id the intervention by the Thai government consti-
terilized or nonsterilized intervention? What is the
ence between the types of intervention? Which type
ou think would be more effective in increasing the
of the baht? Why? (Hint: Think about the effect of
terilized intervention on U.S. interest rates.)
f the Thai baht is virtually fixed with respect to the
ir, how could this affect U.S. levels of inflation? Do
think these effects on the U. S. economy will be
e pronounced for companies such as Blades that
rate under trade arrangements involving
commitments or for firms that do not? How are companies such as Blades affected by a fixed exchange rate?
4. What are some of the potential disadvantages for Thai levels of inflation associated with the floating exchange rate system that is now used in Thailand? Do you think Blades contributes to these disadvantages to a great extent? How are companies such as Blades affected by a freely floating exchange rate?
5. What do you think will happen to the Thai baht's value when the swap arrangement is completed? How will this affect Blades?

MALL BUSINESS DILEMMA

sessment of Central Bank Intervention by the Sports Exports Company

Logan, owner of the Sports Exports Company, is con-
ned about the value of the British pound over time
ause his firm receives pounds as payment for footballs
orted to the United Kingdom. He recently read that the
nk of England (the central bank of the United Kingdom)
ikely to intervene directly in the foreign exchange mar-
by flooding the market with British pounds.

1. Forecast whether the British pound will weaken or strengthen based on the information provided.
2. How would the performance of the Sports Exports Company be affected by the Bank of England's policy of flooding the foreign exchange market with British pounds (assuming that it does not hedge its exchange rate risk)?

NTERNET/EXCEL EXERCISES

he website for Japan's central bank, the Bank of
apan, provides information about its mission and its
olicy actions. Its address is www.boj.or.jp/en.

. Use this website to review the outline of the Bank of
apan's objectives. Summarize the mission of the Bank
f Japan. How does this mission relate to intervening in
he foreign exchange market?

2. Review the minutes of recent meetings by Bank of Japan officials. Summarize at least one recent meeting that was associated with possible or actual intervention to affect the yen's value.
3. Why might the foreign exchange intervention strategies of the Bank of Japan be relevant to the U.S. government and to U.S.-based MNCs?

ONLINE ARTICLES WITH REAL-WORLD EXAMPLES

Find a recent article online that describes an actual international finance application or a real world example about a specific MNC's actions that reinforces one or more concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary there and provide the web link of the article so that other students can access it. If your class is live, your professor may ask you to summarize your application in class. Your professor may assign specific students to complete this assignment for this chapter, or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real world examples applied to this chapter, consider using the following search terms and include the current year as a search term to ensure that the online articles are recent:

1. pegged exchange rate
2. Bank of China control of yuan
3. Federal Reserve intervention
4. European Central Bank intervention
5. central bank intervention
6. impact of the dollar
7. impact of the euro
8. central bank AND currency volatility
9. central bank AND weaken currency
10. central bank AND strengthen currency

APPENDIX 6

Government Intervention during the Asian Crisis

From 1990 to 1997, Asian countries achieved higher economic growth than any others. They were viewed as models for advances in technology and economic improvement. In the summer and fall of 1997, however, they experienced financial problems that led to what is known as the "Asian crisis" and resulted in the bailouts of several countries by the International Monetary Fund.

Much of the crisis is attributed to the substantial depreciation of Asian currencies, which caused severe financial problems for firms and governments throughout Asia and also in other regions. This crisis demonstrated how exchange rate movements could affect country conditions and thus affect the firms that operate in those countries.

The specific objectives of this appendix are to describe the conditions in the foreign exchange market that contributed to the Asian crisis, explain how governments intervened in an attempt to control their exchange rates, and describe the consequences of those intervention efforts. The Asian crisis offers useful lessons to governments about controlling their currency's value.

CRISIS IN THAILAND

Until July 1997, Thailand was one of the world's fastest-growing economies. Its high level of spending and low level of saving put upward pressure on prices of real estate and products and also on the local interest rate. Normally, countries with high inflation tend to have weak currencies due to the force of purchasing power parity. Prior to July 1997, however, Thailand's currency was linked to the U.S. dollar. Thailand was an attractive site for foreign investors, who could earn a high interest rate on invested funds while being protected (until the crisis) from a large depreciation in the baht.

Bank Lending Situation

A country normally desires a large inflow of funds, which can help support its growth. In Thailand's case, however, the inflow of funds provided Thai banks with more funds than they could use for making loans. Consequently, in attempting to use all the funds, the banks made a large number of extremely risky loans. Commercial developers borrowed heavily without having to prove that the expansion was feasible. Lenders offered to lend large sums of money based solely on a developer's previous success. These loans made sense only if the economy continued its high growth, but such levels of development could not last forever.

Flow-of-Funds Situation

Apart from the bank lending situation just described, the large inflow of funds increased Thailand's susceptibility to a massive *outflow* of funds if foreign investors ever lost confidence in the Thai economy. Given the large amount of risky loans and the potential for large outflows, Thailand was sometimes described as a "house of cards" waiting to collapse.

Although the large inflow of funds put downward pressure on interest rates, the supply was offset by a strong demand for funds as developers and corporations sought to capitalize on the growth economy by expanding. Thailand's government was also borrowing heavily to improve the country's infrastructure. The sheer volume of borrowing was enough to increase interest rates, which made the debt expensive to borrowers.

Export Competition

During the first half of 1997, the U.S. dollar strengthened against the Japanese yen and European currencies, which reduced the prices of Japanese and European imports. Although the dollar was linked to the baht over this period, Thailand's products were more expensive than those of other exporters to the United States.

Pressure on the Thai Baht

The baht experienced downward pressure in July 1997 as some foreign investors recognized its potential weakness. The baht's value relative to the dollar was depressed by the large sale of baht in exchange for dollars. On July 2, 1997, the baht was detached from the dollar, after which Thailand's central bank attempted to maintain the currency's value by intervention. Specifically, it swapped its baht reserves for dollar reserves at other central banks and then used its dollar reserves to purchase the baht in the foreign exchange market (this swap agreement required Thailand to reverse this exchange by exchanging dollars for baht at a future date). The intervention was intended to offset the sales of baht by foreign investors in the foreign exchange market, but market forces overwhelmed the intervention efforts. As the supply of baht to be exchanged for dollars exceeded the U.S. demand for baht in the foreign exchange market, the government eventually had to surrender its effort to defend the baht's value. In July 1997, the value of the baht plummeted. Over a five-week period, it declined by more than 20 percent against the dollar.

Damage to Thailand

Thailand's central bank used more than $20 billion to purchase baht in the foreign exchange market as part of its direct intervention efforts. Then, because of the currency's steep decline, Thailand needed still more baht to be exchanged for the dollars required to repay the other central banks.

Thailand's banks estimated the amount of their defaulted loans at over $30 billion. Meanwhile, some corporations in Thailand had borrowed funds in other currencies (including the dollar) because the interest rates in Thailand were relatively high. This strategy backfired because the baht's weakening forced these corporations to exchange larger amounts of baht for the currencies needed to pay off the loans. Hence the corporations incurred a much higher effective financing rate (which explains the need to account for exchange rate effects when determining a loan's true cost) than if they had borrowed funds locally in Thailand. This higher borrowing cost was an additional strain on these corporations.

Rescue Package for Thailand

On August 5, 1997, the IMF and several countries agreed to provide Thailand with a $16 billion rescue package; Japan and the IMF provided $4 billion each. At the time this was the second-largest bailout plan ever put together for a single country (Mexico had received a $50 billion bailout in 1994). In return for this monetary support, Thailand agreed to reduce its budget deficit, prevent inflation from rising above 9 percent, raise its value-added tax from 7 to 10 percent, and clean up its local banks' financial statements, which had many undisclosed bad loans.

The rescue package took time to finalize because Thailand's government was unwilling to shut down all the banks experiencing financial problems that stemmed from their overly generous lending policies. Many critics have questioned the rescue package's efficacy, since some of the funding was misallocated because of corruption in Thailand.

Spread of the Crisis throughout Southeast Asia

The crisis in Thailand was contagious to other countries in Southeast Asia. The Southeast Asian economies are fairly integrated because of the trade between countries. The crisis was expected to weaken Thailand's economy, which would reduce its demand for imports from the other countries of Southeast Asia. As the demand for those countries' products declined, so would their national income and their demand for products from other Southeast Asian countries. In this way, the effects of the crisis could spread across the region. Like Thailand, the other Southeast Asian countries had experienced high growth in recent years, leading to overly optimistic assessments of future economic conditions and thus to excessive loans being extended for projects that had a high risk of default.

These countries were also similar to Thailand in that they had relatively high interest rates and their governments tended to stabilize their currencies. As a result, these other Southeast Asian countries had attracted a large amount of foreign investment as well. Thailand's crisis made foreign investors realize that a similar crisis could befall the region's other countries. Consequently, they began to withdraw funds from these countries.

Effects on Other Asian Currencies

In July and August of 1997, the values of the Malaysian ringgit, Singapore dollar, Philippine peso, Taiwan dollar, and Indonesian rupiah declined. The Philippine peso was devalued in July. Malaysia initially attempted to maintain the ringgit's value within a narrow band, but in the end it surrendered and let the ringgit float to a level determined by market forces.

In August 1997, Bank Indonesia (the central bank) used more than $500 million in direct intervention to purchase rupiah in the foreign exchange market in an attempt to boost that currency's value. By mid-August, however, it gave up this effort and let the rupiah float to its natural level, a decision that may have been influenced by the failure of Thailand's costly efforts to maintain the baht. The market forces were simply too strong to be offset by direct intervention. On October 30, 1997, a rescue package for Indonesia was announced, but the IMF and Indonesia's government did not agree on the $43 billion package's terms until the spring of 1998. One of the main points of contention was that President Suharto wanted to peg the rupiah's exchange rate; the IMF believed that Bank Indonesia would not be able to maintain the rupiah's exchange rate at a fixed level and so the currency would come under renewed speculative attack.

Investors and firms had no confidence that the fundamental factors causing weakness in these currencies were being corrected. Therefore, the flow of funds out of the Asian countries continued. This outflow led to even more sales of Asian currencies in exchange for other currencies, which put additional downward pressure on the values of the Asian currencies.

Impact of the Asian Crisis on Hong Kong

On October 23, 1997, prices in the Hong Kong stock market declined by 10.2 percent on average; considering the three trading days before that, the cumulative four-day effect

was a decline of 23.3 percent. This decline was primarily attributed to speculation that Hong Kong's currency might be devalued and that Hong Kong could experience financial problems similar to those evident in Southeast Asian countries. That Hong Kong companies could lose nearly a quarter of their market value in less than a week demonstrated the perceived exposure of Hong Kong to the crisis.

During this period, Hong Kong maintained its pegged exchange rate system (with the Hong Kong dollar tied to the U.S. dollar). However, it had to increase interest rates in order to discourage investors from transferring their funds out of the country.

Impact of the Asian Crisis on Russia

The Asian crisis caused investors to reconsider other countries where similar effects might occur. In particular, they focused on Russia. As investors lost confidence in the Russian currency (the ruble), they began to transfer funds out of Russia. In response to the downward pressure that this outflow of funds placed on the ruble, the central bank of Russia engaged in direct intervention by using dollars to purchase rubles in the foreign exchange market. It also used indirect intervention by raising interest rates to make Russia more attractive to investors, thereby discouraging additional outflows.

In July 1998, the IMF (with some help from Japan and the World Bank) organized a loan package worth $22.6 billion for Russia. The package required that Russia boost its tax revenues, reduce its budget deficit, and create a more capitalist environment for its businesses.

During August 1998, Russia's central bank intervened frequently to prevent substantial declines in the ruble. On August 26, however, it gave up its fight to defend the ruble's value, and market forces caused the ruble to decline by more than 50 percent against most currencies on that day. This led to fears of a new crisis and on the next day, "Bloody Thursday," paranoia swept stock markets around the world. Some stock markets (including the U.S. stock market) experienced declines of more than 4 percent.

Impact of the Asian Crisis on South Korea

By November 1997, seven of South Korea's conglomerates (called *chaebols*) had collapsed, and the banks that financed the operations of the chaebols were stuck with the equivalent of $52 billion in bad debt. Like banks in the Southeast Asian countries, South Korea's banks had been too willing to provide loans to corporations (especially the chaebols) without conducting a thorough credit analysis. In November, South Korea's currency (the won) declined substantially; the central bank tried using its reserves in an unsuccessful attempt to prevent a free fall in the won.

On December 3, 1997, the IMF agreed to a $55 billion rescue package for South Korea. The World Bank and the Asian Development Bank joined with the IMF to provide a standby credit line of $35 billion. In exchange for this funding, South Korea agreed to reduce its economic growth and to restrict the excessive borrowing of its conglomerates. This restriction resulted in some bankruptcies and unemployment, since the banks could now provide loans to conglomerates only if the funding was economically justified.

Impact of the Asian Crisis on Japan

Japan was also affected by the Asian crisis not only because it exports products to the affected countries but also because many of its corporations have subsidiaries located there, which means that the business performance of Japanese firms is affected by foreign economic conditions. Japan had also been experiencing its own problems. Its financial industry had been struggling, primarily because of defaulted loans. In April 1998, the Bank of Japan used more than $20 billion to purchase yen in the foreign exchange market.

This effort to boost the yen's value was unsuccessful. Prime Minister Hashimoto resigned in July 1998, causing more uncertainty about the outlook for Japan.

Impact of the Asian Crisis on China

Because China had grown less rapidly than the Southeast Asian countries, it did suffer any adverse economic effects from the Asian crisis. The Chinese government also had more influence on its economic conditions: it still owned most of the real estate and still controlled most of the banks that provided credit to support growth. As a result, China saw few bankruptcies resulting from the Asian crisis in China. China's government was also able to maintain the value of the yuan against the dollar, which limited speculative flows of funds out of China. Although interest rates increased during the crisis, they remained relatively low; hence Chinese firms could obtain funding at a reasonable cost and could continue to meet their interest payments.

Impact of the Asian Crisis on Latin American Countries

The Asian crisis also affected Latin American countries. Chile, Mexico, and Venezuela were all adversely affected because they export products to Asia, and the weakened Asian economies resulted in a lower demand for Latin American exports. In addition, the Latin American countries lost some business to other countries that switched to Asian products because the Asian currencies depreciated substantially, which made their products cheaper than those of Latin America.

These adverse effects on Latin American countries put pressure on Latin American currency values, since there was concern that speculative outflows of funds would weaken these currencies in the same way that Asian currencies had weakened. In particular, there was pressure on Brazil's currency (the real) in late October 1997.

The central bank of Brazil used about $7 billion of reserves in a direct intervention to buy the real in the foreign exchange market and protect the real from depreciation. It also used indirect intervention by raising short-term interest rates in Brazil. However, this intervention reduced economic growth because it increased the cost of borrowing for households, corporations, and government agencies in Brazil.

Impact of the Asian Crisis on Europe

Like firms in Latin America, some firms in Europe experienced a reduced demand for their exports to Asia during the crisis. In addition, they lost some exporting business to Asian exporters as a result of the weakened Asian currencies that reduced Asian prices from an importer's perspective. European banks were especially affected by the Asian crisis because they had provided large loans to numerous Asian firms that defaulted.

Impact of the Asian Crisis on the United States

The effects of the Asian crisis were felt even in the United States. Stock values of U.S. firms, such as 3M Co., Motorola, Hewlett-Packard, and Nike, that conducted much business in Asia declined. Many U.S. engineering and construction firms were adversely affected as Asian countries reduced their plans to improve infrastructure. Stock values of U.S. exporters to those countries fell because of the decline in spending by consumers and corporations in Asian countries and also because of the weakened Asian currencies, which made U.S. products more expensive. Some large U.S. commercial banks experienced significant stock price declines because of their exposure (primarily loans and bond holdings) to Asian countries.

Lessons about Exchange Rates and Intervention

The Asian crisis demonstrated the degree to which currencies could depreciate in response to a lack of confidence by investors and firms in a central bank's ability to stabilize its local currency. If investors and firms had believed the central banks could prevent the free fall in currency values, then they would not have transferred their funds to other countries and Southeast Asian currency values would not have experienced such downward pressure.

Exhibit 6A.1 shows how the exchange rates of some Asian currencies changed against the U.S. dollar during one year of the crisis (from June 1997 to June 1998). The currencies of Indonesia, Malaysia, South Korea, and Thailand all declined substantially.

The Asian crisis also demonstrated how interest rates could be affected by flows of funds out of countries. Exhibit 6A.2 illustrates how interest rates changed from June 1997 (just before the crisis) to June 1998 for various Asian countries. The increase in interest rates can be attributed to the indirect interventions (intended to prevent the local currencies from depreciating further) or to the massive outflows of funds or to both of these conditions. In particular, the interest rates of Indonesia, Malaysia, and Thailand increased substantially from their pre-crisis levels. Those countries whose local currencies experienced more depreciation had higher upward adjustments. Since the substantial increase in interest rates (which tends to reduce economic growth) may have been caused by the outflow of funds, it could have resulted indirectly from the lack of confidence by investors and firms in the ability of the Asian central banks to stabilize their respective local currencies.

Finally, the Asian crisis demonstrated how integrated country economies actually are—especially during a crisis. Just as the United States and European economies can affect emerging markets, they are susceptible to conditions in emerging markets. Even if a central bank can withstand the pressure on its currency caused by conditions in other

Exhibit 6A.1 How Exchange Rates Changed during the Asian Crisis (June 1997–June 1998)

Exhibit 6A.2 How Interest Rates Changed during the Asian Crisis (Number before slash represents annualized interest rate as of June 1997; number after slash represents annualized interest rate as of June 1998)

countries, it may not be able to insulate its economy from other countries that are experiencing financial problems.

Discussion Questions

The following discussion questions related to the Asian crisis illustrate how the foreign exchange market conditions are integrated with the other financial markets around the world. Thus, participants in any of these markets must understand the dynamics of the foreign exchange market. These discussion questions can be used in several ways. They may serve as an assignment on a day that the professor is unable to attend class. They are especially useful for group exercises. The class could be segmented into small groups; each group is asked to assess all of the issues and determine a solution. Each group should have a spokesperson. For each issue, one of the groups will be randomly selected and asked to present its solution, and then other students not in that group may suggest alternative answers if they feel that the answer can be improved. Some of the issues have no perfect solution, which allows for different points of view to be presented by students.

1. Was the depreciation of the Asian currencies during the Asian crisis due to trade flows or capital flows? Why do you think the degree of movement over a short period may depend on whether the reason is trade flows or capital flows?

2. Why do you think the Indonesian rupiah was more exposed to an abrupt decline in value than the Japanese yen during the Asian crisis (even if their economies experienced the same degree of weakness)?

