probability distribution of dollars needed for a call option if used (include the premium paid) by filling out the following table:

Probability	FSR	Dollars Needed to Pay for Payables
40%		
40		
20		

- l. Compare the forward hedge to the money market hedge. Which is superior? Why?
- m. Compare either the forward hedge or the money market hedge (whichever is better) to the call option hedge. If you hedge, which technique should you use? Why?
- n. Compare the hedge you believe is the best to an unhedged strategy. Should you hedge or remain unhedged? Explain.

Chapter 12 Madison, Inc.

Assessing Economic Exposure

The situation for Madison, Inc., was described in this chapter to illustrate how alternative operational structures could affect economic exposure to exchange rate movements. Ken Moore, the vice president of finance at Madison, Inc., was seriously considering a shift to the proposed operational structure described in the text. He was determined to stabilize the earnings before taxes and believed that the proposed approach would achieve this objective. The firm expected that the Canadian dollar would consistently depreciate over the next several years. Over time, its forecasts have been very accurate. Moore paid little attention to the forecasts, stating that regardless of how the Canadian dollar changed, future earnings would be more stable under the proposed operational structure. He also was constantly reminded of how the strengthened Canadian dollar in some years had adversely affected the firm's earnings. In fact, he was somewhat concerned that he might even lose his job if the adverse effects from economic exposure continued.

- a. Would a revised operational structure at this time be in the best interests of the shareholders? Would it be in the best interests of the vice president?
- b. How could a revised operational structure possibly be feasible from the vice president's perspective but not from the shareholders' perspective? Explain how the firm might be able to ensure that the vice president will make decisions related to economic exposure that are in the best interests of the shareholders.

Chapter 13 Blues Corporation

Capitalizing on the Opening of Eastern European Borders

Having done business in the United States for over 50 years, Blues Corporation has an established reputation. Most of Blues' business is in the United States. It has a subsidiary in the western section of Germany, which produces goods and exports them to other European countries. Blues Corporation produces many consumer goods that could possibly be produced or marketed in Eastern European countries. The following issues were raised at a recent executive meeting. Offer your comments about each issue.

- a. Blues Corporation is considering shifting its European production facility from western Germany to eastern Germany. There are two key factors motivating this shift. First, the labor cost is lower in eastern Germany. Second, there is an existing facility (currently government owned) in the former East Germany that is for sale. Blues would like to transform the facility and use its technology to increase production efficiency. It estimates that it would need only one-fourth of the workers in that facility. What other factors deserve to be considered before the decision is made?
- b. Blues Corporation believes that it could penetrate the Eastern European markets. It would need to invest considerable funds in promoting its consumer goods in Eastern Europe, since its goods are not well known in that area. Yet, it believes that this strategy could pay off in the long run because Blues could underprice the competition. At the current time, the main competition consists of businesses that are perceived to be inefficiently run. The lack of competitive pricing in this market is the primary reason for Blues Corporation to consider marketing its product in Eastern Europe. What other factors deserve to be considered before a decision is made?

- c. Blues Corporation is currently experiencing a cash squeeze because of a reduced demand for its goods in the United States (although management expects the demand in the United States to increase soon). It is currently near its debt capacity and prefers not to issue stock at this time. Blues Corporation will purchase a facility in Eastern Europe or implement a heavy promotion program in Eastern Europe only if it can raise funds by divesting a significant amount of its U.S. assets. The market values of its assets are temporarily depressed, but some of the executives think an immediate move is necessary to fully capitalize on the Eastern European market. Would you recommend that Blues Corporation divest some of its U.S. assets? Explain.

Chapter 14 North Star Company

Capital Budgeting

This case is intended to illustrate that the value of an international project is sensitive to various types of input. It also is intended to show how a computer spreadsheet format can facilitate capital budgeting decisions that involve uncertainty.

This case can be performed using an electronic spreadsheet such as Excel. The following present value factors may be helpful input for discounting cash flows:

Years from Now	Present Value Interest Factor at 18%
1	.8475
2	.7182
3	.6086
4	.5158
5	.4371
6	.3704

For consistency in discussion of this case, you should develop your computer spreadsheet in a format somewhat similar to that in Chapter 14, with each year representing a column across the top. The use of a computer spreadsheet will significantly reduce the time needed to complete this case.

North Star Company is considering establishing a subsidiary to manufacture clothing in Singapore. Its sales would be invoiced in Singapore dollars (S\$). It has forecasted net cash flows to the subsidiary as follows:

Year	Net Cash Flows to Subsidiary
1	S\$ 8,000,000
2	10,000,000
3	14,000,000
4	16,000,000
5	16,000,000
6	16,000,000

These cash flows do not include financing costs (interest expenses) on any funds borrowed in Singapore. North Star Company also expects to receive S\$30 million after taxes as a result of selling the subsidiary at the end of Year 6. Assume that there will not be any withholding taxes imposed on this amount.

The exchange rate of the Singapore dollar is forecasted in Exhibit B.3 based on three possible scenarios of economic conditions.

The probability of each scenario is shown below:

	Somewhat Stable S\$	Weak S\$	Strong S\$
Probability	60%	30%	10%

Fifty percent of the net cash flows to the subsidiary would be remitted to the parent, while the remaining 50 percent would be reinvested to support ongoing operations at the subsidiary. North Star Company anticipates a 10 percent withholding tax on funds remitted to the United States.

The initial investment (including investment in working capital) by North Star in the subsidiary would be S\$40 million. Any investment in working capital (such as accounts receivable, inventory, etc.) is to be assumed by the buyer in Year 6. The expected salvage value has already accounted for this transfer of working capital to the buyer in Year 6. The initial investment could be financed completely by the parent (\$20 million, converted at the present exchange rate of \$.50 per Singapore dollar to achieve S\$40 million). North Star Company will go forward with its intentions to build the subsidiary only if it expects to achieve a return on its capital of 18 percent or more.

The parent is considering an alternative financing arrangement. With this arrangement, the parent would provide \$10 million (S\$20 million), which means that the subsidiary would need to borrow S\$20 million. Under this scenario, the subsidiary would obtain a 20-year loan and pay interest on the loan each year. The interest payments are S\$1.6 million per year. In addition, the forecasted proceeds to be received from selling the subsidiary (after taxes) at the end of 6 years would be S\$20 million (the forecast of proceeds is revised downward here because the equity investment of the subsidiary is less; the buyer would be assuming more debt if part of the initial investment in the subsidiary were supported by local bank loans). Assume the parent's required rate of return would still be 18 percent.

a. Which of the two financing arrangements would you recommend for the parent?

Assess the forecasted *NPV* for each exchange rate scenario to compare the two financing arrangements and substantiate your recommendation.