3. During the Asian crisis, direct intervention did not prevent depreciation of currencies. Offer your explanation for why the interventions did not work.

4. During the Asian crisis, some local firms in Asia borrowed U.S. dollars rather than local currency to support local operations. Why would they borrow dollars when they really needed their local currency to support operations? Why did this strategy backfire?

5. The Asian crisis showed that a currency crisis could affect interest rates. Why did the crisis put upward pressure on interest rates in Asian countries? Why did it put downward pressure on U.S. interest rates?

6. It is commonly argued that high interest rates reflect high expected inflation and can signal future weakness in a currency. Based on this theory, how would expectations of Asian exchange rates change after interest rates in Asia increased? Why? Is the underlying reason logical?

7. During the Asian crisis, why did the discount of the forward rate of Asian currencies change? Do you think it increased or decreased? Why?

8. During the Hong Kong crisis, the Hong Kong stock market declined substantially over a 4-day period due to concerns in the foreign exchange market. Why would stock prices decline due to concerns in the foreign exchange market? Why would some countries be more susceptible to this type of situation than others?

9. On August 26, 1998, the day that Russia decided to let the ruble float freely, the ruble declined by about 50 percent. On the following day, called "Bloody Thursday," stock markets around the world (including the United States) declined by more than 4 percent. Why do you think the decline in the ruble had such a global impact on stock prices? Was the markets' reaction rational? Would the effect have been different if the ruble's plunge had occurred in an earlier time period, such as 4 years earlier? Why?

10. Normally, a weak local currency is expected to stimulate the local economy. Yet, it appeared that the weak currencies of Asia adversely affected their economies. Why do you think the weakening of the currencies did not initially improve their economies during the Asian crisis?

11. During the Asian crisis, Hong Kong and China successfully intervened (by raising their interest rates) to protect their local currencies from depreciating. Nevertheless, these countries were also adversely affected by the Asian crisis. Why do you think the actions to protect the values of their currencies affected these countries' economies? Why do you think the weakness of other Asian currencies against the dollar and the stability of the Chinese and Hong Kong currencies against the dollar adversely affected their economies?

12. Why do you think the values of bonds issued by Asian governments declined during the Asian crisis? Why do you think the values of Latin American bonds declined in response to the Asian crisis?

13. Why do you think the depreciation of the Asian currencies adversely affected U.S. firms? (There are at least three reasons, each related to a different type of exposure of some U.S. firms to exchange rate risk.)

14. During the Asian crisis, the currencies of many Asian countries declined even though their governments attempted to intervene with direct intervention or by raising interest rates. Given that the abrupt depreciation of the currencies was attributed to an abrupt outflow of funds in the financial markets, what alternative Asian government action might have been more successful in preventing a substantial decline in the currencies' values? Are there any possible adverse effects of your proposed solution?

7
International Arbitrage and Interest Rate Parity

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- explain the conditions that will result in various forms of international arbitrage and the realignments that will occur in response,
- explain the concept of interest rate parity, and
- explain the variation in forward rate premiums across maturities and over time.

If discrepancies occur in the foreign exchange market, with quoted prices of currencies varying from what their market prices should be, then certain market forces will realign the rates. This realignment occurs as a result of international arbitrage. Financial managers of MNCs must understand how international arbitrage realigns exchange rates because it has implications for how they should use the foreign exchange market to facilitate their international business.

7-1 International Arbitrage

Arbitrage can be loosely defined as capitalizing on a discrepancy in quoted prices by making a riskless profit. In many cases, the strategy involves no risk and does not require that funds be tied up.

The type of arbitrage discussed in this chapter is primarily international in scope; it is applied to foreign exchange and international money markets and takes three common forms:

- locational arbitrage,
- triangular arbitrage, and
- covered interest arbitrage

Each form will be discussed in turn.

7-1a Locational Arbitrage

Commercial banks providing foreign exchange services normally quote about the same rates on currencies, so shopping around may not lead to a more favorable rate. If the demand and supply conditions for a particular currency vary among banks then a given currency may be priced at different rates, in which case market forces will lead to realignment.

When quoted exchange rates vary among locations, participants in the foreign exchange market can capitalize on the discrepancy. Specifically, they can use **locational arbitrage**, which is the process of buying a currency at a location where it is priced cheap and then immediately selling it at some other location where it is priced higher.

EXAMPLE

Akron Bank and Zyn Bank serve the foreign exchange market by buying and selling currencies. Assume that there is no bid/ask spread. The exchange rate quoted at Akron Bank for a British pound is $1.60 while the exchange rate quoted at Zyn Bank is $1.61. You could conduct locational arbitrage by purchasing pounds at Akron Bank for $1.60 per pound and then selling them at Zyn Bank for $1.61 per pound. If there is no bid/ ask spread and if there are no other costs of

9
Forecasting Exchange Rates

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- explain how firms can benefit from forecasting exchange rates,
- describe the common techniques used for forecasting,
- explain how forecasting performance can be evaluated, and
- explain how interval forecasts can be applied.

Both the cost of an MNC's operations and the revenue it receives from operations are affected by exchange rate movements. Therefore, an MNC's forecasts of exchange rate movements can affect the feasibility of its planned projects and might influence its managerial decisions. Any revision of exchange rate forecasts can change the relative benefits of alternative proposed operations and may lead the MNC to revise its business strategies.

9-1 Why Firms Forecast Exchange Rates

In reality, it is extremely difficult to forecast exchange rates with much accuracy. However, MNCs can still benefit from forecasting exchange rates; doing so allows them to derive reasonable forecasts of future cash flows, which enables them to make informed financial decisions. The following corporate functions typically require exchange rate forecasts.

- *Hedging decision.* Multinational corporations constantly face the decision of whether to hedge future payables and receivables in foreign currencies. Whether or not a firm hedges may be determined by its forecasts of foreign currency values.

EXAMPLE

Laredo Co., based in the United States, plans to pay for clothing imported from Mexico in 90 days. If the forecasted value of the peso in 90 days is sufficiently below the 90-day forward rate, then the MNC may decide not to hedge. Forecasting may enable the firm to make a decision that will increase its cash flows. ●

- *Short-term investment decision.* Corporations sometimes have a substantial amount of excess cash available for a short time period. Large deposits can be established in several currencies. The ideal currency for deposits will (1) exhibit a high interest rate and (2) strengthen in value over the investment period.

EXAMPLE

Lafayette Co. has excess cash and considers depositing the cash into a British bank account. If the British pound appreciates against the dollar by the end of the deposit period when pounds will be withdrawn and exchanged for U.S. dollars, more dollars will be received. Thus, the firm can use forecasts of the pound's exchange rate when determining whether to invest the short-term cash in a British versus a U.S. account. ●

- *Capital budgeting decision.* When an MNC assesses whether to invest funds in a foreign project, the firm takes into account that the project may periodically require

the exchange of currencies. The capital budgeting analysis can be completed only when all estimated cash flows are measured in the MNC's local currency.

EXAMPLE Evansville Co. wants to determine whether to establish a subsidiary in Thailand. The earnings to be generated by the proposed subsidiary in Thailand would need to be periodically converted into dollars to be remitted to the U.S. parent. The capital budgeting process requires estimates of future dollar cash flows to be received by the U.S. parent. These dollar cash flows depend on the forecasted exchange rate of Thailand's currency (the baht) against the dollar over time. Accurate forecasts of currency values will improve the accuracy of the estimated cash flows and therefore enhance the MNC's decision making. ●

- *Earnings assessment.* An MNC's decision about whether a foreign subsidiary should reinvest earnings in a foreign country or instead remit those earnings back to the parent may be influenced by exchange rate forecasts. If a strong foreign currency is expected to weaken substantially against the MNC's home country currency, then the parent may prefer to expedite the remittance of subsidiary earnings before the foreign currency weakens.

  Exchange rate forecasts are also useful for forecasting an MNC's earnings. When earnings of an MNC are reported, subsidiary earnings are consolidated and translated into the currency representing the parent firm's home country.
- *Long-term financing decision.* Multinational corporations that issue bonds to secure long-term funds may consider denominating those bonds in foreign currencies. They prefer that the currency borrowed depreciate over time against the currency they are receiving from sales. To estimate the cost of issuing bonds denominated in a foreign currency, forecasts of exchange rates are required.

Most forecasting is applied to currencies whose exchange rates fluctuate continuously, and that is the focus of this chapter. However, some forecasts are also derived for currencies whose exchange rates are pegged. MNCs recognize that a pegged exchange rate today does not necessarily serve as a good forecast because the government might devalue the currency in the future.

An MNC's motives for forecasting exchange rates are summarized in Exhibit 9.1. The motives are distinguished according to whether they can enhance the MNC's value by influencing its cash flows or its cost of capital. The need for accurate exchange rate projections should now be clear. The following section describes the forecasting methods available.

9-2 Forecasting Techniques

The numerous methods available for forecasting exchange rates can be categorized into four general groups: (1) technical, (2) fundamental, (3) market-based, and (4) mixed.

9-2a Technical Forecasting

Technical forecasting involves the use of historical exchange rate data to predict future values. There may be a trend of successive daily exchange rate adjustments in the same direction, which could lead to a continuation of that trend. Alternatively, there may be some technical indication that a correction in the exchange rate is likely, which would result in a forecast that the exchange rate will reverse its direction.

EXAMPLE Tomorrow Kansas Co. must pay 10 million Mexican pesos for supplies that it recently received from Mexico. Today, the peso has appreciated by 3 percent against the dollar. Kansas Co. could send the payment today so that it would avoid the effects of any additional appreciation tomorrow. Based on an analysis of historical time series, Kansas has determined that whenever the peso appreciates against the dollar by more than 1 percent, it experiences a reversal of about 60 percent of that change on the following day. That is,

$$e_{t+1} = e_t \times (-60\%) \text{ when } e_t > 1\%$$

Applying this tendency to the current situation, in which the peso appreciated by 3 percent today, Kansas Co. forecasts that tomorrow's exchange rate will change by

$$\begin{aligned} e_{t+1} &= e_t \times (-60\%) \\ &= (3\%) \times (-60\%) \\ &= -1.8\% \end{aligned}$$

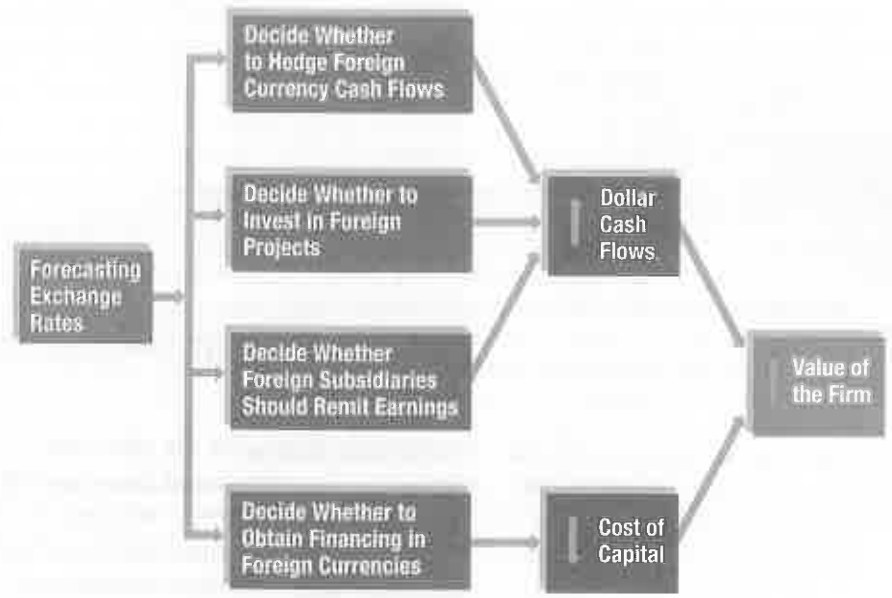
Given this forecast that the peso will depreciate tomorrow, Kansas Co. decides that it will make its payment tomorrow instead of today. ●

WEB
www.ny.frb.org/markets/foreignex.html
Historical exchange rate data that can be used to create technical forecasts of exchange rates.

Technical forecasting is sometimes cited as the main technique used by investors who speculate in the foreign exchange market, especially when their investment is for a very short time period.

Limitations of Technical Forecasting Multinational corporations make only limited use of technical forecasting because it typically focuses on the near future, which is not that helpful for developing corporate policies. Most technical forecasts apply to very short-term periods (e.g., one day) because patterns in exchange rate movements may be more predictable over such periods. Because such patterns are likely less reliable for forecasting long-term movements (e.g., over a quarter, a year, or five years),

Exhibit 9.1 Corporate Motives for Forecasting Exchange Rates



technical forecasts are less useful for forecasting exchange rates in the distant future. Thus, technical forecasting may not be suitable for firms that require a long-range forecast of exchange rates.

Furthermore, a technical forecasting model that has worked well in one particular period may not work well in another period. Unless historical trends in exchange rate movements can be identified, examination of past movements will not be useful for indicating future movements.

9-2b Fundamental Forecasting

Fundamental forecasting is based on fundamental relationships between economic variables and exchange rates. Recall from Chapter 4 that a change in a currency's spot rate is influenced by the following factors:

$$e = f(\Delta INF, \Delta INT, \Delta INC, \Delta GC, \Delta EXP)$$

where

e = percentage change in the spot rate
ΔINF = change in the differential between U.S. inflation and the foreign country's inflation
ΔINT = change in the differential between the U.S. interest rate and the foreign country's interest rate
ΔINC = change in the differential between the U.S. income level and the foreign country's income level
ΔGC = change in government controls
ΔEXP = change in expectations of future exchange rates

Given current values of these variables along with their historical impact on a currency's value, a corporation can develop exchange rate projections.

A forecast may arise simply from a subjective assessment of the degree to which general movements in economic variables in one country are expected to affect exchange rates. From a statistical perspective, a forecast would be based on quantitatively measured impacts of factors on these rates. Although full-blown fundamental models are beyond the scope of this text, a simplified discussion follows.

EXAMPLE

Galena, Inc., wants to forecast the percentage change (rate of appreciation or depreciation) in the British pound with respect to the U.S. dollar during the next quarter. Its forecast for the British pound depends on only two factors that affect the pound's value:

1. inflation in the United States relative to inflation in the United Kingdom; and
2. income growth in the United States relative to income growth in the United Kingdom (measured as a percentage change).

Galena must first determine how these variables have affected the percentage change in the pound's value based on historical data, a task for which regression analysis is well suited. First, quarterly data are compiled for the inflation and income growth levels of both the United Kingdom and the United States. The dependent variable is the quarterly percentage change in value of the British pound (BP). The independent (influential) variables are as follows.

1. Previous quarterly percentage change in the inflation differential (U.S. inflation rate minus British inflation rate), this is denoted INF_{t-1}.
2. Previous quarterly percentage change in the income growth differential (U.S. income growth minus British income growth), denoted INC_{t-1}.

The regression equation is then

$$BP_t = b_0 + b_1 INF_{t-1} + b_2 INC_{t-1} + \mu_t$$

where b_0 is a constant, b_1 measures the sensitivity of BP_t to changes in INF_{t-1}, b_2 measures the sensitivity of BP_t to changes in INC_{t-1}, and μ_t is an error term. Galena, Inc., uses a set of historical data to obtain previous values of BP, INF, and INC. Using this data set, regression analysis will generate the values of the regression coefficients (b_0, b_1, and b_2). In other words, regression analysis determines the direction and degree to which BP is affected by each independent variable. The coefficient b_1 will exhibit a positive sign if, when INF_{t-1} changes, BP_t changes in the same direction (other things held constant); a negative coefficient indicates that BP_t and INF_{t-1} move in opposite directions. In the regression equation, b_1 is expected to be positive because, when U.S. inflation increases relative to U.K. inflation, upward pressure is exerted on the pound's value.

The regression coefficient b_2 (which measures the impact of INC_{t-1} on BP_t) is likewise expected to be positive because, when U.S. income growth exceeds British income growth, there is upward pressure on the pound's value. These relationships were discussed thoroughly in Chapter 4.

Assume that Galena's application of regression analysis generates the following estimates of the coefficients: $b_0 = .002$, $b_1 = .8$, and $b_2 = 1.0$. These coefficients can be interpreted as follows. For a one-unit percentage change in the inflation differential, the pound is expected to change by .8 percent in the same direction (other things held constant); for a one-unit percentage change in the income differential, the British pound is expected to change by 1.0 percent in the same direction. To develop forecasts, assume that the most recent quarterly percentage change in INF_{t-1} (the inflation differential) is 4 percent and that INC_{t-1} (the income growth differential) is 2 percent. Using this information along with the estimated regression coefficients, Galena's forecast for BP_t is

$$\begin{aligned} BP_t &= b_0 + b_1 INF_{t-1} + b_2 INC_{t-1} \\ &= .002 + .8(4\%) + 1(2\%) \\ &= .2\% + 3.2\% + 2\% \\ &= 5.4\% \end{aligned}$$

Thus, given the current figures for inflation rates and income growth, the pound should appreciate by 5.4 percent during the next quarter. ●

This example is simplified to illustrate how fundamental analysis can be implemented for forecasting. A full-blown model might include many more than two factors, but the application would still be similar. A large time-series database would be necessary to warrant any confidence in the relationships detected by such a model.

Use of Sensitivity Analysis for Fundamental Forecasting If a regression model is used for forecasting and if the values of the influential factors have a *lagged* (delayed) impact on exchange rates, then the actual value of those factors can be used as input for the forecast. For example, when the inflation differential has a lagged impact on exchange rates, the inflation differential in the previous period may be used to forecast the percentage change in the exchange rate over the future period. Some factors, however, have an instantaneous influence on exchange rates. Since these factors obviously cannot be known, forecasts must be used. The firm recognizes that poor forecasts of these factors will produce poor forecasts of exchange rate movements and so may attempt to account for the resulting uncertainty by using **sensitivity analysis**, which considers more than one possible outcome for the factors exhibiting uncertainty.

EXAMPLE

Phoenix Corp. has developed a regression model to forecast the percentage change in the Mexican peso's value. The company believes that the real interest rate differential and the inflation differential are the only factors that affect exchange rate movements, as indicated in its regression model:

$$e_t = a_0 + a_1 INT_t + a_2 INF_{t-1} + \mu_t$$

where

e_t = percentage change in the peso's exchange rate over period t
INT_t = real interest rate differential over period t
INF_{t-1} = inflation differential in the previous period t
a_0, a_1, a_2 = regression coefficients
μ_t = error term

Historical data are used to determine values for e, along with values for INT_t and INF_{t-1}, for several periods (preferably, 30 or more periods are used to build the database). The length of each historical period (quarter, month, etc.) should match the length of the period for which the forecast is needed. The historical data needed per period for the Mexican peso model are (1) the percentage change in the peso's value, (2) the U.S. real interest rate minus the Mexican real interest rate, and (3) the U.S. inflation rate in the previous period minus the Mexican inflation rate in the previous period.