Exhibit B.3 Three Scenarios of Economic Conditions

End of Year	Scenario I: Somewhat Stable S\$	Scenario II: Weak S\$	Scenario III: Strong S\$
1	.50	.49	.52
2	.51	.46	.55
3	.48	.45	.59
4	.50	.43	.64
5	.52	.43	.67
6	.48	.41	.71

- b. In the first question, an alternative financing arrangement of partial financing by the subsidiary was considered, with an assumption that the required rate of return by the parent would not be affected. Is there any reason why the parent's required rate of return might increase when using this financing arrangement? Explain. How would you revise the analysis in the previous question under this situation? (This question requires discussion, not analysis.)
- c. Would you recommend that North Star Company establish the subsidiary even if the withholding tax is 20 percent?
- d. Assume that there is some concern about the economic conditions in Singapore, which could cause a reduction in the net cash flows to the subsidiary. Explain how Excel could be used to reevaluate the project based on alternative cash flow scenarios. That is, how can this form of country risk be incorporated into the capital budgeting decision? (This question requires discussion, not analysis.)
- e. Assume that North Star Company does implement the project, investing \$10 million of its own funds with the remainder borrowed by the subsidiary. Two years later, a U.S.-based corporation notifies North Star that it would like to purchase the subsidiary. Assume that the exchange rate forecasts for the somewhat stable scenario are appropriate for Years 3 through 6. Also assume that the other information already provided on net cash flows, financing costs, the 10 percent withholding tax, the salvage value, and the parent's required rate of return is still appropriate. What would be the minimum dollar price (after taxes) that North Star should receive to divest the subsidiary? Substantiate your opinion.

Chapter 15 Redwing Technology Company

Assessing Subsidiary Performance

Redwing Technology Company is a U.S.-based firm that makes a variety of high-tech components. Five years ago, it established subsidiaries in Canada, South Africa, and Japan. The earnings generated by each subsidiary as translated (at the average annual exchange rate) into U.S. dollars per year are shown in Exhibit B.4.

Each subsidiary had an equivalent amount in resources with which to conduct operations. The wage rates for the labor needed were similar across countries. The inflation rates, economic growth, and degree of competition were somewhat similar across countries. The average exchange rates of the respective currencies over the last 5 years are disclosed below:

Years Ago	Canadian Dollar	South African Rand	Japanese Yen
5	\$.84	\$.10	\$.0040
4	.83	.12	.0043
3	.81	.16	.0046
2	.81	.20	.0055
1	.79	.24	.0064

The earnings generated by each country were reinvested rather than remitted. There were no plans to remit any future earnings either.

A committee of vice presidents met to determine the performance of each subsidiary in the last 5 years. The assessment was to be used to determine whether Red-

Exhibit B.4 Translated Dollar Value of Annual Earnings in Each Subsidiary (in millions of \$)

Years Ago	Canada	South Africa	Japan
5	\$20	\$21	\$30
4	24	24	32
3	28	24	35
2	32	36	41
1	36	42	46

wing should be restructured to focus future growth on any particular subsidiary or to divest any subsidiaries that might experience poor performance. Since exchange rates of the related currencies were affected by so many different factors, the treasurer acknowledged that there was much uncertainty about their future direction. The treasurer did suggest, however, that last year's average exchange rate would probably serve as at least a reasonable guess of exchange rates in future years. He did not anticipate that any of the currencies would experience consistent appreciation or depreciation.

- Use whatever means you think are appropriate to rank the performance of each subsidiary. That is, which subsidiary did the best job over the 5-year period, in your opinion? Justify your opinion.
- Use whatever means you think are appropriate to determine which subsidiary deserves additional funds from the parent to push for additional growth. (Assume no constraint on potential growth in any country.) Where would you recommend the parent's excess funds be invested, based on the information available? Justify your opinion.
- Repeat question (b), but assume that all earnings generated from the parent's investment will be remitted to the parent every year. Would your recommendation change? Explain.
- A final task of the committee was to recommend whether any of the subsidiaries should be divested. One vice president suggested that a review of the earnings translated into dollars shows that the performances of the Canadian and South African subsidiaries are very highly correlated. She concluded that having both of these subsidiaries did not achieve much in diversification benefits and suggested that either the Canadian or the South African subsidiary could be sold without forgoing any diversification benefits. Do you agree? Explain.

Chapter 16 King, Inc.

Country Risk Analysis

King, Inc., a U.S. firm, is considering the establishment of a small subsidiary in Bulgaria that would produce food products. All ingredients can be obtained or produced in Bulgaria. The final products to be produced by the subsidiary would be sold in Bulgaria and other Eastern European countries. King, Inc., is very interested in this project, as there is little competition in that area. Three high-level managers of King, Inc., have been assigned the task of assessing the country risk of Bulgaria. Specifically, the managers were asked to list all characteristics of Bulgaria that could adversely

affect the performance of this project. The decision as to whether to undertake this project will be made only after this country risk analysis is completed and accounted for in the capital budgeting analysis. Since King, Inc., has focused exclusively on domestic business in the past, it is not accustomed to country risk analysis.

- a. What factors related to Bulgaria's government deserve to be considered?
- b. What country-related factors can affect the demand for the food products to be produced by King, Inc.?
- c. What country-related factors can affect the cost of production?

Chapter 17 Sabre Computer Corporation

Cost of Capital

Sabre Computer Corporation is a U.S.-based company that plans to participate in joint ventures in Mexico and in Hungary. Each joint venture involves the development of a small subsidiary that helps produce computers. Sabre's main contributions are the technology and a few key computer components used in the production process. The joint venture in Mexico specifies joint production of computers with a Mexican company owned by the government. The computers have already been ordered by educational institutions and government agencies throughout Mexico. Sabre has a contract to sell all the computers it produces in Mexico to these institutions and agencies at a price that is tied to inflation. Given the very high and volatile inflation levels in Mexico, Sabre wanted to ensure that the contracted price would adjust to cover rising costs over time.

The venture will require a temporary transfer of several managers to Mexico plus the manufacturing of key computer components in a leased Mexican plant. Most of these costs will be incurred in Mexico and will therefore require payment in pesos. Sabre will receive 30 percent of the revenue generated (in pesos) from computer sales. The Mexican partner will receive the remainder.

The joint venture in Hungary specifies joint production of personal computers with a Hungarian computer manufacturer. The computers will then be marketed to consumers throughout Eastern Europe. Similar computers are produced by some competitors, but Sabre believes it can penetrate these markets because its products will be competitively priced. Although the economies of the Eastern European countries are expected to be somewhat stagnant, demand for personal computers is reasonably strong. The computers will be priced in Hungary's currency, the forint, and Sabre will receive 30 percent of the revenue generated from sales.

- a. Assume that Sabre plans to finance most of its investment in the Mexican subsidiary by borrowing Mexican pesos and to finance most of its investment in the Hungarian subsidiary by borrowing forint. The cost of financing is influenced by the risk-free rates in the respective countries and the risk premiums on funds borrowed. Explain how these factors will affect the relative costs of financing both ventures. Address this question from the perspective of the subsidiary, not from the perspective of Sabre's parent.
- b. Will the joint venture experiencing the higher cost of financing (as determined in the previous question) necessarily experience lower returns to the subsidiary? Explain.
- c. The Hungarian subsidiary has a high degree of financial leverage. Yet, the parent's capital structure is mostly equity. What will determine whether the credi-

- tors of the Hungarian subsidiary charge a high-risk premium on borrowed funds because of the high degree of financial leverage?
- d. One Sabre executive has suggested that since the cost of debt financing by highly leveraged Hungarian-owned companies is about 14 percent, its Hungarian subsidiary should be able to borrow at about the same interest rate. Do you agree? Explain. (Assume that the chances of the subsidiary's experiencing financial problems are the same as those for these other Hungarian-owned firms.)
 - e. There is some concern that the economy in Hungary could become inflated. Assess the relative magnitude of an increase in inflation on (1) the cost of funds, (2) the cost of production, and (3) revenue from selling the computers.

Chapter 18 Devil Corporation

Long-Term Financing

Devil Corporation is a U.S.-based company that produces DVD players. Three years ago, Devil established a production facility in the United Kingdom, since it sells DVD players there. Devil has excess capacity there and will use that facility to produce the DVD players that are to be marketed in Singapore. The DVD players will be sold to distributors in Singapore and invoiced in Singapore dollars (S\$). If the exporting program is very successful, Devil Corporation will probably build a facility in Singapore, but it plans to wait at least 10 years.

Prior to this exporting program, Devil Corporation decided to develop a hedging strategy to hedge any cash flows to the U.S. parent. Its plan is to issue bonds to finance the entire investment in the exporting program. Virtually all expenses associated with this program are denominated in pounds. Yet, the revenue generated by the program is denominated in Singapore dollars. Any revenue above and beyond expenses is to be remitted to the United States on an annual basis. Aside from the exporting program, the British subsidiary will generate just enough in cash flows to cover expenses and therefore will not be remitting any earnings to the parent. Devil Corporation is considering three different ways to finance the program for 10 years:

- Issue 10-year, Singapore dollar-denominated bonds at par value; coupon rate = 11%.
- Issue 10-year, pound-denominated bonds at par value; coupon rate = 14%.
- Issue 10-year, U.S. dollar-denominated bonds at par value; coupon rate = 11%.
 - a. Describe the exchange rate risk if Devil finances with Singapore dollars.
 - b. Describe the exchange rate risk if Devil finances with British pounds.
 - c. Describe the exchange rate risk if Devil finances with U.S. dollars.

Chapter 19 Ryco Chemical Company

Using Countertrade

Ryco Chemical Company produces a wide variety of chemical products that are sold to manufacturing firms. Some of the chemicals used in its production process are imported from Concellos Chemical Company in Brazil. Concellos uses some chemicals in its production process that are produced by Ryco (although Concellos has

historically purchased these chemicals from another U.S. chemical company rather than from Ryco). The Brazilian real has been depreciating continuously against the dollar, so Concellos' cost of obtaining chemicals is always rising. Concellos will probably pay twice as much for these chemicals this year because of the weak real. It probably will attempt to pass on most of its higher costs to its customers in the form of higher prices. However, it may not always be able to pass on higher costs from a weak real: Its competitors make all their chemicals locally, and their costs are directly tied to Brazil's inflation. Its competitors sell all their goods locally. This year, Concellos planned to charge Ryco a price in real that was substantially above last year's price.

Representatives from Ryco are flying to Brazil to discuss its trade problems with Concellos. Specifically, Ryco wants to avoid its exposure to the high inflation rate in Brazil. This adverse effect is somewhat offset by the consistent decline in the value of the real, which allows Ryco to obtain more real with a given amount of dollars every year. However, the offset is not perfect, and Ryco wants to create a better hedge against Brazilian inflation.

- a. Describe a countertrade strategy that could reduce Ryco's exposure to Brazilian inflation.
- b. Would Concellos be willing to consider this strategy? Is there any favorable effect on Concellos that may motivate it to accept the strategy?
- c. Assume that both parties agree on countertrade. Why would the cost of obtaining imports still rise over time for Concellos? Would Concellos earn lower profits as a result?

Chapter 20 Flyer Company

Composing the Optimal Currency Portfolio for Financing

As treasurer for Flyer Company, you must develop a strategy for short-term financing. The firm, based in the United States, currently has no transaction exposure to currency movements. Assume the following data as of today:

Currency	Spot Exchange Rate	Annualized Interest Rate
Australian dollar	\$.75	13.0%
British pound	1.70	12.5
Canadian dollar	.86	11.0
Japanese yen	.006	8.0
Mexican peso	.17	11.5
New Zealand dollar	.60	7.0
Singapore dollar	.50	6.0
South African rand	.16	9.0
U.S. dollar	1.00	9.0
Venezuelan bolivar	.0008	12.0

Your forecasting department has provided you with the following forecasts of the spot rates one year from now:

	Strong \$ Scenario	Stable \$ Scenario	Weak \$ Scenario
Australian dollar	\$.66	\$.76	\$.85
British pound	1.58	1.73	1.83
Canadian dollar	.85	.85	.91
Japanese yen	.0055	.0062	.0072
Mexican peso	.14	.173	.18
New Zealand dollar	.53	.59	.63
Singapore dollar	.45	.48	.52
South African rand	.15	.155	.17
U.S. dollar	1.00	1.00	1.00
Venezuelan bolivar	.00073	.00079	.00086

The probability of the strong-dollar scenario is 30 percent, the probability of the stable-dollar scenario is 40 percent, and the probability of the weak-dollar scenario is 30 percent. Based on the information provided, prescribe the composition of the portfolio that would achieve the minimum expected effective financing rate based on each of the following risk preferences:

1. *Risk neutral* Focus on minimizing the expected value of your effective financing rate, without any constraints.
2. *Balanced* Borrow no more than 25 percent in any foreign currency.
3. *Conservative* Borrow at least 60 percent U.S. dollars and no more than 10 percent of the funds from any individual foreign currency.
4. *Ultraconservative* Do not create any exposure to exchange rate risk.

Fill out the following table:

Risk Preference	Portfolio's Effective Financing Rate Based on:			Expected Value of Effective Financing Rate
	Strong \$ Scenario	Stable \$ Scenario	Weak \$ Scenario	
Risk-neutral portfolio				
Balanced portfolio				
Conservative portfolio				
Ultraconservative portfolio				

Which portfolio would you prescribe for your firm? Why?

Chapter 21 Islander Corporation

Composing the Optimal Currency Portfolio for Investing

As treasurer for the Islander Corporation, you must develop a strategy for investing the excess cash that will be available for the next year. The firm, based in the United States, currently has no transaction exposure to foreign currency movements. Assume the following data as of today:

Currency	Spot Exchange Rate	Annualized Interest Rate
Australian dollar	.75	13.00
British pound	1.70	12.5
Canadian dollar	.86	11.0
Japanese yen	.006	8.0
U.S. dollar	1.00	9.0

Your forecasting department has provided you with the following forecasts of the spot rates one year from now:

	Strong \$ Scenario	Somewhat Stable \$ Scenario	Weak \$ Scenario
Australian dollar	\$.66	\$.76	\$.85
British pound	1.58	1.73	1.83
Canadian dollar	.85	.85	.91
Japanese yen	.0055	.0062	.0072
U.S. dollar	1.00	1.00	1.00

The probability of the strong-dollar scenario is 30 percent, the probability of the somewhat stable-dollar scenario is 40 percent, and the probability of the weak-dollar scenario is 30 percent. Based on the information provided, prescribe the composition of the investment portfolio that would maximize the expected value of the effective yield for each of four possible risk preferences:

1. *Risk neutral* Focus on maximizing the expected value of your effective yield, without any constraints.
2. *Balanced* Invest no more than 25 percent in any foreign currency.
3. *Conservative* Invest at least 50 percent of the funds in the U.S. dollar and no more than 10 percent of the funds in any individual foreign currency.
4. *Ultraconservative* Do not create any exposure to exchange rate risk.

Fill out the following table:

Risk Preference	Forecasted Effective Yield for:			Expected Value of Effective Yield
	Strong \$ Scenario	Somewhat Stable \$ Scenario	Weak \$ Scenario	
Risk-neutral portfolio				
Balanced portfolio				
Conservative portfolio				
Ultraconservative portfolio				

Which portfolio would you prescribe for your firm? Why? (You may find it helpful to draw bar charts that show the probability distribution of effective yields for each of the portfolios, placing one bar chart above another.)