Now suppose that regression analysis has provided the following estimates for the regression coefficients:

REGRESSION COEFFICIENT	ESTIMATE
a_0	.001
a_1	−.7
a_2	.6

The negative value of a_1 indicates a negative relationship between INT_t and the peso's movements, while the positive sign of a_2 indicates a positive relationship between INF_{t-1} and the peso's movements.

To forecast the peso's percentage change over the upcoming period, both INT_t and INF_{t-1} must be estimated. Suppose INF_{t-1} was 1 percent. However, INT_t is not known at the beginning of the period and must therefore be forecast. Assume that Phoenix Corp. has developed the following probability distribution for INT_t:

PROBABILITY	POSSIBLE OUTCOME
20%	−3%
50%	−4%
30%	−5%
100%	

A separate forecast of e_t can be developed from each possible outcome of INT_t as follows:

FORECAST OF INT	FORECAST OF e_t	PROBABILITY
−3%	$.1\% + (-.7)(-3\%) + .6(1\%) = 2.8\%$	20%
−4%	$.1\% + (-.7)(-4\%) + .6(1\%) = 3.5\%$	50%
−5%	$.1\% + (-.7)(-5\%) + .6(1\%) = 4.2\%$	30%

If the firm needs forecasts for other currencies, it can develop the probability distribu tions of their movements over the upcoming period in a similar manner.

EXAMPLE Phoenix Corp. can forecast the percentage change in the Japanese yen by regressing historical per centage changes in the yen's value against (1) the differential between U.S. real interest rates and Japanese real interest rates and (2) the differential between U.S. inflation in the previous period and Japanese inflation in the previous period. The regression coefficients estimated by regression analysis for the yen model will differ from those for the peso model. The firm can then use the esti mated coefficients, along with estimates for the interest rate differential and inflation rate differ ential between the United States and Japan, to develop a forecast of the percentage change in the yen. Sensitivity analysis can be used to re-forecast the yen's percentage change based on alternative estimates of the interest rate differential. ●

Use of PPP for Fundamental Forecasting Recall that the theory of purchasing power parity specifies the fundamental relationship between the inflation differential and the exchange rate. In simple terms, PPP states that the currency of the higher-inflation country will depreciate by an amount that reflects the two country's inflation differential. If PPP holds, then the percentage change in the foreign currency's value (e) over a given period should reflect the differential between the home inflation rate (I_h) and the foreign inflation rate (I_f) over that period.

EXAMPLE The U.S. inflation rate is expected to be 1 percent over the next year and the Australian inflation rate is expected to be 6 percent. According to PPP, the Australian dollar's exchange rate should change as follows:

$$e_f = \frac{1 + I_{U.S.}}{1 + I_f} - 1$$
$$= \frac{1.01}{1.06} - 1$$
$$\approx -4.7\%$$

This forecast of the percentage change in the Australian dollar can be applied to its existing spot rate to forecast the future spot rate at the end of one year. If the existing spot rate S_t of the Australian dollar is \$.50 then the expected spot rate at the end of one year, $E(S_t + 1)$, will be about \$.4765:

$$E(S_{t+1}) = S_t(1 + e_t)$$
$$= \$.50[1 + (-.047)]$$
$$= \$.4765$$

●

In reality, the inflation rates of two countries over an upcoming period are uncertain and thus would have to be forecast when using PPP to forecast the future exchange rate at the end of the period. This complicates the use of PPP to forecast future exchange rates. Even if the inflation rates in the upcoming period were known with certainty, PPP still might not forecast exchange rates accurately because other factors, such as the interest rate differential between countries, can also affect exchange rates. Although the inflation differential by itself is not sufficient to accurately forecast exchange rate movements, it should be included in any fundamental forecasting model.

Limitations of Fundamental Forecasting Although fundamental forecasting accounts for the expected fundamental relationships between factors and currency values, it has four main limitations.

1. The precise timing of the impact of some factors on a currency's value is not known. It is possible that the full impact of factors on exchange rates will not occur until two, three, or four quarters later. The regression model would need to be adjusted accordingly.
2. As mentioned previously, some factors have an immediate impact on exchange rates. Yet such factors can be usefully included in a fundamental forecasting model only if forecasts can be obtained for them. Those forecasts should be developed for a period corresponding to that for which an exchange rate forecast is needed. In this case, the accuracy of the exchange rate forecasts is affected by the accuracy of these factors. Even if a firm knows exactly how their movements affect exchange rates, its exchange rate projections may be inaccurate if it cannot predict the factors' values.
3. Some factors that deserve consideration in the fundamental forecasting process cannot be easily quantified. For example, suppose large Australian exporting firms

experience an unanticipated labor strike the causes shortages? This will reduce the availability of Australian goods for U.S. consumers and therefore reduce U.S. demand for Australian dollars. Such an event, which would put downward pressure on the Australian dollar value, is not normally incorporated into a forecasting model.

4. Coefficients derived from the regression analysis may not remain constant over time. In the previous example, the coefficient for INF_{t-1} is .6; this value indicates that, for a one-unit change in INF_{t-1}, the Mexican peso appreciates by .6 percent. But if either the Mexican or U.S. government imposed new trade barriers (or eliminated existing barriers), the impact of the inflation differential on trade, and thus on the Mexican peso's exchange rate, could be affected.

These limitations of fundamental forecasting have been discussed to emphasize that even the most sophisticated forecasting techniques (fundamental or otherwise) cannot provide consistently accurate forecasts. This means that the forecasts developed by MNCs must allow for some margin of error and recognize the possibility of error when implementing corporate policies.

WEB

www.cmegroup.com
Quotes on currency futures that can be used to create market-based forecasts.

9-2c Market-Based Forecasting

The process of developing forecasts from market indicators, which is known as **market-based forecasting**, is usually based on either the spot rate or the forward rate.

Using the Spot Rate Today's spot rate may be used as a forecast of the spot rate that will exist on a future date. To see why the spot rate can be a useful market-based forecast, suppose the British pound is expected to appreciate against the dollar in the near future. This expectation will encourage speculators to buy the pound with U.S. dollars today in anticipation of its appreciation, and these purchases can force the pound's value up immediately. Conversely, if the pound is expected to depreciate against the dollar then speculators will sell off pounds now, hoping to purchase them back at a lower price after they decline in value. Such actions can force the pound to depreciate immediately. Thus, the current value of the pound should reflect the expectation of the pound's value in the near future. When the spot rate is used as the forecast of the future spot rate, the implication is that the expected percentage change in the currency will be zero over the forecast period:

$$E(e) = 0$$

Of course, MNCs realize that the currency's value will not remain constant. Even so, they might use today's spot rate as their best guess of the spot rate at a future point in time.

Using the Forward Rate A forward rate quoted for a specific date in the future is commonly used as the forecasted spot rate on that future date. Thus, a 30-day forward rate forecasts the spot rate in 30 days, a 90-day forward rate forecasts the spot rate in 90 days, and so on. Recall that the forward rate is measured as

$$F = S(1 + p)$$

where p denotes the forward premium. Since p represents the percentage by which the forward rate exceeds the spot rate, it serves as the expected percentage change in the exchange rate:

$$\begin{aligned} E(e) &= p \\ &= (F/S) - 1 \text{ [by rearranging terms]} \end{aligned}$$

EXAMPLE

If the one-year forward rate of the Australian dollar is $.63 while the spot rate is $.60, then the expected percentage change in the Australian dollar is

$$\begin{aligned} E(e) &= p \\ &= (F/S) - 1 \\ &= (.63/.60) - 1 \\ &= .05, \text{ or } 5\% \end{aligned}$$

●

Rationale for Using the Forward Rate The forward rate should serve as a reasonable forecast for the future spot rate because otherwise speculators would trade forward contracts (or futures contracts) to capitalize on the difference between these two rates.

EXAMPLE

Assume that most speculators expect the spot rate of the British pound in 30 days to be $1.45, and suppose the prevailing forward rate is $1.40. The speculators would buy pounds 30 days forward at $1.40 and, when received 30 days later, sell them at the prevailing spot rate. As speculators implement this strategy today, the substantial demand to purchase pounds 30 days forward will cause today's 30-day forward rate to increase. Once the forward rate reaches $1.45 (the expected future spot rate in 30 days), there is no incentive for additional speculation in the forward market. Thus, the forward rate should move toward the market's general expectation of the future spot rate. In this sense, the forward rate serves as a market-based forecast because it reflects the market's expectation of the spot rate at the end of the forward horizon (in this example, 30 days from now). ●

WEB

www.bmonesbittburns.com/economics/fxrates
Forward rates for the euro, British pound, Canadian dollar, and Japanese yen for 1-month, 3-month, 6-month, and 12-month maturities. These forward rates may serve as forecasts of future spot rates.

Although the focus of this chapter is on corporate forecasting rather than speculation, it is speculation that helps to push the forward rate to the level that reflects the general expectation of the future spot rate. If corporations are convinced that the forward rate is a reliable indicator of the future spot rate, then they can simply monitor this publicly quoted rate to develop exchange rate projections. Forward rates are commonly quoted in financial newspapers for short-term periods (such as 30 days or 90 days) for currencies of developed countries, and these rates can be used to derive short-term forecasts for those currencies.

Long-Term Forecasting with Forward Rates Long-term exchange rate forecasts can analogously be derived from long-term forward rates.

EXAMPLE

Assume that the spot rate of the euro is currently $1.00 while its five-year forward rate is $1.06. This forward rate can serve as a forecast of $1.06 for the euro in five years, which reflects a 6 percent appreciation in the euro over that period. ●

Forward rates are normally available for periods of two to five years or even longer, but the bid/ask spread is wide because of the limited trading volume. Although such rates are rarely quoted in financial newspapers, the quoted interest rates on risk-free instruments of various countries can be used to determine what the forward rates would be under conditions of interest rate parity.

EXAMPLE

The U.S. five-year interest rate is currently 10 percent (annualized) while the British five-year interest rate is 13 percent. If interest rate parity holds, then the five-year compounded return on investments in each of these countries is computed as follows:

COUNTRY	FIVE-YEAR COMPOUNDED RETURN
United States	$(1.10)^5 - 1 = 61\%$
United Kingdom	$(1.13)^5 - 1 = 84\%$

Therefore, the appropriate five-year forward rate premium (or discount) of the British pound would be

$$\begin{aligned} p &= \frac{1 + i_{U.S.}}{1 + i_{U.K.}} - 1 \\ &= \frac{1.61}{1.84} - 1 \\ &= -.125, \text{ or } -12.5\% \end{aligned}$$

So if the five-year forward rate of the pound is used as a forecast, then the spot rate of the pound is expected to depreciate by 12.5 percent over the five-year period. ●

The governments of some emerging markets (such as those in Latin America) seldom issue long-term fixed rate bonds. Consequently, long-term interest rates are not available and so long-term forward rates cannot be derived in the manner shown here.

Like any method of forecasting exchange rates, the forward rate is typically more accurate when forecasting exchange rates for short-term than for long-term horizons. Exchange rates tend to wander farther from expectations over longer periods of time.

Implications of the IFE for Forecasts Recall that if the international Fisher effect holds then a currency with a higher quoted (nominal) interest rate than the U.S. interest rate should depreciate against the dollar; the reason is that the higher interest rate implies a higher level of expected inflation in that country than in the United States. Since the forward rate captures the difference in interest rates (and thus in expected inflation rates) between two countries, it should provide more accurate forecasts for currencies in high-inflation countries than does the spot rate.

EXAMPLE

Alves, Inc., is a U.S. firm that does business in Brazil, and it needs to forecast the exchange rate of the Brazilian currency (the real) for one year ahead. It considers using either the spot rate or the forward rate to forecast the real. The spot rate of the Brazilian currency is $.40. The one-year interest rate in Brazil is 20 percent, versus 5 percent in the United States. The one-year forward rate of the Brazilian real is $.35, which reflects a discount to offset the interest rate differential (according to IRP; check this yourself). Alves believes that the real's future exchange rate will be driven by the inflation differential between Brazil and the United States. It also believes that the real rate of interest in both Brazil and the United States is 3 percent. These values imply that the expected inflation rate for next year is 17 percent in Brazil and 2 percent in the United States. The pronounced forward rate discount is based on the interest rate differential, which in turn is related to the inflation differential.

In contrast, using the spot rate of the real as a forecast would imply that the exchange rate at the end of the year will be the same as it is today. Since the forward rate forecast (indirectly) captures the differential in expected inflation rates, Alves considers it a more appropriate forecast metric than the spot rate. ●

An MNC that does not believe in the IFE may well disagree that using the forward rate is a more appropriate forecast method than using the spot rate. One could argue that either the high Brazilian interest rates do not reflect high expected inflation or that, even if the inflation occurs, it will not depress the Brazilian real. In either case, the preceding example's use of the forward rate as a forecast would be a mistake.

When a country's interest rate is similar to the U.S. interest rate, the forward rate premium or discount of that country's currency will be close to zero. That currency's forward rate is therefore similar to its spot rate, so the two will yield similar forecasts.

9-2d Mixed Forecasting

Because no single forecasting technique has been found to be consistently superior to the others, some MNCs prefer to use a combination of forecasting techniques. This method is referred to as **mixed forecasting**. Various forecasts for a particular currency value are developed using several forecasting techniques. The techniques used are assigned relative weights that total 100 percent, with the techniques considered more reliable being assigned higher weights. The actual forecast of the currency is a weighted average of the various forecasts developed.

EXAMPLE

College Station, Inc., needs to assess the value of the Mexican peso because it is considering expanding its business in that country. The conclusions that would be drawn from each forecasting technique are listed in Exhibit 9.2, which reveals that the forecasted direction of the peso's value depends on the technique used. The fundamental forecast predicts the peso will appreciate, whereas the technical and market-based forecast predict it will depreciate. It is noteworthy that, even though the fundamental and market-based forecasts are both driven by the same factor (interest rates), the results are distinctly different. ●

Exhibit 9.2 Forecasts of the Mexican Peso Drawn from Each Forecasting Technique

FORECAST TECHNIQUE	FACTORS CONSIDERED	SITUATION	FORECAST
Technical	Recent movement in peso	The peso's value declined below a specific threshold level in the last few weeks.	The peso's value will continue to fall now that it is beyond the threshold level.
Fundamental	Economic growth, inflation, interest rates	Mexico's interest rates are high, and inflation should remain low.	The peso's value will rise as U.S. investors capitalize on the high interest rates by investing in Mexican securities.
Market-based	Spot rate, forward rate	The peso's forward rate exhibits a significant discount, which is attributed to Mexico's relatively high interest rates.	Based on the forward rate, which provides a forecast of the future spot rate, the peso's value will decline.

An MNC might decide that only the technical and market-based forecasts are relevant when forecasting in one period but that, in some other period, only the fundamental forecast is relevant. The selection of a forecasting technique may also vary with the particular currency involved. At any given time the MNC may decide, for instance, that a market-based forecast provides the best prediction for the pound whereas fundamental forecasting generates the best prediction for the New Zealand dollar and technical forecasting the best prediction for the Mexican peso.

9-2e Guidelines for Implementing a Forecast

Regardless of the technique used to forecast exchange rates, managers of MNCs should consider the following guidelines when implementing their forecasts.

Apply Forecasts Consistently within the MNC All managers of an MNC should rely on the same exchange rate forecasts. Otherwise, one manager may be making decisions based on forecasted appreciation of a currency while another is making decisions based on forecasted depreciation of the same currency! For this reason, forecasts should normally be established by a centralized department and not from a department focused on the sales of a particular product.

Measure Impact of Alternative Forecasts Managers of an MNC are expected to derive what they believe to be the best forecast for an exchange rate; however, they should also check for whether (and how) alternative forecasts would affect their decisions. If a major proposed project is judged to be feasible only when one particular technique is used to forecast exchange rates, then that project deserves closer analysis before being implemented. An MNC is more confident about such managerial project decisions when the project's feasibility remains unchanged under alternative exchange rate forecasts.

Consider Other Sources of Forecasts Because forecasting exchange rates is subject to considerable error, managers of MNCs may complement their forecast with one from another source, such as a bank that provides forecasting services. Some forecasting services specialize in technical forecasts while others specialize in fundamental forecasts. These services can accommodate a wide range of forecast horizons ranging from one month to ten years.

There is, of course, no guarantee that a forecasting service will provide more accurate forecasts than those that the MNCs can generate on their own. However, managers might have more confidence in their decisions if they consider forecasts from other sources. Treasurers of some MNCs may choose to rely on forecasting services simply because they recognize how difficult it is to generate accurate exchange rate forecasts and prefer not to be directly accountable for the potential error.

9-3 Forecast Error

Regardless of which method is used or which service is hired to forecast exchange rates, it is important to recognize that forecasted exchange rates are rarely perfect. Multinational corporations commonly assess their past forecast errors to evaluate the accuracy of their forecasting techniques.

9-3a Measurement of Forecast Error

An MNC that forecasts exchange rates must monitor its performance over time to determine whether the forecasting procedure is satisfactory. For this purpose, a measurement of the forecast error is required. There are various ways to compute forecast errors. One popular measurement is discussed here and is defined as follows:

$$\left.\begin{array}{l}\text{Absolute forecast error as a percentage}\\ \text{of the realized value}\end{array}\right\} = \frac{|\text{Forecasted value} - \text{Realized value}|}{\text{Realized value}}$$

The error is computed using an absolute value (in the numerator) because this avoids a possible offsetting effect when determining the mean forecast error. For example, if the forecast error is .05 in the first period and −.05 in the second period (i.e., if the absolute value is not taken) the mean error is zero. Yet that would be misleading because the forecast was not perfectly accurate in either period. Taking the absolute value avoids distortions of this type.

When comparing a forecasting technique's performance among different currencies, examine the relative size of the discrepancy between the forecasted and realized value.