Using Excel to Conduct Analysis

Computing with Excel

Excel spreadsheets are useful for organizing numerical data. In addition, they can execute computations for you. Excel not only allows you to compute general statistics such as average and standard deviation of cells but also can be used to conduct regression analysis. First, the use of Excel to compute general statistics is described. Then, a background of regression analysis is provided, followed by the application of Excel to run regression analysis.

General Statistics

Some of the more popular computations are discussed here.

Creating a COMPUTE Statement. If you want to determine the percentage change in a value from one period to the next, type the COMPUTE statement in a cell where you want to see the result. For example, assume that you have months listed in column A and the corresponding exchange rate of the euro (with respect to the dollar) at the beginning of that month in column B. Assume you want to insert the monthly percentage change in the exchange rate for each month in column C. In cell C2 (the second row of column C), you want to determine the percentage change in the exchange rate as of the month in cell B2 from the previous month B1. Thus, you would type the COMPUTE statement in C2 that reflects the computation you want. A COMPUTE statement begins with an = sign. The proper COMPUTE statement to compute a percentage change for cell C2 is $=(B2-B1)/B1$. Assume that in cell C3, you want to derive the percentage change in the exchange rate as of the month in cell B3 from the previous month B2. Type the COMPUTE statement $=(B3-B2)/B2$ in cell C3.

Using the COPY Command. If you need to repeat a particular COMPUTE statement for several different cells, you can use the COPY command, as follows:

1. Place the cursor in the cell with the COMPUTE statement that you want to copy to other cells.
2. Click Edit on your menu bar.
3. Highlight the cells where you want that COMPUTE statement copied.
4. Hit the Enter key.

For example, suppose that you have 30 monthly exchange rates of the euro in column B and you already calculated the percentage change in the exchange rate in cell C2 as explained above. [You did not have a percentage change in cell C1 since you needed

two dates (cells B1 and B2) to derive your first percentage change.] You could then place the cursor on cell C2, click Edit on your menu bar, highlight cells C3 to C30, and then hit the Enter key.

Computing an Average. You can compute the average of a set of cells as follows. Assume that you wanted to determine the average exchange rate of the 30 monthly exchange rates of the euro that you have listed from cell B1 to cell B30. In cell B31 (or in any blank cell where you want to see the result), type the COMPUTE statement =AVERAGE(B1:B30). Alternatively, if you wanted to determine the average of the monthly percentage changes in the euro, go to column C where you have monthly percentage changes in the euro from cell C2 down to C30. In cell C31 (or in any blank cell where you want to see the result), type the COMPUTE statement =AVERAGE(C2:C30).

Computing a Standard Deviation. You can compute the standard deviation of a set of cells as follows. Assume that you wanted to determine the standard deviation of the 30 monthly exchange rates of the euro that you have listed from cell B1 to cell B30. In cell B31 (or in any blank cell where you want to see the result), type the COMPUTE statement =STDEV(B1:B30). Alternatively, if you wanted to determine the standard deviation of the monthly percentage changes in the euro, go to column C where you have monthly percentage changes in the euro from cell C2 down to C30. In cell C31 (or in any blank cell where you want to see the result), type the COMPUTE statement =STDEV(C2:C30).

Fundamentals of Regression Analysis

Businesses often use **regression analysis** to measure relationships between variables when establishing policies. For example, a firm may measure the historical relationship between its sales and its accounts receivable. Using the relationship detected, it can then forecast the future level of accounts receivable based on a forecast of sales. Alternatively, it may measure the sensitivity of its sales to economic growth and interest rates so that it can assess how susceptible its sales are to future changes in these economic variables. In international financial management, regression analysis can be used to measure the sensitivity of a firm's performance (using sales or earnings or stock price as a proxy) to currency movements or economic growth of various countries.

Regression analysis can be applied to measure the sensitivity of exports to various economic variables. This example will be used to explain the fundamentals of regression analysis. The main steps involved in regression analysis are

1. Specifying the regression model
2. Compiling the data
3. Estimating the regression coefficients
4. Interpreting the regression results

Specifying the Regression Model

Assume that your main goal is to determine the relationship between percentage changes in U.S. exports to Australia (called *CEXP*) and percentage changes in the value of the Australian dollar (called *CAUS*). The percentage change in the exports to Australia is the **dependent variable** since it is hypothesized to be influenced by another variable. Although you are most concerned with how *CAUS* affects *CEXP*, the regression model should include any other factors (or so-called **independent variables**) that could also affect *CEXP*. Assume that the percentage change in the Australian GDP (called *CGDP*) is also hypothesized to influence *CEXP*. This factor should also be included in the regression model. To simplify the example, assume that *CAUS* and

$CGDP$ are the only factors expected to influence $CEXP$. Also assume that there is a lagged impact of one quarter. In this case, the regression model can be specified as

$$CEXP_t = b_0 + b_1(CAUS_{t-1}) + b_2(CGDP_{t-1}) + \mu_t$$

where

b_0 = a constant

b_1 = regression coefficient that measures the sensitivity of $CEXP_t$ to $CAUS_{t-1}$

b_2 = regression coefficient that measures the sensitivity of $CEXP_t$ to $CGDP_{t-1}$

μ_t = an error term

The t subscript represents the time period. Some models, such as this one, specify a lagged impact of an independent variable on the dependent variable and therefore use a $t-1$ subscript.

Compiling the Data

Now that the model has been specified, data on the variables must be compiled. The data are normally input onto a spreadsheet as follows:

Period (t)	CEXP	CAUS	CGDP
1	.03	-.01	.04
2	-.01	.02	-.01
3	-.04	.03	-.02
4	.00	.02	-.01
5	.01	-.02	.02
.
.
.

The column specifying the period is not necessary to run the regression model but is normally included in the data set for convenience.

The difference between the number of observations (periods) and the regression coefficients (including the constant) represents the degrees of freedom. For our example, assume that the data covered 40 quarterly periods. The degrees of freedom for this example are $40 - 3 = 37$. As a general rule, analysts usually try to have at least 30 degrees of freedom when using regression analysis.

Some regression models involve only a single period. For example, if you desired to determine whether there was a relationship between a firm's degree of international sales (as a percentage of total sales) and earnings per share of MNCs, last year's data on these two variables could be gathered for many MNCs, and regression analysis could be applied. This example is referred to as **cross-sectional analysis**, whereas our original example is referred to as a **time-series analysis**.

Estimating the Regression Coefficients

Once the data have been input into a data file, a regression program can be applied to the data to estimate the **regression coefficients**. There are various packages such as Excel that contain a regression analysis application.

The actual steps conducted to estimate regression coefficients are somewhat complex. For more details on how regression coefficients are estimated, see any econometrics textbook.

Interpreting the Regression Results

Most regression programs provide estimates of the regression coefficients along with additional statistics. For our example, assume that the following information was provided by the regression program:

	Estimated Regression Coefficient	Standard Error of Regression Coefficient	t-statistic
Constant	.002		
$CAUS_{t-1}$.80	.32	2.50
$CGDP_{t-1}$.36	.50	.72
Coefficient of determination (R^2) =	.33		

The independent variable $CAUS_{t-1}$ has an estimated regression coefficient of .80, which suggests that a 1 percent increase in $CAUS$ is associated with an .8 percent increase in the dependent variable $CEXP$ in the following period. This implies a positive relationship between $CAUS_{t-1}$ and $CEXP_t$. The independent variable $CGDP_{t-1}$ has an estimated coefficient of .36, which suggests that a 1 percent increase in the Australian GDP is associated with a .36 percent increase in $CEXP$ one period later.