EXAMPLE Consider the following forecasted and realized values by New Hampshire Co. during one period:

	FORECASTED VALUE	REALIZED VALUE
British pound	$1.35	$1.50
Mexican peso	$.12	$ .10

In this case, the difference between the forecasted and realized value is $.15 for the pound versus $.02 for the peso. This does not mean that the forecast for the peso is more accurate. When measured as a percentage of the realized value, the forecast error of the British pound is

$$\frac{|\$1.35 - \$1.50|}{\$1.50} = \frac{\$.15}{\$1.50} = .10, \text{ or } 10\%$$

In contrast, the forecast error of the Mexican peso is

$$\frac{|.12 - .10|}{.10} = \frac{.02}{.10} = .20, \text{ or } 20\%$$

Thus, the peso's value was predicted with less accuracy. ●

9-3b Forecast Errors among Time Horizons

The potential forecast error for a particular currency depends on the forecast horizon. A forecast of the spot rate of the euro for tomorrow will have a relatively small error because tomorrow's spot rate probably will not deviate much from today's. However, a forecast of the euro in 1 month is more difficult because there is more time for economic conditions to change, which can cause the euro's value to stray farther from today's spot rate. A forecast of the euro for 1 year ahead is even more difficult, and a forecast of 10 years aheadwill very likely be subject to very large error.

9-3c Forecast Errors over Time Periods

The forecast error for a given currency changes over time. In periods when a country is experiencing economic and political problems, its currency is more volatile and more difficult to predict. The size of the errors changes over time, because the errors are larger in periods when the currency's value is more volatile.

9-3d Forecast Errors among Currencies

The ability to forecast currency values may vary with the currency of concern. From a U.S. perspective, the currencies that are more stable are susceptible to less error. As an extreme example, for a currency whose value is pegged to an exact dollar level, the spot rate would always be a perfect forecast of the future spot rate and the forecast error would be zero. The central bank of China maintains the value of the Chinese yen within narrow boundaries, so the yuan is quite stable and should be subject to a lower forecast error. In contrast, currencies (e.g., Australian dollar, Brazilian real, New Zealand dollar) that are volatile should be subject to larger forecast errors. Some currencies, including the Canadian dollar and Japanese yen, usually exhibit moderate volatility (even without central bank intervention) and hence should be subject to moderate forecast errors.

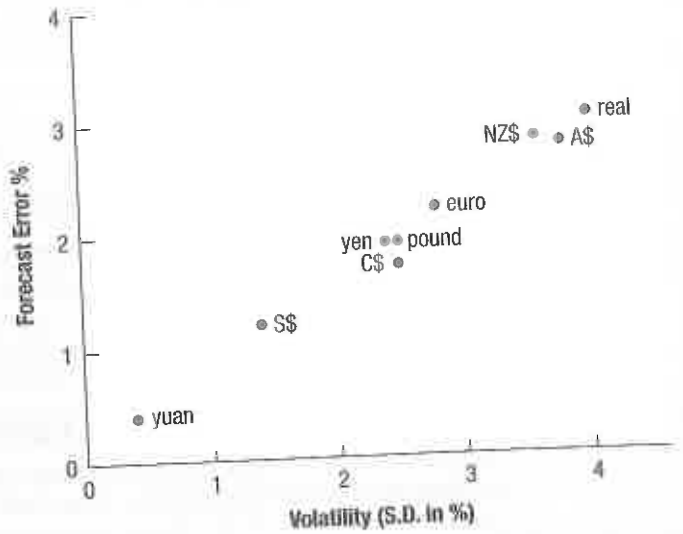
Exhibit 9.3 displays the results from comparing the mean absolute forecast error to the volatility (standard deviation of exchange rate movements) for selected currencies; the points are plotted based on monthly data over the 2007–2012 period. The monthly forecasts for each currency were derived using the currency's prevailing spot rate as the forecast for one month ahead. The exhibit demonstrates how forecast errors are generally lower for less volatile currencies, including the Chinese yuan and Singapore dollar (S$), and higher for more volatile currencies, which include the Australian dollar (A$), the Brazlian real, and the New Zealand dollar (NZ$). Financial managers of U.S.-based MNCs should be especially concerned if they are exposed to these more volatile currencies because they are subject to greater forecast errors. Managers may therefore wish to hedge that exposure, as discussed in detail in the next chapter.

9-3e Forecast Bias

When a forecast error is measured as the forecasted value minus the realized value, negative errors indicate underestimating whereas positive errors indicate overestimating. If the forecast errors for a particular currency are consistently positive or negative over time, then there must be some bias in the forecasting procedure.

Statistical Test of Forecast Bias If the forward rate is a biased predictor of the future spot rate, then there is a systematic forecast error whose correction would

Exhibit 9.3 How Forecast Error Is Affected by Volatility



improve forecast accuracy. A conventional method of testing for forecast bias is to apply the following regression model to historical data:

$$S_t = a_0 + a_1 F_{t-1} + \mu_t$$

where

S_t = spot rate at time t
F_{t-1} = forward rate at time $t-1$
μ_t = error term
a_0 = intercept
a_1 = regression coefficient

If the forward rate is unbiased, then the intercept a_0 should equal 0 and the regression coefficient a_1 should equal 1. The t-test for a_1 is

$$t = \frac{a_1 - 1}{\text{Standard error of } a_1}$$

If $a_0 = 0$ and if a_1 is significantly less than 1, this implies that the forward rate is systematically overestimating the spot rate. For example, if $a_0 = 0$ and $a_1 = .90$ then the future spot rate is estimated to be 90 percent of the forecast generated by the forward rate.

If $a_0 = 0$ and a_1 is significantly greater than 1, this implies that the forward rate is systematically underestimating the spot rate. For example, if $a_0 = 0$ and $a_1 = 1.1$, then the future spot rate is estimated to be 110 percent of the forecast generated by the forward rate.

When a bias is detected and anticipated to persist in the future, future forecasts may incorporate that bias. For instance, if $a_1 = 1.1$ then future forecasts of the spot rate may

well incorporate this information, multiplying the forward rate by 1.1 to create a forecast of the future spot rate.

By detecting a bias, an MNC may be able to adjust for that bias and so improve its forecasting accuracy. For example, if the errors are consistently positive, an MNC could adjust today's forward rate downward to reflect this bias.

Graphical Evaluation of Forecast Bias Forecast bias can be examined with the use of a graph that compares forecasted values with the realized values for various time periods.

EXAMPLE

For eight consecutive quarters, Tunek Co. used the three-month forward rate of Currency Q to forecast its value three months ahead. The results from this strategy are shown in Exhibit 9.4, and the predicted and realized exchange rate values in Exhibit 9.4 are compared graphically in Exhibit 9.5.

The 45-degree line in Exhibit 9.5 represents perfect forecasts. If the realized value turned out to be exactly what was predicted over several periods, then all points would be located on that 45-degree line in Exhibit 9.5. For this reason, that line is known as the **perfect forecast line.** The closer the points reflecting the eight periods are to the 45-degree line, the better the forecast; the vertical distance between each point and the 45-degree line is the forecast error. A point that is $.04 above the 45-degree line indicates that the realized spot rate was $.04 higher than the exchange rate forecasted. All points above the 45-degree line reflect underestimation, while all points below the 45-degree line reflect overestimation. ●

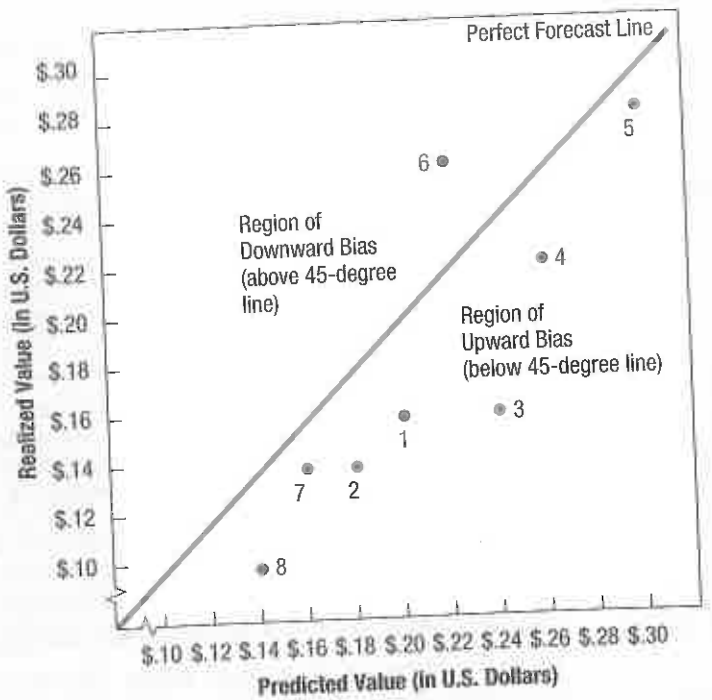
If points appear to be scattered evenly on both sides of the 45-degree line, then the forecasts are said to be *unbiased* because they are not consistently above or below the realized values. Whether evaluating the size of forecast errors or attempting to search for a bias, more reliable results are obtained when examining a large number of forecasts.

Shifts in Forecast Bias over Time The forecast bias of a currency tends to shift over time. Consider the use of the spot rate of the euro to forecast the euro's value one month later. During the period from January 2006 to October 2008, the euro exhibited fairly consistent appreciation. Thus, the one-month forecast typically underestimated the spot rate one month ahead. During the period from December 2009 to June 2010, however, the euro consistently depreciated; hence the one-month forecast typically overestimated the spot rate one month ahead. Even if the one-month forward rate of the euro (rather than its prevailing spot rate) had been used to predict the spot rate one month ahead, the forecast bias would have been similar because the one-month forward rate was usually close to the prevailing spot rate in the periods considered and so would yield a similar forecast as the prevailing spot rate. Because the forecast bias can change over time, adjusting forecasts to reflect past bias is not a reliable technique.

Exhibit 9.4 Evaluation of Forecast Performance

PERIOD	PREDICTED VALUE OF CURRENCY Q FOR END OF PERIOD	REALIZED VALUE OF CURRENCY Q AT END OF PERIOD
1	$.20	$.16
2	.18	.14
3	.24	.16
4	.26	.22
5	.30	.28
6	.22	.26
7	.16	.14
8	.14	.10

Exhibit 9.5 Graphic Evaluation of Forecast Performance



9-3f Comparison of Forecasting Methods

An MNC can compare forecasting methods by plotting the points that each method generates on a graph similar to Exhibit 9.5. The points pertaining to each method can be distinguished by a distinctive mark or color, and their respective performance can be evaluated by comparing the distances of these points from the 45-degree line. It may be that neither forecasting method stands out as superior when compared graphically. In that case, a more precise comparison can be conducted by computing the forecast errors for all periods for each method and then comparing those errors.

EXAMPLE

Xavier Co. uses a fundamental forecasting method to forecast the Polish currency (zloty), which it will need to purchase to buy imports from Poland. Xavier also derives a second forecast for each period based on an alternative forecasting model. Its previous forecasts of the zloty, using Model 1 (the fundamental method) and Model 2 (the alternative method), are shown in columns 2 and 3, respectively, of Exhibit 9.6; column 4 gives the realized value of the zloty.

The absolute forecast errors of forecasting with Model 1 and Model 2 are shown in columns 5 and 6, respectively. Notice that Model 1 outperformed Model 2 in six of the eight periods. The mean absolute forecast error when using Model 1 is $.04, so this model's forecasts are off by $.04 on average. Model 1 is not perfectly accurate but does a better job than Model 2, which had a mean absolute forecast error of $.07. Overall, predictions with Model 1 are (on average) $.03 closer to the realized value. ●

For a complete comparison of performance among forecasting methods, an MNC should evaluate as many periods as possible. Only eight periods are used in our example

Exhibit 9.6 Comparison of Forecast Techniques

(1) PERIOD	(2) PREDICTED VALUE OF ZLOTY BY MODEL 1	(3) PREDICTED VALUE OF ZLOTY BY MODEL 2	(4) REALIZED VALUE OF ZLOTY	(5) ABSOLUTE FORECAST ERROR USING MODEL 1	(6) ABSOLUTE FORECAST ERROR USING MODEL 2	(7) = (5) − (6) DIFFERENCE IN ABSOLUTE FORECAST ERRORS (MODEL 1 − MODEL 2)
1	$.20	$.24	$.16	$.04	$.08	$−.04
2	.18	.20	.14	.04	.06	−.02
3	.24	.20	.16	.08	.04	.04
4	.26	.20	.22	.04	.02	.02
5	.30	.18	.28	.02	.10	−.08
6	.22	.32	.26	.04	.06	−.02
7	.16	.20	.14	.02	.06	−.04
8	.14	.24	.10	.04	.14	−.10
				Sum = .32 Mean = .04	Sum = .56 Mean = .07	Sum = −.24 Mean = −.03

because that is enough to illustrate how to compare forecasting performance. If the MNC has a large number of periods to evaluate, it could statistically test for significant differences in forecasting errors.

9-3g Forecasting under Market Efficiency

The efficiency of the foreign exchange market also has implications for forecasting. If the foreign exchange market is **weak-form efficient**, then *historical and current* exchange rate information is not useful for forecasting exchange rate movements because today's exchange rates already reflect this information. In other words, technical analysis would not be able to improve forecasts. If the foreign exchange market is **semistrong-form efficient**, then not only historical and current information but also all relevant *public* information is reflected in today's exchange rates.

If today's exchange rates fully reflect any historical trends in exchange rate movements yet do not reflect other public information on expected interest rate movements, then the foreign exchange market is weak-form efficient but not semistrong-form efficient. Much research has tested the efficient market hypothesis for foreign exchange markets. Most of this research indicates that foreign exchange markets are weak-form efficient and semistrong-form efficient. However, there is some evidence of inefficiencies for some currencies in certain periods.

If foreign exchange markets are **strong-form efficient**, then all relevant public *and private* information is already reflected in today's exchange rates. This form of efficiency cannot be tested because private information is by definition unavailable.

Even though foreign exchange markets are generally found to be at least semistrong-form efficient, forecasts of exchange rates by MNCs may still be worthwhile. Their goal is is to derive reasonable exchange rate forecasts in order to make managerial decisions. When MNCs assess proposed policies, they usually prefer developing their own forecasts of exchange rates to simply using market-based rates for this purpose. Multinational corporations are nearly always interested in more than a single point estimate of some exchange rate one year, three years, or five years from now; they usually prefer

developing a variety of scenarios and assessing how exchange rates may change under each scenario. Even if today's forward exchange rate properly reflects all available information, it does not indicate how much the realized future exchange rate could deviate from what is expected. An MNC must determine the range of various possible exchange rate movements in order to assess the extent to which its operating performance could be affected.

9-4 Using Interval Forecasts

It is nearly impossible to predict future exchange rates with perfect accuracy. For this reason, MNCs typically specify an interval around their point estimate forecast.

EXAMPLE

Harp, Inc., which is based in Oklahoma, imports products from Canada. It uses the spot rate of the Canadian dollar (currently $.70) to forecast the value of the Canadian dollar one month from now. In addition, Harp specifies an interval around its forecasts that is based on the Canadian dollar's historical volatility. The more volatile the currency, the more likely it is to deviate significantly from its forecasted value (i.e., the larger is the expected forecast error). Harp determines that the standard deviation of the Canadian dollar's movements over the last 12 months is 2 percent. So assuming the movements are normally distributed, there is a 68 percent chance that the actual value will be within a single standard deviation (2 percent) of its forecasted value; the resulting interval ranges from $.686 to $.714. Furthermore, Harp assumes there is a 95 percent chance that the Canadian dollar will be within two standard deviations (4 percent) of the predicted value; this results in an interval ranging from $.672 to $.728. By specifying an interval, Harp can anticipate more specifically how much the currency's actual value might deviate from its predicted value. For currencies that are more volatile, the standard deviation is larger and the interval surrounding the point estimate forecast is wider. ●

As this example shows, knowing a currency's volatility is useful when specifying an interval around a forecast. Yet because a currency's volatility can change over time, past volatility levels may not be the best way to establish an interval around a point estimate forecast. Hence MNCs may prefer forecasting exchange rate volatility to determine this interval.

WEB

www.fednewyork.org/markets/impliedvolatility.html
Implied volatilities of major currencies. The implied volatility can be used to measure the market's expectations of a specific currency's volatility in the future.

The first step in forecasting exchange rate volatility is to determine the relevant period of concern. If an MNC is forecasting the value of the Canadian dollar each day over the next quarter, then it may also attempt to forecast the standard deviation of daily exchange rate movements over this quarter. That information could be combined with the point estimate forecast of the Canadian dollar for each day to derive confidence intervals around each day's forecast.

9-4a Methods of Forecasting Exchange Rate Volatility

An interval forecast requires values for the volatility of exchange rate movements. These values can be forecast using (1) recent exchange rate volatility, (2) historical time series of volatilities, and (3) the implied standard deviation derived from currency option prices.

Using Recent Levels of Volatility The volatility of historical exchange rate movements over a recent period can be used to forecast the future. In our example, the standard deviation of monthly exchange rate movements in the Canadian dollar during the previous 12 months could be used to estimate the volatility of the Canadian dollar over the next month.

Using Historical Patterns of Volatilities Historical volatility can change over time, so the standard deviation of monthly exchange rate movements in the last 12 months is not necessarily an accurate predictor of such volatility in the next month.

To the extent that there is a pattern to changes in the exchange rate's volatility, a series of time periods may be used to forecast volatility in the subsequent period.

EXAMPLE

The standard deviation of monthly exchange rate movements in the Canadian dollar can be determined for each of the last several years. Then, a time-series trend of these standard deviation levels can be used to form an estimate for the volatility of the Canadian dollar over the next month. The forecast may be based on a time-based weighting scheme such as 60 percent times the standard deviation in the last year *plus* 30 percent times the standard deviation in the year before that *plus* 10 percent times the standard deviation in the year before that. This scheme places more weight on the most recent data to derive the forecast but allows data from previous years to influence the forecast as well. The weights that achieved the most accuracy (lowest forecast error) over previous periods are normally used when applying this method to forecast exchange rate volatility. ●

Because various economic and political factors can cause exchange rate volatility to change abruptly, not even sophisticated time-series models can necessarily forecast it accurately. A poor forecast of exchange rate volatility can lead to an improper interval surrounding a point estimate forecast.

Using the Implied Standard Deviation A third method for forecasting exchange rate volatility is to derive the exchange rate's implied standard deviation (ISD) from the currency option pricing model. Recall that the premium on a call option for a currency depends on such factors as the relationship between the spot exchange rate and the exercise (strike) price of the option, the number of days until the option's expiration date, and the anticipated volatility of the denominating currency's exchange rate movements.

There is a currency option pricing model for estimating the call option premium based on various factors. The actual values of these factors are all known *except* for the anticipated volatility. By considering the existing option premium paid by investors for a specific currency option, MNCs can derive the anticipated volatility (also known as implied volatility or implied standard deviation) of a currency that they are forecasting. After accounting for the currency's existing spot rate (relative to the option's exercise price) and the time until expiration of the option, a larger premium must be paid for options on currencies that are expected to be volatile before the option expires. The logic is that investors who sell the option would demand a sufficiently high premium to reflect the degree of anticipated volatility before the option expires because they are subject to greater losses when the currency is more volatile. The higher the implied volatility (as determined by the currency option pricing model), the more dispersed it is in the probability distribution that surrounds a forecast of the currency's exchange rate; in other words, the interval surrounding the forecast is wider.

Summary

- Multinational corporations need exchange rate forecasts to make decisions on hedging payables and receivables, short-term financing and investment, capital budgeting, and long-term financing.
- The most common forecasting techniques can be classified as (1) technical, (2) fundamental, (3) market based, or (4) mixed. Each technique has limitations, and the quality of the forecasts produced varies. Yet, exchange rates are very difficult to forecast accurately, because their movements can be volatile over time.
- Forecasting methods can be evaluated by comparing the actual values of currencies to the values predicted by the forecasting method. To be meaningful, this comparison should be conducted over several periods. Two criteria used to evaluate performance of a forecast method are bias and accuracy. When comparing the accuracy of forecasts for two currencies, the absolute forecast error should be divided by the realized value of the currency in order to control for differences in the currencies' relative values.

Because future exchange rates cannot be predicted with perfect accuracy, MNCs specify an interval around their point estimate forecast. Such an interval can be derived from the recent exchange rate volatility, the historical time series of volatilities, and the implied standard deviation from currency option prices.

POINT COUNTER-POINT

Which Exchange Rate Forecast Technique Should MNCs Use?

Point **Use the spot rate to forecast.** When a U.S.-based MNC firm conducts financial budgeting, it must estimate the values of its foreign currency cash flows that will be received by the parent. Since it is well documented that firms cannot accurately forecast future values, MNCs should use the spot rate for budgeting. Changes in economic conditions are difficult to predict, and the spot rate reflects the best guess of the future spot rate if there are no changes in economic conditions.

Counter-Point **Use the forward rate to forecast.** The spot rates of some currencies do not represent accurate or even unbiased estimates of the future spot rates. Many currencies of developing countries have generally declined over time. These currencies tend to be in countries that have high inflation rates. If the spot rate had been used for budgeting, the dollar cash flows resulting from cash inflows in these currencies would have been highly overestimated. The expected inflation in a country can be accounted for by using the nominal interest rate. A high nominal interest rate implies a high level of expected inflation. Based on interest rate parity, these currencies will have pronounced discounts. Thus, the forward rate captures the expected inflation differential between countries because it is influenced by the nominal interest rate differential. Since it captures the inflation differential, it should provide a more accurate forecast of currencies, especially those currencies in high- inflation countries.

Who Is Correct? Use the Internet to learn more about this issue. Which argument do you support? Offer your own opinion on this issue.

SELF-TEST

Answers are provided in Appendix A at the back of the text.

1. Assume that the annual U.S. return is expected to be 7 percent for each of the next 4 years, while the annual interest rate in Mexico is expected to be 20 percent. Determine the appropriate 4-year forward rate premium or discount on the Mexican peso, which could be used to forecast the percentage change in the peso over the next 4 years.
2. Consider the following information:

CURRENCY	90-DAY FORWARD RATE	SPOT RATE THAT OCCURRED 90 DAYS LATER
Canadian dollar	$.80	$.82
Japanese yen	$.012	$.011

Assuming the forward rate was used to forecast the future spot rate, determine whether the Canadian dollar or the Japanese yen was forecasted with more accuracy, based on the absolute forecast error as a percentage of the realized value.

3. Assume that the forward rate and spot rate of the Mexican peso are normally similar at a given point in time. Assume that the peso has depreciated consistently and substantially over the last 3 years. Would the forward rate have been biased over this period? If so, would it typically have overestimated or underestimated the future spot rate of the peso (in dollars)? Explain.
4. An analyst has stated that the British pound seems to increase in value over the 2 weeks following announcements by the Bank of England (the British central bank) that it will raise interest rates. If this statement is true, what are the inferences regarding weak-form or semi-strong-form efficiency?
5. Assume that Mexican interest rates are much higher than U.S. interest rates. Also assume that interest rate parity (discussed in Chapter 7) exists. If you use the forward rate of the Mexican peso to forecast the Mexican peso's future spot rate, would you expect the peso to appreciate or depreciate? Explain.

6. Warden Co. is considering a project in Venezuela that will be very profitable if the local currency (bolivar) appreciates against the dollar. If the bolivar depreciates, the project will result in losses. Warden Co. forecasts that the bolivar will appreciate. The bolivar's value historically has been very volatile. As a manager of Warden Co., would you be comfortable with this project? Explain.

QUESTIONS AND APPLICATIONS

1. **Motives for Forecasting** Explain corporate motives for forecasting exchange rates.
2. **Technical Forecasting** Explain the technical technique for forecasting exchange rates. What are some limitations of using technical forecasting to predict exchange rates?
3. **Fundamental Forecasting** Explain the fundamental technique for forecasting exchange rates. What are some limitations of using a fundamental technique to forecast exchange rates?
4. **Market-Based Forecasting** Explain the market-based technique for forecasting exchange rates. What is the rationale for using market-based forecasts? If the euro appreciates substantially against the dollar during a specific period, would market-based forecasts have overestimated or underestimated the realized values over this period? Explain.
5. **Mixed Forecasting** Explain the mixed technique for forecasting exchange rates.
6. **Detecting a Forecast Bias** Explain how to assess performance in forecasting exchange rates. Explain how to detect a bias in forecasting exchange rates.
7. **Measuring Forecast Accuracy** You are hired as a consultant to assess a firm's ability to forecast. The firm has developed a point forecast for two different currencies presented in the following table. The firm asks you to determine which currency was forecasted with greater accuracy.

PERIOD	YEN FORECAST	ACTUAL YEN VALUE	POUND FORECAST	ACTUAL POUND VALUE
1	$.0050	$.0051	$1.50	$1.51
2	.0048	.0052	1.53	1.50
3	.0053	.0052	1.55	1.58
4	.0055	.0056	1.49	1.52

8. **Limitations of a Fundamental Forecast** Syracuse Corp. believes that future real interest rate movements will affect exchange rates, and it has applied regression analysis to historical data to assess the relationship. It will use regression coefficients derived from this analysis along with forecasted real interest rate movements to predict exchange rates in the future. Explain at least three limitations of this method.
9. **Consistent Forecasts** Lexington Co. is a U.S.-based MNC with subsidiaries in most major countries. Each subsidiary is responsible for forecasting the future exchange rate of its local currency relative to the U.S. dollar. Comment on this policy. How might Lexington Co. ensure consistent forecasts among the different subsidiaries?
10. **Forecasting with a Forward Rate** Assume that the 4-year annualized interest rate in the United States is 9 percent and the 4-year annualized interest rate in Singapore is 6 percent. Assume interest rate parity holds for a 4-year horizon. Assume that the spot rate of the Singapore dollar is $.60. If the forward rate is used to forecast exchange rates, what will be the forecast for the Singapore dollar's spot rate in 4 years? What percentage appreciation or depreciation does this forecast imply over the 4-year period?
11. **Foreign Exchange Market Efficiency** Assume that foreign exchange markets were found to be weak-form efficient. What does this suggest about utilizing technical analysis to speculate in euros? If MNCs believe that foreign exchange markets are strong-form efficient, why would they develop their own forecasts of future exchange rates? That is, why wouldn't they simply use today's quoted rates as indicators about future rates? After all, today's quoted rates should reflect all relevant information.
12. **Forecast Error** The director of currency forecasting at Champaign-Urbana Corp. says, "The most critical task of forecasting exchange rates is not to derive a point estimate of a future exchange rate but to assess how wrong our estimate might be." What does this statement mean?
13. **Forecasting Exchange Rates of Currencies That Previously Were Fixed** When some countries in Eastern Europe initially allowed their currencies to fluctuate against the dollar, would the fundamental

13
Direct Foreign Investment

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- describe common motives for initiating direct foreign investment and
- illustrate the benefits of international diversification.

Multinational corporations frequently capitalize on foreign business opportunities by engaging in direct foreign investment (DFI), which is investment in real assets (such as land, buildings, or even existing plants) in foreign countries. They engage in joint ventures with foreign firms, acquire foreign firms, and form new foreign subsidiaries. Financial managers must understand the potential return and risk associated with DFI so that they can make investment decisions that maximize the MNC's value.

13-1 Motives for Direct Foreign Investment

Multinational corporations often consider direct foreign investment because it can improve their profitability and enhance shareholder wealth. They are normally focused on investing in real assets such as machinery or buildings that can support operations, rather than financial assets. The direct foreign investment decisions of MNCs usually involve foreign real assets and not foreign financial assets. When MNCs review various foreign investment opportunities, they must consider whether the opportunity is compatible with their operations. In most cases, MNCs engage in DFI because they are interested in boosting revenues, reducing costs, or both.

13-1a Revenue-Related Motives

The following are typical motives of MNCs that are attempting to boost revenues.

- *Attract new sources of demand.* Multinational corporations commonly pursue DFI in countries experiencing economic growth so that they can benefit from the increased demand for products and services there. The increased demand is typically driven by local residents' higher income levels. Higher income allows for higher consumption, and higher consumption within the country results in higher income. Many developing countries, such as Argentina, Chile, Mexico, Hungary, and China, have been perceived as attractive sources of new demand. Many MNCs have penetrated these countries since barriers have been removed.

EXAMPLE

China has been a major target of MNCs because of its economic growth and rapidly increasing income. Siemens recently invested $190 million in China. The Coca-Cola Co. has invested about $500 million in bottling facilities in China, and PepsiCo has invested about $200 million in bottling facilities. Yum! Brands, Inc. has KFC franchises and Pizza Hut franchises in China. Other MNCs such as Ford Motor Co., United Technologies, General Electric, Hewlett-Packard, and IBM have also invested more than $100 million in China to attract demand by consumers there. ●

- *Enter profitable markets.* When an MNC notices that other corporations in its particular industry are generating high earnings in a particular country, it may decide to sell its own products in those markets. If it believes that its competitors are charging excessively high prices in a particular country, it may penetrate that market and undercut those prices. A typical problem with this strategy is that previously established sellers in a new market may prevent a new competitor from taking away their business by lowering their prices just when the new competitor attempts to break into that market.
- *Exploit monopolistic advantages.* Firms may become internationalized if they possess resources or skills not available to competing firms. If a firm possesses advanced technology and has exploited this advantage successfully in local markets, then the firm may attempt to exploit it internationally as well. In fact, the firm may have a more distinct advantage in markets that have less advanced technology.

EXAMPLE In recent years, Google has acquired businesses in Canada, China, Finland, Greece, Israel, South Korea, Spain, and Sweden. The company is effective at using its technology to improve the capabilities of other businesses. In this way, it expands its technology internationally. ●

- *React to trade restrictions.* In some cases, MNCs use DFI as a defensive rather than an aggressive strategy. Specifically, MNCs may pursue DFI to circumvent trade barriers.

EXAMPLE Japanese automobile manufacturers established plants in the United States in anticipation that their exports to the United States would be subject to more stringent trade restrictions. Japanese companies recognized that trade barriers could be established that would limit or prohibit their exports. By producing automobiles in the United States, Japanese manufacturers could circumvent those barriers. ●

- *Diversify internationally.* Since economies of countries do not move perfectly in tandem over time, net cash flow from sales of products across countries should be more stable than comparable sales of the products in a single country. By diversifying sales (and possibly even production) internationally, a firm can make its net cash flows less volatile. Thus, the possibility of a liquidity deficiency is less likely. In addition, the firm may enjoy a lower cost of capital as shareholders and creditors perceive the MNC's risk to be lower because of the more stable cash flows. Potential benefits to MNCs that diversify internationally are examined more thoroughly later in the chapter.

EXAMPLE Several firms experienced weak sales because of reduced U.S. demand for their products. They responded by increasing their expansion in foreign markets. AT&T and Starbucks pursued new business in China. United Technologies and Wal-Mart expanded in Europe and Asia. IBM increased its presence in China, India, South Korea, and Taiwan. Cisco Systems expanded substantially in China, Japan, and South Korea. Foreign expansion diversifies an MNC's sources of revenue and thus reduces its reliance on the U.S. economy. ●

13-1b Cost-Related Motives

MNCs also engage in DFI in an effort to reduce costs. The following are typical motives of MNCs that are trying to cut costs.

- *Fully benefit from economies of scale.* A corporation that attempts to sell its primary product in new markets may increase its earnings and shareholder wealth due to **economies of scale** (lower average cost per unit resulting from increased production). Firms that utilize much machinery are most likely to benefit from economies of scale.

EXAMPLE Facebook benefits from economies of scale by allowing people outside the United States to access its platform. Its popularity spread to the United Kingdom in 2007, but its penetration into other non-English-speaking markets was limited because of language differences. The company therefore developed a tool that enables users to translate the service into their own language. This allowed Facebook to achieve substantial growth in many countries, including Brazil, Poland, and Turkey. Because much of its cost of operations is due to its platform, increasing the international access to that platform reduces the company's cost per customer. ●

WEB

www.cia.gov

The CIA's home page, which provides a link to the *World Factbook*, is a valuable resource for information about countries that MNCs might be considering for direct foreign investment.

- *Use foreign factors of production.* Labor and land costs can vary dramatically among countries. Multinational corporations often attempt to set up production in locations where land and labor are cheap. Because of market imperfections (as discussed in Chapter 1) such as imperfect information, relocation transaction costs, and barriers to industry entry, specific labor costs are seldom equal among markets. Thus, it is worthwhile for MNCs to survey markets to determine whether they can benefit from cheaper costs by producing in those markets.

EXAMPLE Mexico has been a major target for MNCs that are seeking to reduce their cost of production. Many U.S.-based MNCs, including Black & Decker, Eastman Kodak, Ford Motor Co., and General Electric, have established subsidiaries in Mexico to achieve lower labor costs.

Mexico has attracted almost $8 billion in DFI from firms in the automobile industry, primarily because of the country's low-cost labor. Mexican workers at subsidiaries of automobile plants who manufacture sedans and trucks earn daily wages that are less than the average hourly rate for similar workers in the United States. Ford produces trucks at subsidiaries based in Mexico. Baxter International has established manufacturing plants in Mexico to capitalize on lower costs of production (primarily wage rates).

Asia has also attracted much direct foreign investment. Honeywell has joint ventures in countries such as Korea and India, where production costs are low, and has also established subsidiaries in Malaysia. Genzyme Corp. recently invested about $100 million in China for research and development and biotechnology production. ●

- *Use foreign raw materials.* Because of transportation costs, a corporation may attempt to avoid importing raw materials from a given country, especially when it plans to sell the finished product back to consumers in that country. Under such circumstances, a more feasible solution may be to develop the product in the country where the raw materials are located.
- *Use foreign technology.* Corporations are increasingly establishing overseas plants or acquiring existing overseas plants to learn about unique technologies in foreign countries. This technology is then used to improve their own production processes and increase production efficiency at all subsidiary plants around the world.

EXAMPLE Cisco recently planned a $1 billion investment in Russia to create innovative business ideas. Cisco has previously invested heavily in India and other markets to tap into unique technologies and innovation. ●

- *React to exchange rate movements.* When a firm perceives that a foreign currency is undervalued, the firm may consider DFI in that country because the initial outlay should be relatively low.

EXAMPLE Wyoming Co. is a distributor of ski equipment that wants to expand its business into snowmobiles. Most of the production would be exported to Canadian retail stores and invoiced in dollars. It anticipates that the Canadian dollar will weaken against the U.S. dollar over the next several years, which would increase the cost to Canadian stores that purchase Wyoming Co.'s exports. Its main competitor of this new business would be a firm in Canada. Wyoming Co. decides to acquire the firm in Canada rather than export products to Canada. Consequently, it can avoid the adverse exchange rate effects and can actually benefit from the expected strength of the Canadian dollar, since the Canadian subsidiary it buys will periodically convert its Canadian earnings into U.S. dollars. ●

EB

morganstanley.
views/gef/index.

gan Stanley's Global
nomic Forum, which
analyses,
cussions, statistics,
forecasts related to
U.S. economies.

EXAMPLE

VEB

nance.yahoo.com/
nformation about
conomic growth and
ther macroeconomic
ndicators used when
considering direct
foreign investment in a
foreign country.

WEB

www.worldbank.org
Valuable updated
country data that can
be considered when
making DFI decisions.

13-1c Comparing Benefits of DFI among Countries

Exhibit 13.1 summarizes the possible benefits of DFI and explains how MNCs can use DFI to achieve those benefits. Most MNCs pursue DFI based on their expectations of capitalizing on one or more of the potential benefits summarized in Exhibit 13.1.

The potential benefits from DFI vary with the country. Countries in Western Europe have well-established markets where the demand for most products and services is large. Thus, these countries may appeal to MNCs that want to penetrate markets because they have better products than those already being offered. Countries in Eastern Europe, Asia, and Latin America tend to have relatively low costs of land and labor. If an MNC desires to establish a low-cost production facility, it would also consider other factors such as the work ethic and skills of the local people, availability of labor, and cultural traits. Although most attempts to increase international business are motivated by one or more of the benefits listed here, some disadvantages are also associated with DFI.

EXAMPLE

Most of Nike's shoe production is concentrated in China, Indonesia, Thailand, and Vietnam. The government regulation of labor in these countries is limited. Thus, if Nike wants to ensure that employees receive fair treatment, it may have to govern the factories itself. Also, because Nike is such a large company, it receives much attention when employees in factories that produce shoes for Nike receive unfair treatment. Nike incurs additional costs of oversight to prevent unfair treatment of employees. Although its expenses from having products produced in Asia are still significantly lower than if produced in the United States, it needs to recognize these other expenses when determining where to have its products produced. A country with the lowest wages may not be the ideal location for production if the MNC will incur high expenses to ensure that the factories treat local employees fairly. ●

Exhibit 13.1 Summary of Motives for Direct Foreign Investment

BENEFIT	MEANS OF USING DFI TO ACHIEVE THIS BENEFIT
Revenue-Related Motives	
1. Attract new sources of demand.	Establish a subsidiary or acquire a competitor in a new market.
2. Enter markets where superior profits are possible.	Acquire a competitor that has controlled its local market.
3. Exploit monopolistic advantages.	Establish a subsidiary in a market where competitors are unable to produce the identical product; sell products in that country.
4. React to trade restrictions.	Establish a subsidiary in a market where tougher trade restrictions will adversely affect the firm's export volume.
5. Diversify internationally.	Establish subsidiaries in markets whose business cycles differ from those where existing subsidiaries are based.
Cost-Related Motives	
6. Fully benefit from economies of scale.	Establish a subsidiary in a new market that can sell products produced elsewhere; this allows for increased production and possibly greater production efficiency.
7. Use foreign factors of production.	Establish a subsidiary in a market that has relatively low costs of labor or land; sell the finished product to countries where the cost of production is higher.
8. Use foreign raw materials.	Establish a subsidiary in a market where raw materials are cheap and accessible; sell the finished product to countries where the raw materials are more expensive.
9. Use foreign technology.	Participate in a joint venture in order to learn about a production process or other operations.
10. React to exchange rate movements.	Establish a subsidiary in a new market where the local currency is weak but is expected to strengthen over time.