Many analysts attempt to determine whether a coefficient is statistically different from zero. Regression coefficients may be different from zero simply because of a coincidental relationship between the independent variable of concern and the dependent variable. One can have more confidence that a negative or positive relationship exists by testing the coefficient for significance. A t -test is commonly used for this purpose, as follows:

Test to determine whether $CAUS_{t-1}$ affects $CEXP_t$

$$\text{Calculated } t\text{-statistic} = \frac{\text{Estimated regression coefficient for } CAUS_{t-1}}{\text{Standard error of the regression coefficient}} = \frac{.80}{.32} = 2.50$$

Test to determine whether $CGDP_{t-1}$ affects $CEXP_t$

$$\text{Calculated } t\text{-statistic} = \frac{\text{Estimated regression coefficient for } CGDP_{t-1}}{\text{Standard error of the regression coefficient}} = \frac{.36}{.50} = .72$$

The calculated t -statistic is sometimes provided within the regression results. It can be compared to the critical t -statistic to determine whether the coefficient is significant. The critical t -statistic is dependent on the degrees of freedom and confidence level chosen. For our example, assume that there are 37 degrees of freedom and that a 95 confidence level is desired. The critical t -statistic would be 2.02, which can be verified by using a t -table from any statistics book. Based on the regression results, the coefficient of $CAUS_{t-1}$ is significantly different from zero, while $CGDP_{t-1}$ is not. This implies that one can be confident of a positive relationship between $CAUS_{t-1}$ and $CEXP_t$, but the positive relationship between $CGDP_{t-1}$ and $CEXP_t$ may have occurred simply by chance.

In some particular cases, one may be interested in determining whether the regression coefficient differs significantly from some value other than zero. In these cases, the t -statistic reported in the regression results would not be appropriate. See an econometrics text for more information on this subject.

The regression results indicate the **coefficient of determination** (called R^2) of a regression model, which measures the percentage of variation in the dependent variable that can be explained by the regression model. R^2 can range from 0 to 100 percent. It is unusual for regression models to generate an R^2 of close to 100 percent, since the movement in a given dependent variable is partially random and not associated with movements in independent variables. In our example, R^2 is 33 percent, suggesting that one-third of the variation in $CEXP$ can be explained by movements in $CAUS_{t-1}$ and $CGDP_{t-1}$.

Some analysts use regression analysis to forecast. For our example, the regression results could be used along with data for $CAUS$ and $CGDP$ to forecast $CEXP$. Assume that $CAUS$ was 5 percent in the most recent period, while $CGDP$ was -1 percent in the most recent period. The forecast of $CEXP$ in the following period is derived from inserting this information into the regression model as follows:

$$\begin{aligned} CEXP_t &= b_0 + b_1(CAUS_{t-1}) + b_2(CGDP_{t-1}) \\ &= .002 + (.80)(.05) + (.36)(-.01) \\ &= .002 + .0400 - .0036 \\ &= .0420 - .0036 \\ &= .0384 \end{aligned}$$

Thus, the $CEXP$ is forecasted to be 3.84 percent in the following period. Some analysts might eliminate $CGDP_{t-1}$ from the model because its regression coefficient was not significantly different from zero. This would alter the forecasted value of $CEXP$.

When there is not a lagged relationship between independent variables and the dependent variable, the independent variables must be forecasted in order to derive a forecast of the dependent variable. In this case, an analyst might derive a poor forecast of the dependent variable even when the regression model is properly specified, if the forecasts of the independent variables are inaccurate.

As with most statistical techniques, there are some limitations that should be recognized when using regression analysis. These limitations are described in most statistics and econometrics textbooks.

Using Excel to Conduct Regression Analysis

Various software packages are available to run regression analysis. The following example is run on Excel to illustrate the ease with which regression analysis can be run. Assume that a firm wants to assess the influence of changes in the value of the Australian dollar on changes in its exports to Australia based on the following data:

Period	Value (in Thousands of Dollars) of Exports to Australia	Average Exchange Rate of Australian Dollar over That Period
1	110	\$.50
2	125	.54
3	130	.57
4	142	.60
5	129	.55

(continued)

6	113	.49
7	108	.46
8	103	.42
9	109	.43
10	118	.48
11	125	.49
12	130	.50
13	134	.52
14	138	.50
15	144	.53
16	149	.55
17	156	.58
18	160	.62
19	165	.66
20	170	.67
21	160	.62
22	158	.62
23	155	.61
24	167	.66

Assume that the firm applies the following regression model to the data:

$$CEXP = b_0 + b_1 CAUS + \mu$$

where

$CEXP$ = percentage change in the firm's export value from one period to the next

$CAUS$ = percentage change in the average exchange rate from one period to the next

μ = error term

The first step is to input the data for the two variables in two columns on a file using Excel. Then, the data can be converted into percentage changes. This can be easily performed with a COMPUTE statement in the third column (column C) to derive $CEXP$ and another COMPUTE statement in the fourth column (column D) to derive $CAUS$. These two columns will have a blank first row since the percentage change cannot be computed without the previous period's data.

Once you have derived $CEXP$ and $CAUS$ from the raw data, you can perform regression analysis as follows. On the main menu, select Tools. This leads to a new menu, in which you should click on Data Analysis. Next to the Input Y Range, identify the range C2 to C24 for the dependent variable as C2:C24. Next to the Input X Range, identify the range D2 to D24 for the independent variable as D2:D24. The Output Range specifies the location on the screen where the output of the regression analysis should be displayed. In our example, F1 would be an appropriate location, representing the upper-left section of the output. Then, click on OK, and within a few seconds, the regression analysis will be complete. For our example, the output is listed below:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.8852
R Square	0.7836
Adjusted R Square	0.7733
Standard Error	2.9115
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1.0000	644.6262	644.6262	76.0461	0.0000
Residual	21.0000	178.0125	8.4768		
Total	22.0000	822.6387			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t-Stat</i>	<i>P-value</i>
Intercept	0.7951	0.6229	1.2763	0.2158
X Variable 1	0.8678	0.0995	8.7204	0.0000

	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.5004	2.0905	-0.5004	2.0905
X Variable 1	0.6608	1.0747	0.6608	1.0747

The estimate of the so-called slope coefficient is about .8678, which suggests that every 1 percent change in the Australian dollar's exchange rate is associated with a .8678 percent change (in the same direction) in the firm's exports to Australia. The *t*-statistic is also estimated to determine whether the slope coefficient is significantly different than zero. Since the standard error of the slope coefficient is about .0995, the *t*-statistic is $.8678/.0995 = 8.72$. This would imply that there is a significant relationship between *CAUS* and *CEXP*. The R-Square statistic suggests that about 78 percent of the variation in *CEXP* is explained by *CAUS*. The correlation between *CEXP* and *CAUS* can also be measured by the correlation coefficient, which is the square root of the R-Square statistic.

If you have more than one independent variable (multiple regression), you should place the independent variables next to each other in the file. Then, for the X-RANGE, identify this block of data. The output for the regression model will display the coefficient, standard error, and *t*-statistic for each of the independent variables. For multiple regression, the R-Square statistic is interpreted as the percentage of variation in the dependent variable explained by the model as a whole.