Exhibit 13.2 Steps Taken by MNCs to Determine Whether to Pursue Direct Foreign Investment

Identify Motives. Review the revenue and cost-related motives for DFI, and determine which motives may apply (as explained in this chapter).

Capital Budgeting. Identify a particular international project that may be feasible, and estimate the cash flows and the initial investment associated with that project. Apply a capital budgeting analysis in order to determine whether the proposed project is feasible (as explained in Chapter 14).

International Corporate Control. Assess existing corporate control within the firm and potential corporate control targets in foreign countries that could be acquired. Apply capital budgeting analysis of corporate control candidates and to any existing subsidiaries that could be sold (as explained in Chapter 15).

Country Risk Analysis. Analyze the country risk of countries where the MNC presently does business as well as in countries where the MNC plans to expand. Incorporate any conclusions from the country risk analysis into the capital budgeting analysis for those proposed projects in which the country risk may affect cash flows or the cost of financing projects (as explained in Chapter 16).

Capital Structure. Assess the existing capital structure, and determine whether it is suitable based on the MNC's existing operations and its ability to repay debt. Estimate the cost of capital that could be obtained to finance new international projects, and incorporate that estimate within the capital budgeting analysis (as explained in Chapter 17).

Long-Term Financing. Consider sources of long-term funds in foreign countries. Determine whether to revise the financing in order to hedge exchange rate risk (match loan repayment currency with cash inflow currency) or to reduce the cost of capital (as explained in Chapter 18).

13-1d Measuring an MNC's Benefits of DFI

Multinational corporations consider the motives explained previously when identifying direct foreign investment opportunities. However, this is only the first step. Exhibit 13.2 shows a set of steps that MNCs use when they consider DFI. The steps are listed in an orderly manner, whereby each is covered in a particular chapter. Yet in reality, MNCs consider all of these steps simultaneously when determining how to expand or restructure existing international operations. They apply a multinational capital budgeting process to compare the benefits and costs of international projects (as explained in Chapter 14). This capital budgeting analysis commonly involves international restructuring (Chapter 15) and an assessment of risk characteristics in the country where the proposed projects are to be implemented (Chapter 16). It also requires an assessment of the cost of capital (Chapter 17) and debt financing possibilities (Chapter 18) in order to determine the required rate of return on any international projects that are considered.

13-2 Benefits of International Diversification

An international project can reduce a firm's overall risk as a result of international diversification benefits. The key to international diversification is selecting foreign projects whose performance levels are not highly correlated over time. In this way, the various international projects should not experience poor performance simultaneously.

EXAMPLE

Merrimack Co., a U.S. firm, plans to invest in a new project in either the United States or the United Kingdom. Once the project is completed, it will constitute 30 percent of the firm's total funds invested in itself. The remaining 70 percent of its investment in its business is exclusively in the United States. Characteristics of the proposed project are forecasted for a five-year period for both a U.S. and a British location, as shown in Exhibit 13.3.

Merrimack Co. plans to assess the feasibility of each proposed project based on expected risk and return and using a five-year time horizon. Its expected annual after-tax return on investment

Exhibit 13.3 Evaluation of Proposed Projects in Alternative Locations

	EXISTING BUSINESS	CHARACTERISTICS OF PROPOSED PROJECT	
		IF LOCATED IN THE UNITED STATES	IF LOCATED IN THE UNITED KINGDOM
Mean expected annual return on investment (after taxes)	20%	25%	25%
Standard deviation of expected annual after-tax returns on investment	.10	.09	.11
Correlation of expected annual after-tax returns on investment with after-tax returns of prevailing U.S. business	—	.80	.02

on its prevailing business is 20 percent, and its variability of returns (as measured by the standard deviation) is expected to be .10. The firm can assess its expected overall performance based on developing the project in the United States and in the United Kingdom. In doing so, it is essentially comparing two portfolios. In the first portfolio, 70 percent of its total funds are invested in its prevailing U.S. business, with the remaining 30 percent invested in a new project located in the United States. In the second portfolio, again 70 percent of the firm's total funds are invested in its prevailing business, but the remaining 30 percent are invested in a new project located in the United Kingdom. Therefore, 70 percent of the portfolios' investments are identical. The difference is in the remaining 30 percent of funds invested.

If the new project is located in the United States, the firm's overall expected after-tax return (r_p) is:

r_p =	(70%)	×	(20%)	+	(30%)	×	(25%)	=	21.5%
	% of funds invested in prevailing business		Expected return on prevailing business		% of funds invested in new U.S. project		Expected return on new U.S. project		Firm's overall expected return

This computation is based on weighting the returns according to the percentage of total funds invested in each investment.

If the firm calculates its overall expected return with the new project located in the United Kingdom instead of the United States, the results are unchanged. This is because the new project's expected return is the same regardless of the country of location. Therefore, in terms of return, neither new project has an advantage.

With regard to risk, the new project is expected to exhibit slightly less variability in returns during the five-year period if it is located in the United States (see Exhibit 13.3). Since firms typically prefer more stable returns on their investments, this is an advantage. However, estimating the risk of the individual project without considering the overall firm would be a mistake. The expected correlation of the new project's returns with those of the prevailing business must also be considered. Recall that portfolio variance is determined by the individual variability of each component as well as their pairwise correlations. The variance of σ_p^2 a portfolio comprising just two investments (A and B) is computed as

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

Here w_A and w_B represent the percentage of total funds allocated to investments A and B, respectively; σ_A and σ_B are the standard deviations of returns on investments A and B; and CORR_{AB} is the correlation coefficient of returns between investments A and B. This equation for portfolio variance can be applied to the problem at hand. The portfolio reflects the overall firm. First, compute the

overall firm's variance in returns while assuming it locates the new project in the United States (based on the information provided in Exhibit 13.3). This variance is

$$\begin{aligned}\sigma_p^2 &= (.70)^2(.10)^2 + (.30)^2(.09)^2 + 2(.70)(.30)(.10)(.09)(.80)\\ &= (.49)(.01) + (.09)(.0081) + .003024\\ &= .0049 + .000729 + .003024\\ &= .008653\end{aligned}$$

If Merrimack Co. decides to locate the new project in the United Kingdom instead of the United States, its overall variability in returns will be different because that project differs from the new U.S. project in terms of individual variability in returns and correlation with the prevailing business. The overall variability of the firm's returns based on locating the new project in the United Kingdom is estimated by the variance in portfolio returns:

$$\begin{aligned}\sigma_p^2 &= (.70)^2(.10)^2 + (.30)^2(.11)^2 + 2(.70)(.30)(.10)(.11)(.02)\\ &= (.49)(.01) + (.09)(.0121) + .0000924\\ &= .0049 + .001089 + .0000924\\ &= .0060814\end{aligned}$$

Thus, Merrimack will generate more stable returns if the new project is located in the United Kingdom. The firm's overall variability in returns is almost 29.7 percent less if the new project is located in the United Kingdom rather than in the United States.

The variability is reduced when locating in a foreign country because of the correlation between the new project's expected returns and the expected returns of the prevailing business. If the new project is located in Merrimack's home country (the United States), its returns are expected to be more highly correlated with those of the prevailing business than they would be if the project were located in the United Kingdom. When economic conditions of two countries (such as the United States and the United Kingdom) are not highly correlated, a firm may reduce its risk by diversifying its business in both countries instead of concentrating in just one. ●

WEB

www.trade.gov/mas
Outlook of international trade conditions for each of several industries.

13-2a Diversification Analysis of International Projects

Like any investor, an MNC with investments positioned around the world is concerned with the risk and return characteristics of the investments. The portfolio of all investments reflects the MNC in aggregate.

EXAMPLE

Virginia, Inc., considers a global strategy of developing projects as shown in Exhibit 13.4. Each point on the graph reflects a specific project that either has been implemented or is being considered. The return (vertical axis) may be measured by potential return on assets or return on equity. The risk (horizontal axis) may be measured by potential fluctuation in the returns generated by each project.

Exhibit 13.4 shows that Project A has the highest expected return of all the projects. Although Virginia, Inc., could devote most of its resources to this project in attempting to achieve such a high return, its risk may be too high to invest in this project exclusively. In addition, such a project may not be able to absorb all the available capital if its potential market for customers is limited. Virginia, Inc., therefore develops a portfolio of projects. By combining Project A with several other projects, the company may decrease its expected return; on the other hand, it may also reduce its risk substantially.

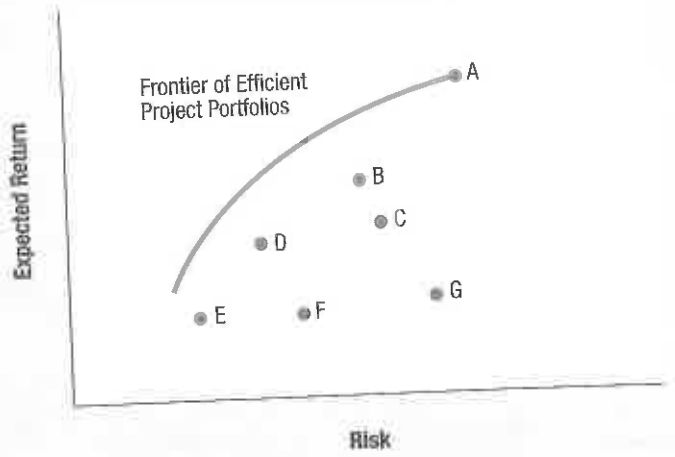
If Virginia, Inc., appropriately combines projects, then its project portfolio may be able to achieve the risk-return trade-off exhibited by any of the points on the curve in Exhibit 13.4. This curve represents a frontier of efficient project portfolios that exhibit desirable risk-return characteristics in that no single project could outperform any of these portfolios. The term *efficient* refers to a minimum risk for a given expected return. Project portfolios outperform the individual projects considered by Virginia, Inc., because of the diversification attributes discussed earlier. The lower (or more negative) the correlation in project returns over time, the lower will be the project portfolio risk. As new projects are proposed, the frontier of efficient project portfolios available to Virginia, Inc., may shift. ●

WEB

www.treasury.gov
Links to international information that should be considered by MNCs that are contemplating direct foreign investment.

Comparing Portfolios along the Frontier Along the frontier of efficient project portfolios, no portfolio can be singled out as "optimal" for all MNCs. This is because

Exhibit 13.4 Risk-Return Analysis of International Projects



MNCs vary in their willingness to accept risk. If the MNC is very conservative and has the choice of any portfolios represented by the frontier in Exhibit 13.4, it will probably prefer one that exhibits low risk (near the bottom of the frontier). In contrast, a more aggressive strategy would be to implement a portfolio of projects that exhibits risk-return characteristics such as those near the top of the frontier.

Comparing Frontiers among MNCs The actual location of the frontier of efficient project portfolios depends on the business in which the firm is involved. Some MNCs have frontiers of possible project portfolios that are more desirable than the frontiers of other MNCs.

EXAMPLE

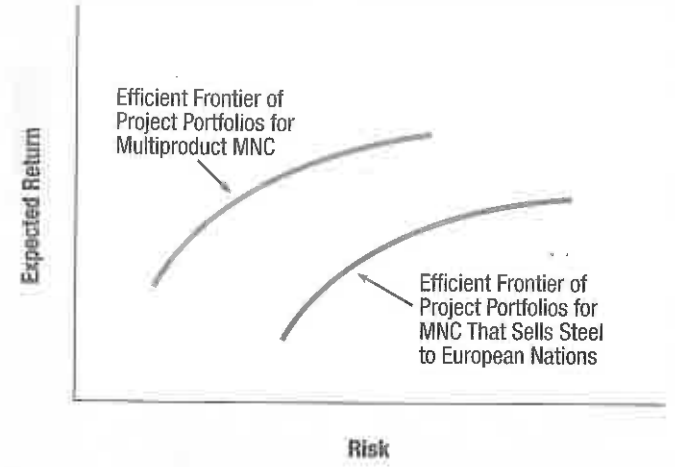
Eurosteel, Inc., sells steel solely to European nations and is considering other related projects. Its frontier of efficient project portfolios exhibits considerable risk (because it sells just one product to countries whose economies move in tandem). In contrast, Global Products, Inc., which sells a wide range of products to countries all over the world, has a lower degree of project portfolio risk. Its frontier of efficient project portfolios is therefore closer to the vertical axis, as illustrated in Exhibit 13.5. Of course, this comparison assumes that Global Products, Inc., is knowledgeable about all of its products and the markets where it sells. ●

Our discussion suggests that MNCs can achieve more desirable risk–return characteristics from their project portfolios if they diversify sufficiently among products and geographic markets. This capacity also relates to the MNC's advantage over a purely domestic firm serving a strictly local market. The MNC may be able to develop a more efficient portfolio of projects than its domestic counterpart.

13-2b Diversification among Countries

Exhibit 13.6 shows how the stock market values of various countries have changed over time. A country's stock market value reflects the expectations of business opportunities and economic growth. Observe how the changes in stock market values vary among

Exhibit 13.5 Risk-Return Advantage of a Diversified MNC



countries, which suggests that business and economic conditions vary among countries. Therefore, when an MNC diversifies its business among countries rather than focusing on only one foreign country, it reduces its exposure to any single foreign country. However, since economic conditions are integrated among countries over time, the weakness of one country may spread to other countries. Notice that, during the financial crisis in 2008, all stock market levels in Exhibit 13.6 were weak, reflecting expectations of weak economic conditions in these countries. Thus, diversification across economies may be less effective when there are global economic conditions that adversely affect most countries.

13-3 Host Government Views of DFI

Each government must weigh the advantages and disadvantages of direct foreign investment in its country. The most frequently cited advantage is that direct foreign investment will create local jobs and thereby reduce the unemployment rate. However, if the products produced as a result of direct foreign investment are sold in the same country, this may take market share away from other local competitor firms and therefore cause layoffs. Some types of DFI could eliminate as many local jobs as it creates. Therefore, governments may provide incentives to encourage some forms of DFI, barriers to prevent other forms of DFI, and impose conditions on some other forms of DFI.

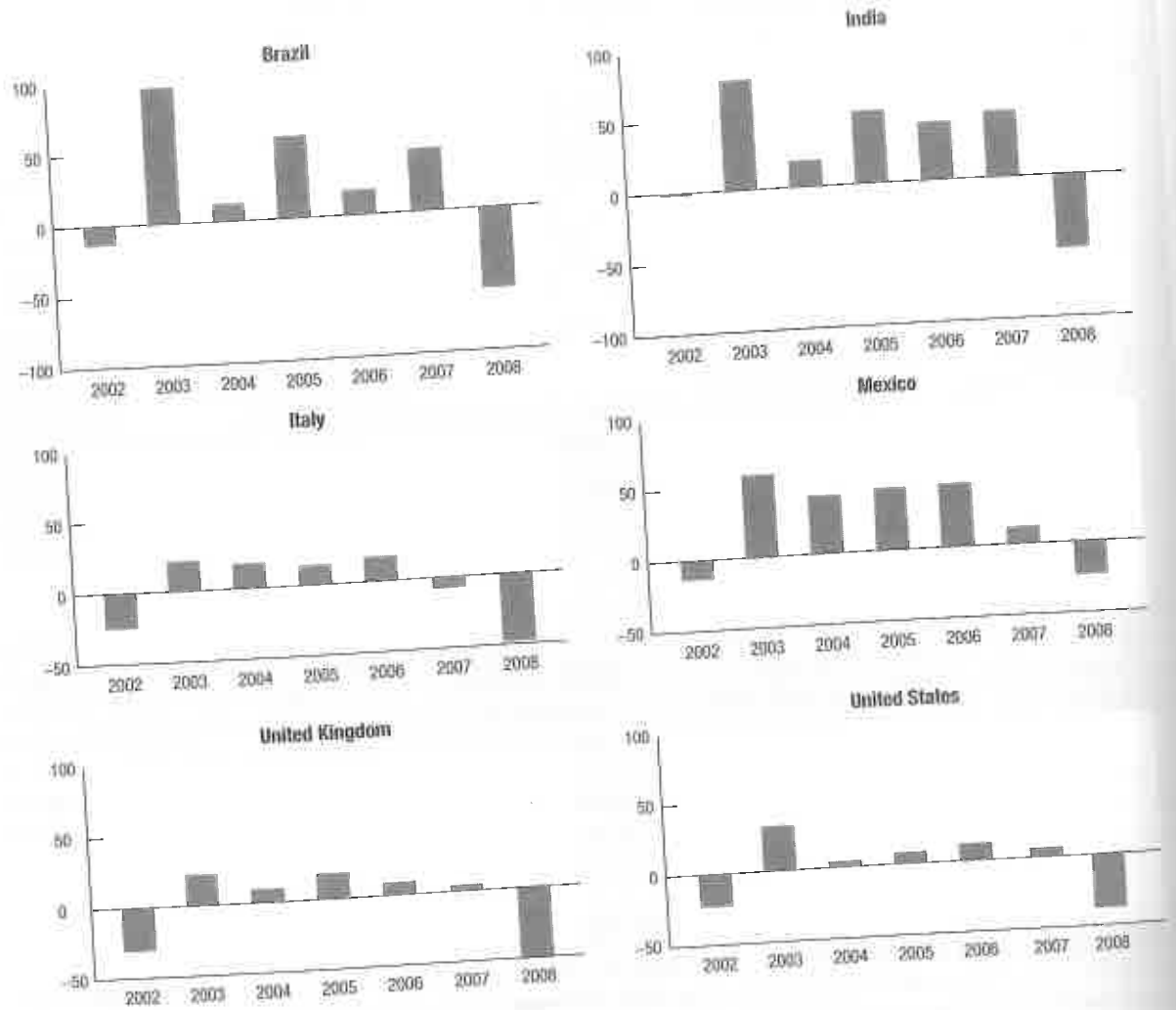
13-3a Incentives to Encourage DFI

The ideal DFI solves problems such as unemployment and lack of technology without taking business away from local firms.

EXAMPLE

Consider an MNC that is willing to build a production plant in a foreign country, using local labor to produce goods that are not direct substitutes for other locally produced goods. In this case, the plant will not cause a reduction in sales by local firms. The host government would normally be receptive to this type of DFI. Another form of DFI that is desirable from the host government's

hibit 13.6 Comparison of Expected Economic Growth among Countries: Annual Stock Market Returns



WEB

www.pwc.com

Access to country-specific information such as general business rules and regulations, tax environments, and other useful statistics and surveys.

perspective is a manufacturing plant that uses local labor and then exports the products (assuming no other local firm exports such products to the same areas). ●

In some cases, a government will offer incentives to MNCs that consider DFI in its country. Governments are particularly willing to offer incentives for DFI that will result in the employment of local citizens or an increase in technology. Common incentives offered by the host government include tax breaks on the income earned there, rent-free land and buildings, low-interest loans, subsidized energy, and reduced environmental regulations. The extent to which a government will offer such incentives depends on how much it benefits from the MNC's DFI.

EXAMPLE The decision by Allied Research Associates, Inc., a U.S.-based MNC, to build a production facility and office in Belgium was highly motivated by Belgian government subsidies. The Belgian government

subsidized a large portion of the expenses incurred by Allied Research Associates and offered tax concessions and favorable interest rates on loans to Allied. ●

Many governments encourage DFI, and they use different types of incentives. France has periodically sold government land at a discount, whereas Finland and Ireland have attracted MNCs by imposing only a low corporate tax rate on specific businesses. In 2010, many cities in Mexico offered tax incentives to attract more direct foreign investment from U.S. firms. Ireland, Hungary, and Singapore have been successfully attracted DFI in recent years.

13-3b Barriers to DFI

A government is less anxious to encourage DFI that adversely affects locally owned companies unless it believes that the increased competition is needed to serve consumers. Therefore, governments tend to regulate closely any DFI that may affect local firms, consumers, and economic conditions.

Protective Barriers When MNCs consider engaging in DFI by acquiring a foreign company, they may face various barriers imposed by host government agencies. All countries have one or more government agencies that monitor mergers and acquisitions. These agencies may prevent an MNC from acquiring companies in their country if they believe it will attempt to lay off employees. They may even restrict foreign ownership of any local firms.

"Red Tape" Barriers An implicit barrier to DFI in some countries is the "red tape" involved, such as procedural and documentation requirements. An MNC pursuing DFI is subject to a different set of requirements in each country. Therefore, it is difficult for an MNC to become proficient at the process unless it concentrates on DFI within a single foreign country. The current efforts to make regulations uniform across Europe have simplified the process of acquiring European firms.

Industry Barriers The local firms of some industries in certain countries have substantial influence on the government and will likely use their influence to prevent competition from MNCs that attempt DFI. Multinational corporations that consider DFI need to recognize the influence that these local firms have on the local government.

Environmental Barriers Each country enforces its own environmental constraints. Some countries may enforce more of these restrictions on a subsidiary whose parent is based in a different country. Building codes, disposal of production waste materials, and pollution controls are examples of restrictions that force subsidiaries to incur additional costs. Many European countries have recently imposed tougher antipollution laws.

Regulatory Barriers Each country also enforces its own regulatory constraints pertaining to taxes, currency convertibility, earnings remittance, employee rights, and other policies that can affect cash flows of a subsidiary established there. Because these regulations can influence cash flows, financial managers must consider them when assessing policies. For example, Facebook has successfully expanded its service internationally. It would like to penetrate China, where the population exceeds 1.3 billion and there are about 500 million Internet users. The government of China grants online operating licenses yet can still restrict content and information. These restrictions have kept Facebook from penetrating China, which prevents the company from generating advertisement revenue there. Also, any change in a host country's regulations may require revision of existing financial policies, so financial managers should monitor those regulations to ensure the MNC's compliance.

Ethical Differences There is no consensus standard of business conduct that applies to all countries. A business practice that is perceived to be unethical in one country may be considered totally ethical in another. Most U.S.-based MNCs are well aware that certain business practices that are accepted in some less developed countries are illegal in the United States. For example, bribes to governments in order to receive special tax breaks or other favors are common in some countries.

The Securities and Exchange Commission has recently established a specialized unit to enforce the Foreign Corrupt Practices Act (FCPA). Some U.S.-based MNCs have recently been charged with violating the FCPA. The charges typically reflect illegal payments provided in order to pursue some types of international business. These MNCs would likely argue that they could not compete for specific international government contracts unless they offered bribes.

An MNC that does not engage in such practices may be at a competitive disadvantage when attempting DFI in some countries. Hence the firm may wish to forgo competing for some types of international business when it knows that illegal payments will be expected.

WEB

www.transparency.org Offers extensive information about corruption in some countries.

Political Instability The governments of some countries may prevent DFI. If a country is susceptible to abrupt changes in government and political conflicts, the feasibility of DFI may depend on the outcome of those conflicts. Multinational corporations prefer to avoid direct investment in a foreign country whose government is likely to be removed after the DFI is made.

13-3c Government-Imposed Conditions on Engaging in DFI

Some governments allow international acquisitions but impose special requirements on MNCs that desire to acquire a local firm. For example, the MNC may be required to ensure pollution control for its manufacturing or to structure the business to export the products it produces so that it does not threaten the market share of other local firms. The MNC may even be required to retain all the employees of the target firm so that unemployment and general economic conditions in the country are not adversely affected.

EXAMPLE

Mexico requires that a specified minimum proportion of parts used to produce automobiles there be made in Mexico. The proportion is lower for automobiles that are to be exported. Spain's government allowed Ford Motor Co. to set up production facilities in Spain only if it would abide by certain provisions, which included limiting Ford's local sales volume to 10 percent of the previous year's local automobile sales. In addition, two-thirds of the total volume of automobiles produced by Ford in Spain must be exported. The idea behind these provisions was to create jobs for workers in Spain without seriously affecting local competitors. Allowing a subsidiary that primarily exports its product achieved this objective. ●

Government-imposed conditions do not necessarily prevent an MNC from pursuing DFI in a specific foreign country, but they can be costly. Therefore, MNCs should not consider DFI that requires costly conditions unless the potential benefits outweigh the costs.

Summary

- MNCs may be motivated to initiate direct foreign investment in order to attract new sources of demand or to enter markets where superior profits are possible. These two motives are normally based on opportunities to generate more revenue in foreign markets. Other motives for using DFI are typically related to cost efficiency, such as using foreign factors of production, raw materials, or technology. In addition MNCs may engage in DFI to protect their foreign market share, to react to exchange rate movements, or to avoid trade restrictions.
- International diversification is a common motive for direct foreign investment. It allows an MNC to reduce its exposure to domestic economic conditions. In this way, the MNC may be able to stabilize its cash flows and reduce its risk. Such a goal is desirable because it may reduce the firm's cost of financing. International projects may allow MNCs to achieve lower risk than is possible from only domestic projects without reducing their expected returns. International diversification tends to be better able to reduce risk when the DFI is targeted to countries whose economies are somewhat unrelated to an MNC's home country economy.

Point Counter-Point

Should MNCs Avoid DFI in Countries with Liberal Child Labor Laws?

Point Yes. An MNC should maintain its hiring standards, regardless of what country it is in. Even if a foreign country allows children to work, an MNC should not lower its standards. Although the MNC forgoes the use of low-cost labor, it maintains its global credibility.

Counter-Point No. An MNC will not only benefit its shareholders but also create employment for some children who need support. The MNC can provide reasonable working conditions and perhaps may even offer educational programs for its employees.

Who Is Correct? Use the Internet to learn more about this issue. Which argument do you support? Offer your own opinion on this issue.

Self-Test

Answers are provided in Appendix A at the back of the text.

1. Offer some reasons why U.S. firms might prefer to engage in direct foreign investment (DFI) in Canada rather than Mexico.
2. Offer some reasons why U.S. firms might prefer to direct their DFI to Mexico rather than Canada.
3. One U.S. executive said that Europe was not considered as a location for DFI because of the euro's value. Interpret this statement.
4. Why do you think U.S. firms commonly use joint ventures as a strategy to enter China?
5. Why would the United States offer a foreign automobile manufacturer large incentives for establishing a production subsidiary in the United States? Isn't this strategy indirectly subsidizing the foreign competitors of U.S. firms?

Questions and Applications

1. **Motives for DFI** Describe some potential benefits to an MNC as a result of direct foreign investment (DFI). Elaborate on each type of benefit. Which motives for DFI do you think encouraged Nike to expand its footwear production in Latin America?
2. **Impact of a Weak Currency on Feasibility of DFI** Packer, Inc., a U.S. producer of computer disks, plans to establish a subsidiary in Mexico in order to penetrate the Mexican market. Packer's executives believe that the Mexican peso's value is relatively strong and will weaken against the dollar over time. If their expectations about the peso's value are correct, how will this affect the feasibility of the project? Explain.
3. **DFI to Achieve Economies of Scale** Bear Co. and Viking, Inc., are automobile manufacturers that desire to benefit from economies of scale. Bear Co. has decided to establish distributorship subsidiaries in various countries, while Viking, Inc., has decided to establish manufacturing subsidiaries in various countries. Which firm is more likely to benefit from economies of scale?
4. **DFI to Reduce Cash Flow Volatility** Raider Chemical Co. and Ram, Inc., had similar intentions to

reduce the volatility of their cash flows. Raider implemented a long-range plan to establish 40 percent of its business in Canada. Ram, Inc., implemented a long-range plan to establish 30 percent of its business in Europe and Asia, scattered among 12 different countries. Which company will more effectively reduce cash flow volatility once the plans are achieved?

5. Impact of Import Restrictions If the United States imposed long-term restrictions on imports, would the amount of DFI by non-U.S. MNCs in the United States increase, decrease, or be unchanged? Explain.

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

7. Opportunities in Less Developed Countries Offer your opinion on why economies of some less developed countries with strict restrictions on international trade and DFI are somewhat independent from economies of other countries. Why would MNCs desire to enter such countries? If these countries relaxed their restrictions, would their economies continue to be independent of other economies? Explain.

8. Effects of September 11 In August 2001, Ohio, Inc., considered establishing a manufacturing plant in central Asia, which would be used to cover its exports to Japan and Hong Kong. The cost of labor was very low in central Asia. On September 11, 2001, the terrorist attacks on the United States caused Ohio to reassess the potential cost savings. Why would the estimated expenses of the plant increase after the terrorist attacks?

9. DFI Strategy Bronco Corp. has decided to establish a subsidiary in Taiwan that will produce stereos and sell them there. It expects that its cost of producing these stereos will be one-third the cost of producing them in the United States. Assuming that its production cost estimates are accurate, is Bronco's strategy sensible? Explain.

10. Risk Resulting from International Business This chapter concentrates on possible benefits to a firm that increases its international business.

a. What are some risks of international business that may not exist for local business?

b. What does this chapter reveal about the relationship between an MNC's degree of international business and its risk?

11. Motives for DFI Starter Corp. of New Haven, Connecticut, produces sportswear that is licensed by professional sports teams. It recently decided to expand in Europe. What are the potential benefits for this firm from using DFI?

12. Disney's DFI Motives What potential benefits do you think were most important in the decision of the Walt Disney Co. to build a theme park in France?

13. DFI Strategy Once an MNC establishes a subsidiary, DFI remains an ongoing decision. What does this statement mean?

14. Host Government Incentives for DFI Why would foreign governments provide MNCs with incentives to undertake DFI there?

Advanced Questions

15. DFI Strategy JCPenney has recognized numerous opportunities to expand in foreign countries and has assessed many foreign markets, including Brazil, Greece, Mexico, Portugal, Singapore, and Thailand. It has opened new stores in Europe, Asia, and Latin America. In each case, the firm was aware that it did not have sufficient understanding of the culture of each country that it had targeted. Consequently, it engaged in joint ventures with local partners who knew the preferences of the local customers.

a. What comparative advantage does JCPenney have when establishing a store in a foreign country, relative to an independent variety store?

b. Why might the overall risk of JCPenney decrease or increase as a result of its recent global expansion?

c. JCPenney has been more cautious about entering China. Explain the potential obstacles associated with entering China.

16. DFI Location Decision Decko Co. is a U.S. firm with a Chinese subsidiary that produces cell phones in China and sells them in Japan. This subsidiary pays its wages and its rent in Chinese yuan, which is stable relative to the dollar. The cell phones sold to Japan are denominated in Japanese yen. Assume that Decko Co. expects that the Chinese yuan will continue to stay stable against the dollar. The subsidiary's main goal is to generate profits for itself and reinvest the profits. It does not plan to remit any funds to Decko, the U.S. parent.

a. Assume that the Japanese yen strengthens against the U.S. dollar over time. How would this be expected to affect the profits earned by the Chinese subsidiary?

b. If Decko Co. had established its subsidiary in Tokyo, Japan, instead of in China, would the subsidiary's profits be more exposed or less exposed to exchange rate risk?

c. Why do you think that Decko Co. established the subsidiary in China instead of Japan? Assume no major country risk barriers.

d. If the Chinese subsidiary needs to borrow money to finance its expansion and wants to reduce its exchange rate risk, should it borrow U.S. dollars, Chinese yuan, or Japanese yen?

17. Foreign Investment Decision Trak Co. (of the United States) presently serves as a distributor of products by purchasing them from other U.S. firms and selling them in Japan. It wants to purchase a manufacturer in India that could produce similar products at a low cost (due to low labor costs in India) and export the products to Japan. The operating expenses would be denominated in Indian rupees. The products would be invoiced in Japanese yen. If Trak Co. can acquire a manufacturer, it will discontinue its existing distributor business. If the yen is expected to appreciate against the dollar and the rupee is expected to depreciate against the dollar, how would this affect Trak's direct foreign investment?

18. Foreign Investment Strategy Myzo Co. (based in the United States) sells basic household products that many other U.S. firms produce at the same quality level, and these other U.S. firms have about the same production cost as Myzo. Myzo is considering direct foreign investment. It believes that the market in the United States is saturated and wants to pursue business in a foreign market where it can generate more revenue. It decides to create a subsidiary in Mexico that will produce household products and sell its products only in Mexico. This subsidiary would definitely not export its products to the United States because exports to the United States could reduce the parent's market share and Myzo wants to ensure that its U.S. employees remain employed. The labor costs in Mexico are very low. Myzo will comply with some international labor laws. By complying with the laws, the total costs of Myzo's subsidiary will be 20 percent higher than other Mexican producers of household products in Mexico that are of similar quality. However, Myzo's subsidiary will be able to produce household products at a cost that is 40 percent lower than its cost of producing household products in the United States. Briefly explain whether you think Myzo's strategy for direct foreign investment is feasible.

Discussion in the Boardroom

This exercise can be found in Appendix E at the back of this textbook.

Running Your Own MNC

This exercise can be found on the *International Financial Management* text companion website. Go to www.cengagebrain.com (students) or www.cengage.com/login (instructors) and search using **ISBN 9781133947837.**

Blades, Inc. Case

Consideration of Direct Foreign Investment

For the last year, Blades, Inc., has been exporting to Thailand in order to supplement its declining U.S. sales. Under the existing arrangement, Blades sells 180,000 pairs of roller blades annually to Entertainment Products, a Thai retailer, for a fixed price denominated in Thai baht. The agreement will last for another 2 years. Furthermore, to diversify internationally and to take advantage of an attractive offer by Jogs, Ltd., a British retailer, Blades has recently begun exporting to the United Kingdom. Under the resulting agreement, Jogs will purchase 200,000 pairs of Speedos, Blades' primary product, annually at a fixed price of £80 per pair.

Blades' suppliers of the needed components for its roller blade production are located primarily in the United States, where Blades incurs the majority of its cost of goods sold. Although prices for inputs needed to manufacture roller blades vary, recent costs have run approximately $70 per pair. Blades also imports components from Thailand because of the relatively low price of rubber and plastic components and because of their high quality. These imports are denominated in Thai baht, and the exact price (in baht) depends on prevailing market prices for these components in Thailand. Currently, inputs sufficient to manufacture a pair of roller blades cost approximately 3,000 Thai baht per pair of roller blades.

Although Thailand had been among the world's fastest growing economies, recent events in Thailand

have increased the level of economic uncertainty. Specifically, the Thai baht, which had been pegged to the dollar, is now a freely floating currency and has depreciated substantially in recent months. Furthermore, recent levels of inflation in Thailand have been very high. Hence, future economic conditions in Thailand are highly uncertain.

Ben Holt, Blades' chief financial officer (CFO), is seriously considering DFI in Thailand. He believes that this is a perfect time to either establish a subsidiary or acquire an existing business in Thailand because the uncertain economic conditions and the depreciation of the baht have substantially lowered the initial costs required for DFI. Holt believes the growth potential in Asia will be extremely high once the Thai economy stabilizes.

Although Holt has also considered DFI in the United Kingdom, he would prefer that Blades invest in Thailand as opposed to the United Kingdom. Forecasts indicate that the demand for roller blades in the United Kingdom is similar to that in the United States; since Blades' U.S. sales have recently declined because of the high prices it charges, Holt expects that DFI in the United Kingdom will yield similar results, especially since the components required to manufacture roller blades are more expensive in the United Kingdom than in the United States. Furthermore, both domestic and foreign roller blade manufacturers are relatively well established in the United Kingdom, so the growth potential there is limited. Holt believes the Thai roller blade market offers more growth potential.

Blades can sell its products at a lower price but generate higher profit margins in Thailand than it can in the United States. This is because the Thai customer has committed itself to purchase a fixed number of Blades' products annually only if it can purchase Speedos at a substantial discount from the U.S. price. Nevertheless, since the cost of goods sold incurred in Thailand is substantially below that incurred in the United States, Blades has managed to generate higher profit margins from its Thai exports and imports than in the United States.

As a financial analyst for Blades, Inc., you generally agree with Holt's assessment of the situation. However, you are concerned that Thai consumers have not been affected yet by the unfavorable economic conditions. You believe that they may reduce their spending on leisure products within the next year. Therefore, you think it would be beneficial to wait until next year, when the unfavorable economic conditions in Thailand may subside, to make a decision regarding DFI in Thailand. However, if economic conditions in Thailand improve over the next year, DFI may become more expensive both because target firms will be more expensive and because the baht may appreciate. You are also aware that several of Blades' U.S. competitors are considering expanding into Thailand in the next year.

If Blades acquires an existing business in Thailand or establishes a subsidiary there by the end of next year, it would fulfill its agreement with Entertainment Products for the subsequent year. The Thai retailer has expressed an interest in renewing the contractual agreement with Blades at that time if Blades establishes operations in Thailand. However, Holt believes that Blades could charge a higher price for its products if it establishes its own distribution channels.

Holt has asked you to answer the following questions:

1. Identify and discuss some of the benefits that Blades, Inc., could obtain from DFI.
2. Do you think Blades should wait until next year to undertake DFI in Thailand? What is the trade-off if Blades undertakes the DFI now?
3. Do you think Blades should renew its agreement with the Thai retailer for another 3 years? What is the trade-off if Blades renews the agreement?
4. Assume a high level of unemployment in Thailand and a unique production process employed by Blades, Inc. How do you think the Thai government would view the establishment of a subsidiary in Thailand by firms such as Blades? Do you think the Thai government would be more or less supportive if firms such as Blades acquired existing businesses in Thailand? Why?