International Investing Project

Note to the Professor: *You may want to assign this as a project to be completed by the end of the semester. This project helps students to understand the factors that influence the performance of MNCs and foreign stocks. This project can also be done with teams of students and may be used for class presentations near the end of the semester. If you allow students to share their results in class, the students will learn that relationships cannot necessarily be generalized, as some MNCs are more exposed than others to economic conditions and exchange rate movements. The focus in grading this project will be on the explanations provided by the students, not on the movements in the stock prices or exchange rates.*

This project allows you to learn more about international investing and about firms that compete in the global arena. You will be asked to create a stock portfolio of at least two U.S.-based multinational corporations (MNCs) and two foreign stocks. You will monitor the performance of your portfolio over the school term and ultimately will attempt to explain why your portfolio performed well or poorly relative to the portfolios created by other students in your class. The explanations will offer insight on what is driving the valuations of the U.S.-based MNCs and the foreign stocks over time.

Select two stocks of U.S.-based MNCs that you want to include in your portfolio. If you want to review a list of possible stocks or do not know the ticker symbol of the stocks you want to invest in, go to the website <http://biz.yahoo.com/i/>, which lists stocks alphabetically, or to <http://biz.yahoo.com/p/>, which lists stocks by sectors or industries. Make sure that your firms conduct a substantial amount of international business.

Next, select two foreign stocks that are traded on U.S. stock exchanges and are not from the same foreign country. Many foreign stocks are traded on U.S. stock exchanges as American depository receipts (ADRs), which are certificates that represent ownership of foreign stock. ADRs are denominated in dollars, but reflect the value of a foreign stock, so an increase in the value of the foreign currency can have a favorable effect on the ADR's value. To review a list of ADRs in which you may invest, go to http://www.adr.com/entry_disclaimer.html. Go to the website, and click on ADR Universe. Click on any industry listed to see a list of foreign companies within that industry that offer ADRs and the country where each foreign company is based. You should select ADRs of firms that are based in any of the countries shown on the website <http://finance.yahoo.com/intlindices>. Click on any company listed to review background information, including a description of its business and its stock price trend over the last year. It is assumed that you will invest \$10,000 in each stock that you purchase.

List your portfolio in the following format:

U.S.-Based MNCs			
Name of Firm	Ticker Symbol	Amount of Your Investment	Price per Share at Which You Purchased the Stock
		\$10,000	
		\$10,000	

Foreign Stocks (ADRs)				
Name of Firm	Ticker Symbol	Country Where Firm Is Based	Amount of Your Investment	Price per Share of ADR at Which You Purchased the Stock
			\$10,000	
			\$10,000	

You can easily monitor your portfolio using various Internet tools. If you do not already use a specific website for this purpose, go to <http://finance.yahoo.com/?u> and register for free. Follow the instructions, and in a few minutes you can create your own portfolio tracking system. This system not only updates the values of your stocks, but also provides charts and recent news and other information on the stocks in your portfolio.

Evaluation

At the end of each month during the school term (or a date specified by your professor), you should evaluate the performance and behavior of your stocks.

- Determine the percentage increase or decrease in each of your stocks over the period of your investment and provide that percentage in a table like the one below. In addition, offer the primary reason for this change in the stock price based on news about that stock or your own intuition. To review the recent news about each of your stocks, click on <http://finance.yahoo.com/?u> and insert the ticker symbol for each firm. Recent news is provided at the bottom of the screen.

Name of Firm	Percentage Change in Stock Price	Primary Reason
1.		
2.		
3.		
4.		
Portfolio (average)		

- How does your portfolio's performance compare to the portfolios of some other students? (Your professor may survey the class on their performances so that you can see how your performance differs from those of other students.) Why do you think your performance was relatively high or low compared to other students' performances? Was it because of the markets where your firms do their business or because of firm-specific conditions?
- Determine whether the performance of each of your U.S.-based MNCs is driven by the U.S. market. Go to the site <http://finance.yahoo.com/?u> and insert the symbol

- for your stock. Once the quote is provided, click on Chart. Click on the box marked S&P (which represents the S&P 500 Index). Then, click on Compare and assess the relationship between the U.S. market index movements and the stock's price movements. Explain whether the stock's price movements appear to be driven by U.S. market conditions. Repeat this task for each U.S.-based MNC in which you invested.
3.
 - a. Determine whether the performance of each of your foreign stocks is driven by the corresponding market where the firm is based. First, go to the site <http://finance.yahoo.com/intlindices?u> and look up the symbol for the country index of concern. For example, Brazil's index is ^BVSP. Next, go to the site <http://finance.yahoo.com/?u> and insert the symbol for your stock. Click on Chart; at the bottom of the chart, insert the corresponding market index symbol (make sure you include the ^ if it is part of the index symbol) in the box. Then, click on Compare and assess the relationship between the market index movements and the stock's price movements. Explain whether the stock's price movements appear to be driven by the local market conditions. Repeat this exercise for each foreign stock in which you invested.
 - b. Determine whether your foreign stock prices are highly correlated. Repeat the process described above, except insert the symbol representing one of the foreign stocks you own in the box below the chart.
 - c. Determine whether your foreign stock's performance is driven by the U.S. market (using the S&P 500 as a market proxy). Erase the symbol you typed into the box below the chart, and click on S&P just to the right.
 4.
 - a. Review annual reports and news about each of your U.S.-based MNCs to determine where it does most of its business and the foreign currency to which it is most exposed. Determine whether your U.S.-based MNC's stock performance is influenced by the exchange rate movements of the foreign currency (against the U.S. dollar) to which it is most exposed. Go to <http://www.oanda.com> and click on FXHistory. You can convert the foreign currency to which the MNC is highly exposed to U.S. dollars and determine the exchange rate movements over the period in which you invested in the stock. Provide your assessment of the relationship between the currency's exchange rate movements and the performance of the stock over the investment period. Attempt to explain the relationship that you just found.
 - b. Repeat the steps in 4a for each U.S.-based MNC in which you invested.
 5.
 - a. Determine whether the stock performance of each of your foreign firms is influenced by the exchange rate movements of the firm's local currency against the U.S. dollar. You can obtain this information from <http://www.oanda.com>. You can convert the foreign currency of concern to U.S. dollars and determine the exchange rate movements over the period in which you invested in the stock. Provide your assessment of the relationship between the currency's exchange rate movements and the performance of the stock over the investment period. Attempt to explain the relationship that you just found.
 - b. Repeat the steps in 5a for each of the foreign stocks in which you invested.

APPENDIX E

Discussion in the Boardroom

This exercise is intended to apply many of the key concepts presented in the text to broad issues that are discussed by managers who make financial decisions. It does not replace the more detailed questions and problems at the end of the chapters. Instead, it focuses on broad financial issues to facilitate class discussion and simulate a boardroom discussion. It serves as a running case in which concepts from every chapter are applied to the same business throughout the school term. The exercise not only enables students to apply concepts to the real world but also develops their intuitive and communication skills.

This exercise can be used in a course in several ways:

1. Apply it on a chapter-by-chapter basis to ensure that the broad chapter concepts are understood before moving to the next chapter.
2. Use it to encourage online discussion for courses taught online.
3. Use it as a review before each exam, covering all chapters assigned for that exam.
4. Use it as a comprehensive case discussion near the end of the semester, as a means of reviewing the key concepts that were described throughout the course.
5. Use it for presentations, in which individuals or teams present their views on the questions that were assigned to them.

This exercise has been placed on the course website so that students can download it and insert their answers after the questions. By the end of the course, students will have applied all the major concepts of the text to a single firm. The focus on a single firm will allow students to recognize how some of their decisions in the earlier chapters interact with decisions to be made in later chapters.

Background

One of the best ways to learn the broad concepts presented in this text is to put yourself in the position of an MNC manager or board member and apply the concepts to financial decisions. Although board members normally do not make the decisions discussed here, they must have the conceptual skills to monitor the policies that are implemented by the MNC's managers. Thus, they must frequently consider what they would do if they were making the managerial decisions or setting corporate policies.

This exercise is based on a business that you could easily create: a business that teaches individuals in a non-U.S. country to speak English. Although this business is very basic, it still requires the same types of decisions faced by large MNCs.

Assume that you live in the United States and invest \$60,000 to establish a language school called Escuela de Inglés in Mexico City, Mexico. You set up a small sub-

subsidiary in Mexico, with an office and an attached classroom that you lease. You hire local individuals in Mexico who can speak English and teach it to others. Your school offers two types of courses: a one-month structured course in English and a one-week intensive course for individuals who already know English but want to improve their skills before visiting the United States. You advertise both types of teaching services in the local newspapers.

All revenue and expenses associated with your business are denominated in Mexican pesos. Your subsidiary sends most of the profits from the business in Mexico to you at the end of each month. Although your expenses are somewhat stable, your revenue varies with the number of clients who sign up for the courses in Mexico.

This background is sufficient to enable you to answer the questions that are asked about your business throughout the term. Answer each question as if you were serving on the board or as a manager of the business. The questions in the early chapters force you to assess the firm's opportunities and exposure, while later chapters force you to consider potential strategies that your business might pursue.

Chapter 1

- a. Discuss the corporate control of your business. Explain why your business in Mexico is exposed to agency problems.
- b. How would you attempt to monitor the ongoing operations of the business?
- c. Explain how you might be able to use a compensation plan to limit the potential agency problems.
- d. Assume that you have been approached by a competitor in Mexico to engage in a joint venture. The competitor would provide the classroom facilities (so you would not need to rent classroom space), while your employees would teach the classes. You and the competitor would split the profits. Discuss how your potential return and your risk would change if you pursue the joint venture.
- e. Explain the conditions that would cause your business to be adversely affected by exchange rate movements.
- f. Explain how your business could be adversely affected by political risk.

Chapter 2

Your business provides CDs for free to customers who pay for the English courses that you offer in Mexico. You are considering mass-producing the CDs in the United States so that you can sell (export) them to distributors or to retail stores throughout Mexico. You would price the CDs in dollars when exporting them. The CDs are less effective without the teaching, but still can be useful to individuals who want to learn the basics of the English language.

- a. If you pursue this idea, explain how the factors that affect international trade flows (identified in Chapter 2) could affect the Mexican demand for your CDs. Which of these factors would likely have the largest impact on the Mexican demand for your CDs? What other factors would affect the Mexican demand for the CDs?
- b. Suppose that you believe the Mexican government will impose a tariff on the CDs exported to Mexico. How could you still execute this business idea at a relatively low cost while avoiding the tariff? Describe any disadvantages of this idea to avoid the tariff.

Chapter 3

Assume that the business in Mexico grows. Explain how financial markets could help to finance the growth of the business.

Chapter 4

Given the factors that affect the value of a foreign currency, describe the type of economic or other conditions in Mexico that could cause the Mexican peso to weaken and thereby to adversely affect your business.

Chapter 5

Explain how currency futures could be used to hedge your business in Mexico. Explain how currency options could be used to hedge your business in Mexico.

Chapter 6

- a. Explain how your business will likely be affected (at least in the short run) if the central bank of Mexico intervenes in the foreign exchange market by exchanging Mexican pesos for dollars.
- b. Explain how your business will likely be affected if the central bank of Mexico uses indirect intervention by lowering Mexican interest rates (assume inflationary expectations have not changed).

Chapter 7

Mexican interest rates are normally substantially higher than U.S. interest rates.

- a. What does this imply about the forward premium or discount of the Mexican peso?
- b. What does this imply about your business using forward or futures contracts to hedge your periodic profits in pesos that must be converted into dollars?
- c. Do you think you would frequently hedge your exposure to Mexican pesos? Explain your answer.

Chapter 8

Mexican interest rates are normally substantially higher than U.S. interest rates.

- a. What does this imply about the inflation differential (Mexican inflation minus U.S. inflation), assuming that the real interest rate is the same in both countries? Does this imply that the Mexican peso will appreciate or depreciate? Explain.
- b. It might be argued that the high Mexican interest rates should entice U.S. investors to invest in Mexican money market securities, which could cause the peso to appreciate. Reconcile this theory with your answer in part (a). If you believe that the high Mexican interest rates will not entice U.S. investors, explain your reasoning.
- c. Assume that the difference between Mexican and U.S. interest rates is typically attributed to a difference in expected inflation in the two countries. Also assume

that purchasing power parity holds. Do you think that your business cash flows will be adversely affected? In reality, purchasing power parity does not hold consistently. Assume that the inflation differential (Mexican inflation minus U.S. inflation) is not fully offset by the exchange rate movement of the peso. Will this benefit or hurt your business? Now assume that the inflation differential is more than offset by the exchange rate movement of the peso. Will this benefit or hurt your business?

- d. Assume that the nominal interest rate in Mexico is currently much higher than the U.S. interest rate and that this difference is due to a high rate of expected inflation in Mexico. You are considering hiring a local firm to promote your business, but you would have to borrow funds to finance this marketing campaign. A consultant advises you to delay the marketing campaign for a year so that you can capitalize on the high nominal interest rate in Mexico. He suggests that you retain the profits that you would normally have remitted to the United States and deposit them in a Mexican bank. The Mexican peso cash flows that your business deposits will grow at a high rate of interest over the year. Should you follow the advice of the consultant?

Chapter 9

- a. Mexican interest rates are normally substantially higher than U.S. interest rates. What does this imply about the forward rate as a forecast of the future spot rate?
- b. Does the forward rate reflect a forecast of appreciation or depreciation of the Mexican peso? Explain how the degree of the expected change implied by the forward rate forecast is tied to the interest rate differential.
- c. Do you think that today's forward rate or today's spot rate of the peso provides a better forecast of the future spot rate of the peso?

Chapter 10

Recall that your Mexican business invoices in Mexican pesos.

- a. You are already aware that a decline in the value of the peso could reduce your dollar cash flows. Yet, according to purchasing power parity, a weak peso should occur only in response to a high level of Mexican inflation, and such high inflation should increase your profits. If this theory holds precisely, your cash flows would not really be exposed. Should you be concerned about your exposure, or not? Explain.
- b. If you change your policy and invoice only in dollars, how will your transaction exposure be affected?
- c. Why might the demand for your business change if you change your invoice policy? What are the implications for your economic exposure?

Chapter 11

Mexican interest rates are normally substantially higher than U.S. interest rates.

- a. Assuming that interest rate parity exists, do you think hedging with a forward rate will be beneficial if the spot rate of the Mexican peso is expected to decline slightly over time?

- b. Will hedging with a money market hedge be beneficial if the spot rate of the Mexican peso is expected to decline slightly over time (assume zero transaction costs)? Explain.
- c. What are some limitations on using currency futures or options that may make it difficult for you to perfectly hedge against exchange rate risk over the next year or so?
- d. In general, not many long-term currency futures and options on the Mexican peso are available. A consultant suggests that this is not a problem because you can hedge your position a quarter at a time. In other words, the profits that you remit at any point in the future can be hedged by taking a currency futures or options position 3 months or so before that time. Thus, although the consultant recognizes that the peso could weaken substantially in the long term, she sees no reason why you should worry about its decline as long as you continually create a short-term hedge. Do you agree?

Chapter 12

- a. Explain how your business is subject to translation exposure.
- b. How could you hedge against this translation exposure?
- c. Is it worthwhile for your business to hedge the translation exposure?

Chapter 13

Assume that you want to expand your English teaching business to other non-U.S. countries where some individuals may want to learn to speak English.

- a. Explain why you might be able to stabilize the profits of your total business in this manner. Review the motives for direct foreign investment that are identified in this chapter. Which of these motives are most important?
- b. Why would a city such as Montreal be a less desirable site for your business than a city such as Mexico City?
- c. Describe the conditions in which your total business would experience weak effects even if the business was spread across three or four countries.
- d. What factors affect the probability that the conditions you identified in part (c) might occur? (In other words, explain why the conditions could occur in one set of countries but not another set of countries.)
- e. What data would you review to assess the probability that these conditions will occur?
- f. Assume that your business has already created some pamphlets and CDs that translate common Spanish terms into English to supplement your primary service of teaching individuals in Mexico to speak English. How could you expand your business in a manner that might allow you to benefit from economies of scale (and perhaps even benefit from your existing business reputation)? When you attempt to benefit from economies of scale, do you forgo diversification benefits? Explain.
- g. How would you come to a decision on whether to pursue business expansion that capitalizes on economies of scale even though it would mean forgoing

- diversification benefits? Do you think economies of scale would be more or less important than diversification for your business?
- h. Is there any way to achieve both economies of scale and diversification benefits?

Chapter 14

- Review the different items that are used in the multinational capital budgeting example (Spartan, Inc.). Describe the items that you would include on a spreadsheet if you conducted a multinational capital budgeting analysis of investing dollars to expand your existing language business in a different location.
- Assume that you recognize your limitations in predicting the future exchange rate of the invoice currency for your expanded business. You think that there are several possible exchange rate scenarios, each with equal probability of occurrence. Explain how you could use this information to estimate the future net present value (*NPV*) and make a decision about whether to accept or reject the project.
- Now assume that there is also much uncertainty about individuals' demand for your service in the new location. Explain how you can incorporate this uncertainty along with the uncertainty of exchange rate movements so that you can make a decision about whether to accept or reject the project.
- Explain how you would derive a required rate of return for your capital budgeting analysis. What type of information would you use to derive the required rate of return?

Chapter 15

You have an opportunity to purchase a private competitor called Fernand in Mexico. If you decide to purchase the company, you will use only your own funds.

- When you attempt to determine the value of this company, how will you derive your required rate of return? Specifically, should you use the U.S. or the Mexican risk-free rate as a base when deriving your required rate of return? Why?
- Another Mexican firm called Vascon is also considering acquiring this firm. Explain why Vascon's required rate of return may be higher than your required rate of return. Is there any reason why Vascon's required rate of return may be lower than your required rate of return?
- Assume that you and Vascon have the same expectations regarding the Mexican cash flows that will be generated by Fernand. Fernand's owner is willing to sell the company for 2 million Mexican pesos. You and Vascon use a similar process to determine the feasibility of acquiring the target. You both compare the present value of the target's cash flows to the purchase price. Based on your analysis, Fernand would generate a positive net present value (*NPV*) for your firm. Based on Vascon's analysis, Fernand would generate a negative *NPV* for Vascon. How could you determine that the acquisition of Fernand is feasible, while Vascon determines that the acquisition is not feasible?
- Repeat part (c) but reverse the assumptions. That is, you determine that Fernand would generate a negative *NPV* for your firm, whereas Vascon determines that Fernand would generate a positive *NPV*. How could you determine that the acquisition of Fernand is not feasible, while Vascon determines that the acquisition of Fernand is feasible?

Chapter 16

- a. Review the political risk factors, and identify those that could possibly affect your business. Explain how your cash flows could be affected.
- b. Explain why threats of terrorism due to friction between two countries could possibly affect your business, even though the terrorism has no effect on the relations between the United States and Mexico.
- c. Assume that an upcoming election in Mexico may result in a complete change in government. Explain why the election could have significant effects on your cash flows.

Chapter 17

- a. Assume that your business is considering expanding in Mexico. You plan to invest a small amount of U.S. dollar equity into this project and finance the remainder with debt. You can obtain debt financing for the expansion in Mexico, but Mexican interest rates are higher than U.S. rates. Yet, if you use mostly U.S. debt financing, you will be more exposed to exchange rate risk. Explain why.
- b. You want to assess the feasibility of the new project in Mexico if you use mostly U.S. debt financing versus mostly Mexican debt financing. You also want to capture possible exchange rate effects on your cash flows over time. How can you use capital budgeting to conduct your comparison?
- c. You prefer to avoid using Mexican debt to finance your expansion in Mexico because the interest rates are high. A consultant suggests that you seek one or more investors in Mexico who would be willing to take an equity position in your business. You would provide them with periodic dividends, and they would be partial owners of your company. The consultant suggests that this strategy would circumvent the high cost of capital in Mexico because it uses equity financing instead of debt financing. Is the consultant correct?

Chapter 18

Recall from the previous chapter that your business is considering expansion within Mexico. Recall that you plan to invest a small amount of U.S. dollar equity into this project and finance the remainder with debt. You can obtain debt financing for the expansion in Mexico, but Mexican interest rates are higher than U.S. rates. Today, you receive credit offers from different banks. You can obtain a fixed rate loan in the United States at 8 percent for the life of this project or a floating rate loan (rate changes each year in response to market interest rates) in Mexico at 10 percent. Explain how you could estimate the net present value (*NPV*) of the project for each alternative financing method. Include an explanation of how you would account for the uncertainty of future movements of Mexican interest rates.

Chapter 19

Recall that your business provides CDs that complement the teaching provided by your employees in Mexico. Assume that you decide to capitalize on these CDs by selling them to a large retail store based in Mexico. The CDs are less effective without the teaching, but still can be useful to individuals who want to learn the basics of the

English language. You do not want to take the risk of sending a case of CDs to the retail store unless you can be sure of receiving payment. Explain how you can ensure payment for the CDs.

Chapter 20

You are considering a major marketing campaign in Mexico. If you implement it, you will incur high expenses in Mexican pesos and will need to finance the cost. To cover the cost, you can either borrow dollars at a low interest rate and convert them to Mexican pesos or borrow Mexican pesos. You expect to pay off the loan on a monthly basis over the next year by using a portion of the revenue you generate from your business in Mexico.

- a. Will your business be more exposed to exchange rate risk if you borrow dollars or Mexican pesos?
- b. Explain how you would make the decision to borrow dollars versus Mexican pesos. What is the key factor (other than the interest rate of each currency) that will determine whether you borrow dollars or Mexican pesos?

Chapter 21

Assume that this year you decide not to implement the marketing campaign that you considered in the previous chapter. Instead, you will invest some of this year's profits in money market investments and then use this money to cover the campaign next year. You can retain the profits earned this year by investing them in a Mexican bank where interest rates are high. Alternatively, you could invest the profits in a dollar-denominated bank account. That is, you could convert your Mexican peso profits to dollars periodically and accumulate the dollars over the year. At the end of the year, you could convert the dollars back to Mexican pesos to pay for the marketing campaign. Explain how you would decide between these two alternatives.