Small Business Dilemma

Direct Foreign Investment Decision by the Sports Exports Company

Jim Logan's business, the Sports Exports Company, continues to grow. His primary product is the footballs he produces and exports to a distributor in the United Kingdom. However, his recent joint venture with a British firm has also been successful. Under this arrangement, a British firm produces other sporting goods for Logan's firm; these goods are then delivered to that distributor. Logan intentionally started his international business by exporting because it was easier and cheaper to export than to establish a place of business in the United Kingdom. However, he is considering establishing a firm in the United Kingdom to produce the footballs there instead of in his garage (in the United States). This firm would also produce the other sporting goods that he now sells, so he would no longer have to rely on another British firm (through the joint venture) to produce those goods.

1. Given the information provided here, what are the advantages to Logan of establishing a firm in the United Kingdom?
2. Given the information provided here, what are the disadvantages to Logan of establishing a firm in the United Kingdom?

Internet/Excel Exercises

IBM has substantial operations in many countries, including the United States, Canada, and Germany. Go to finance.yahoo.com/q?s=ibm.

1. Click on Historical Prices. (Or apply this exercise to a different MNC.) Set the date range so that you can obtain quarterly values of the U.S. stock index for the last 20 quarters. Insert the quarterly data on a spreadsheet. Compute the percentage change in IBM's stock price for each quarter. Next go to finance.yahoo.com/intlindices?e=Americas and click (under "Americas") on ^GSPC, which represents the U.S. stock market index, so that you can derive the quarterly percentage change in the U.S. stock index over the last 20 quarters. Then run a regression analysis with IBM's quarterly return (percentage change in stock price) as the dependent variable and the quarterly percentage change in the U.S. stock market's value as the independent variable. (Appendix C explains how Excel can be used to run regression analysis.) The slope coefficient serves as an estimate of the sensitivity of IBM's value to the U.S. market returns. Also, check the fit of the relationship based on the *R*-squared statistic.
2. Go to finance.yahoo.com/intlindices?e=europe and click (under "Europe") on ^GDAXI, which represents the German stock market index. Repeat the process described in exercise 1 so that you can assess IBM's sensitivity to the German stock market. Compare the slope coefficient between the two analyses. Is IBM's value more sensitive to the U.S. market or the German market? Does the U.S. market or the German market explain a higher proportion of the variation in IBM's returns (check the R-squared statistic)? Offer an explanation of your results.

Online Articles with Real-World Examples

Find a recent article online that describes an actual international finance application or a real-world example about a specific MNC's actions that reinforces one or more of the concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary there and provide the Web link of the article so that other students can access it. If your class is live, your professor may ask you to summarize your application in class. Your professor may assign specific students to complete this assignment for this chapter or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples applied to this chapter, consider using the following search terms (and include the current year as a search term to ensure that the online articles are recent).

1. direct foreign investment AND motive
2. direct foreign investment AND production cost
3. direct foreign investment AND economies of scale
4. international expansion AND motive
5. international expansion AND production cost
6. international expansion AND economies of scale
7. direct foreign investment AND [name of an MNC]
8. direct foreign investment AND government incentives
9. direct foreign investment AND government barriers
10. direct foreign investment AND regulation

14
Multinational Capital Budgeting

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- compare the capital budgeting analysis of an MNC's subsidiary versus its parent,
- demonstrate how multinational capital budgeting can be applied to determine whether an international project should be implemented,
- show how multinational capital budgeting can be adapted to account for special situations such as alternative exchange rate scenarios or when subsidiary financing is considered, and
- explain how the risk of international projects can be assessed.

Multinational corporations (MNCs) evaluate international projects by using multinational capital budgeting, which compares the benefits and costs of these projects. More specifically, MNCs determine whether an international project is feasible by comparing the present value of that project's expected future cash flows to the initial investment that would be necessary for that project. This type of evaluation for international projects is similar to the evaluation of domestic projects. However, special circumstances of international projects that affect the expected future cash flows or the discount rate used to discount cash flows make multinational capital budgeting more complex than domestic capital budgeting.

Given that many MNCs spend more than $100 million per year on international projects, multinational capital budgeting is a critical function. Many international projects are irreversible and cannot be easily sold to other corporations at a reasonable price. Financial managers must understand how to apply capital budgeting to international projects so they can maximize the value of the MNC. This chapter provides an overview of the capital budgeting process and identifies the type of information used.

14-1 Subsidiary versus Parent Perspective

Normally, multinational capital budgeting should be based on the parent's perspective. Some projects might be feasible for a subsidiary but not feasible for the parent, since net after-tax cash inflows to the subsidiary can differ substantially from those to the parent. Such differences in cash flows between the subsidiary versus parent can be due to several factors, some of which are discussed here.

14-1a Tax Differentials

If the earnings from the project will someday be remitted to the parent, then the MNC needs to consider how the parent's government taxes these earnings. If the parent's government imposes a high tax rate on the remitted funds, the project may be feasible from the subsidiary's point of view but not from the parent's point of view.

WEB

www.kpmg.com
Detailed information on the tax regimes, rates, and regulations of more than 75 countries.

14-1b Restrictions on Remitted Earnings

Host governments may impose restrictions on remitted earnings by subsidiaries. Consider a potential project to be implemented in a country where host government restrictions require that a percentage of the subsidiary earnings remain in the country. Since the parent may never have access to these funds, the project is not attractive to the parent although it may be attractive to the subsidiary.

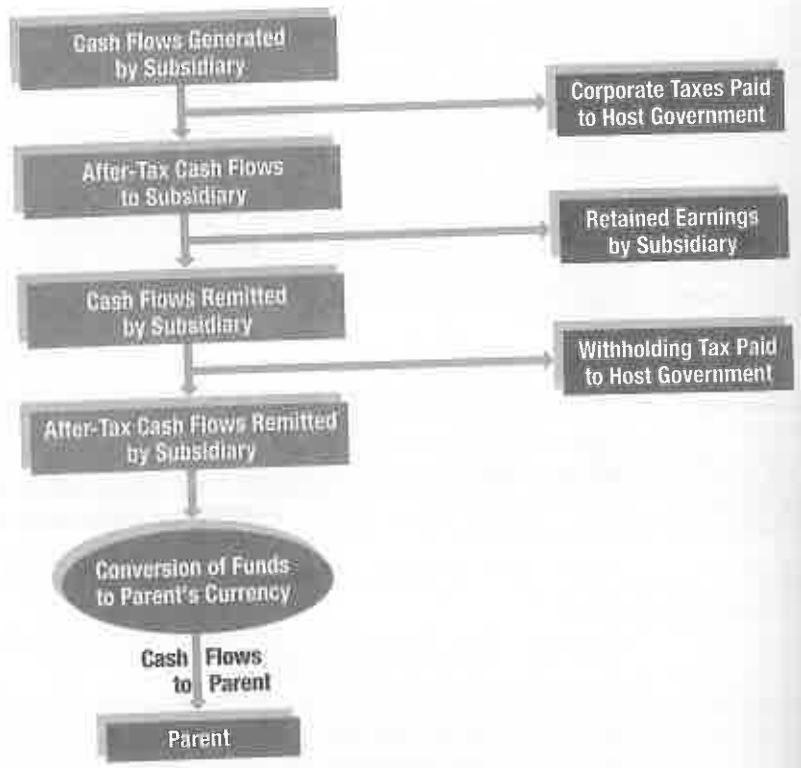
14-1c Exchange Rate Movements

When earnings are remitted to the parent, the amount received by the parent is influenced by the existing exchange rate. Therefore, a project that appears to be feasible to the subsidiary may not be feasible to the parent if the subsidiary's currency is expected to weaken substantially over time.

14-1d Summary of Factors

Exhibit 14.1 illustrates the process from the time earnings are generated by the subsidiary until the parent receives the remitted funds. The exhibit shows how the cash flows of the subsidiary may be reduced by the time they reach the parent. The subsidiary's earnings

Exhibit 14.1 Process of Remitting Subsidiary Earnings to the Parent



are reduced initially by corporate taxes paid to the host government. Then, some of the earnings are retained by the subsidiary (either by the subsidiary's choice or according to the host government's rules), with the residual targeted as funds to be remitted. Those funds that are remitted may be subject to a withholding tax by the host government. The remaining funds are converted to the parent's currency (at the prevailing exchange rate) and remitted to the parent.

Given the various factors shown here that can drain subsidiary earnings, the cash flows actually remitted by the subsidiary may represent only a small portion of the earnings it generates. The feasibility of the project from the parent's perspective depends not on the subsidiary's cash flows but on the cash flows that the parent ultimately receives.

The parent's perspective is appropriate in attempting to determine whether a project will enhance the firm's value. Given that the parent's shareholders are its owners, it should make decisions that satisfy its shareholders. Each project, whether foreign or domestic, should ultimately generate sufficient cash flows to the parent to enhance shareholder wealth. Any changes in the parent's expenses should also be included in the analysis. The parent may incur additional expenses for monitoring the new foreign subsidiary's management or consolidating the subsidiary's financial statements. Any project that can create a positive net present value for the parent should enhance shareholder wealth.

WEB

finance.yahoo.com/intlindices?u
Information on the recent performance of country stock indexes. This is sometimes used as a general indicator of economic conditions in various countries and may be considered by MNCs that assess the feasibility of foreign projects.

One exception to the rule of using a parent's perspective occurs when the foreign subsidiary is not wholly owned by the parent and the foreign project is partially financed with retained earnings of the parent and of the subsidiary. In this case, the foreign subsidiary has a group of shareholders that it must satisfy. Any arrangement made between the parent and the subsidiary should be acceptable to the two entities only if the arrangement enhances the values of both. The goal is to make decisions in the interests of both groups of shareholders and not to transfer wealth from one entity to another.

Although this exception occasionally occurs, most foreign subsidiaries of MNCs are wholly owned by the parents. Examples in this text implicitly assume that the subsidiary is wholly owned by the parent (unless noted otherwise) and therefore focus on the parent's perspective.

14-2 Input for Multinational Capital Budgeting

Capital budgeting for the MNC is necessary for all long-term projects that deserve consideration. The projects may range from a small expansion of a subsidiary division to the creation of a new subsidiary. Regardless of the long-term project to be considered, an MNC will normally require forecasts of the financial characteristics that influence the initial investment or cash flows of the project. Each of these characteristics is briefly described here:

1. *Initial investment.* The parent's initial investment in a project may constitute the major source of funds to support a particular project. Funds initially invested in a project may include not only what is necessary to start the project but also additional funds, such as working capital, to support the project over time. Such funds are needed to finance inventory, wages, and other expenses until the project begins to generate revenue. Because cash inflows will not always be sufficient to cover upcoming cash outflows, working capital is needed throughout a project's lifetime.
2. *Price and consumer demand.* The price at which the product could be sold can be forecast using competitive products in the markets as a comparison. The future prices will most likely be responsive to the future inflation rate in the host country (where the project is to take place), but the future inflation rate is not known.

Thus, future inflation rates must be forecast in order to develop projections of the product price over time.

When projecting a cash flow schedule, an accurate forecast of consumer demand for a product is quite valuable. The future demand is usually influenced by economic conditions, which are uncertain.

3. *Costs.* Variable-cost forecasts can be developed from comparative costs of the components (such as hourly labor costs and the cost of materials). Such costs should normally move in tandem with the future inflation rate of the host country. Even if the variable cost per unit can be accurately predicted, the projected total variable cost (variable cost per unit times quantity produced) may be wrong if the consumer demand is inaccurately forecast.

   Fixed costs are expenses that are not affected by consumer demand, so they can be estimated without an estimate of that demand. Rent or leasing expense is an example of a fixed cost. On a periodic basis, the fixed cost may be easier to predict than the variable cost. It is, however, sensitive to any change in the host country's inflation rate from the time the forecast is made until the time the fixed costs are incurred.
4. *Tax laws.* The tax laws on earnings generated by a foreign subsidiary or remitted to the MNC's parent vary among countries (see the chapter appendix for more details). Because after-tax cash flows are necessary for an adequate capital budgeting analysis, international tax effects must be considered when assessing the feasibility of any proposed foreign projects.
5. *Remitted funds.* The MNC's policy for remitting funds to the parent is relevant input because it influences the estimated cash flows generated by a foreign project that will be remitted to the parent each period. In some cases, a host government will prevent a subsidiary from remitting its earnings to the parent. If the parent is aware of these restrictions, it can incorporate them when projecting net cash flows.
6. *Exchange rates.* Any international project will be affected by exchange rate fluctuations during the life of the project, but these movements are usually difficult to forecast. Although it is possible to hedge foreign currency cash flows, there is normally much uncertainty surrounding the amount of those flows.
7. *Salvage (liquidation) value.* The after-tax salvage value of most projects will depend on several factors, including the success of the project and the attitude of the host government toward the project. Some projects have indefinite lifetimes that can be difficult to assess; other projects have designated specific lifetimes, following which they will be liquidated. This makes the capital budgeting analysis easier to apply. The MNC does not always have complete control over the lifetime decision. In some cases, political events may force the firm to liquidate the project earlier than planned. The probability that such events will occur varies among countries.
8. *Required rate of return.* Once the relevant cash flows of a proposed project are estimated, they can be discounted at the project's required rate of return. The MNC should first estimate its cost of capital, after which it can derive its required rate of return on a project based on the risk of that project. If a particular project has higher risk than other operations of the MNC, then the required return on that project should be higher than the MNC's cost of capital. The manner by which an MNC determines its cost of capital is discussed in Chapter 17.

WEB

www.weforum.org
Information on global competitiveness and other details of interest to MNCs that implement projects in foreign countries.

The challenge of multinational capital budgeting is to accurately forecast the financial variables just described that are used to estimate cash flows. If garbage (inaccurate forecasts) is input into a capital budgeting analysis, then the output of an analysis will also be garbage. Consequently, an MNC may take on a project by mistake. Because such a mistake may cost millions of dollars, MNCs need to assess the degree of uncertainty for

any input that is used in the project evaluation. This is discussed more thoroughly later in this chapter.

14-3 Multinational Capital Budgeting Example

This section illustrates how multinational capital budgeting can be applied. It begins with assumptions that simplify the capital budgeting analysis. Then, additional considerations are introduced to emphasize the potential complexity of such an analysis.

14-3a Background

Spartan, Inc., is considering the development of a subsidiary in Singapore that would manufacture and sell tennis rackets locally. Spartan's financial managers have asked the manufacturing, marketing, and financial departments to provide them with relevant input so they can apply a capital budgeting analysis to this project. In addition, some Spartan executives have met with government officials in Singapore to discuss the proposed subsidiary. The project would end in four years. All relevant information follows.

1. *Initial investment.* The project would require an initial investment of 20 million Singapore dollars (S$), which includes funds to support working capital. Given the existing spot rate of $.50 per Singapore dollar, the U.S. dollar amount of the parent's initial investment is S$20 million × $.50 = $10 million.
2. *Price and consumer demand.* The estimated price and demand schedules during each of the next 4 years are shown here:

	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Price per tennis racket	S$350	S$350	S$360	S$380
Demand in Singapore	60,000 units	60,000 units	100,000 units	100,000 units

3. *Costs.* The variable costs (for materials, labor, etc.) per unit have been estimated and consolidated as shown here:

	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Variable costs per tennis racket	S$200	S$200	S$250	S$250

   The expense of leasing extra office space is S$1 million per year. Other annual overhead expenses are expected to be S$1 million per year.
4. *Tax Laws.* The Singapore government will allow Spartan's subsidiary to depreciate the cost of the plant and equipment at a maximum rate of S$2 million per year, which is the rate the subsidiary will use.

   The Singapore government will impose a 20 percent tax rate on income. In addition, it will impose a 10 percent withholding tax on any funds remitted by the subsidiary to the parent.

   The U.S. government will allow a tax credit on taxes paid in Singapore; therefore, earnings remitted to the U.S. parent will not be taxed by the U.S. government.
5. *Remitted funds.* The Spartan subsidiary plans to send all net cash flows received back to the parent firm at the end of each year. The Singapore government promises no restrictions on the cash flows to be sent back to the parent firm but does impose a 10 percent withholding tax on any funds sent to the parent, as mentioned previously.

6. *Exchange rates.* The spot exchange rate of the Singapore dollar is $.50. Spartan uses the spot rate as its forecast for all future periods.
7. *Salvage value.* The Singapore government will pay the parent S$12 million to assume ownership of the subsidiary at the end of four years. Assume that there is no capital gains tax on the sale of the subsidiary.
8. *Required rate of return.* Spartan, Inc., requires a 15 percent return on this project.

14-3b Analysis

The capital budgeting analysis will be conducted from the parent's perspective and be based on the assumption that the subsidiary would be wholly owned by the parent and be created to enhance the parent's value. Thus, Spartan, Inc., will approve this proposed project only if the present value of estimated future cash flows (including the salvage value) to be received by the parent exceeds the parent's initial outlay.

The capital budgeting analysis to determine whether Spartan, Inc., should establish the subsidiary is provided in Exhibit 14.2 (review this exhibit as you read on). The first step is to incorporate demand and price estimates in order to forecast total revenue earned by the subsidiary (see lines 1 through 3). Then, the expenses incurred by the subsidiary are summed up to forecast total expenses (see lines 4 through 9). Next, before-tax earnings are computed (in line 10) by subtracting total expenses from total revenues. Host government taxes (line 11) are then deducted from before-tax earnings to determine after-tax earnings for the subsidiary (line 12).

Exhibit 14.2 Capital Budgeting Analysis: Spartan, Inc.

		YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
1.	Demand		60,000	60,000	100,000	100,000
2.	Price per unit		S$350	S$350	S$360	S$380
3.	Total revenue = (1) × (2)		S$21,000,000	S$21,000,000	S$36,000,000	S$38,000,000
4.	Variable cost per unit		S$200	S$200	S$250	S$260
5.	Total variable cost = (1) × (4)		S$12,000,000	S$12,000,000	S$25,000,000	S$26,000,000
6.	Annual lease expense		S$1,000,000	S$1,000,000	S$1,000,000	S$1,000,000
7.	Other fixed annual expenses		S$1,000,000	S$1,000,000	S$1,000,000	S$1,000,000
8.	Noncash expense (depreciation)		S$2,000,000	S$2,000,000	S$2,000,000	S$2,000,000
9.	Total expenses = (5) + (6) + (7) + (8)		S$16,000,000	S$16,000,000	S$29,000,000	S$30,000,000
10.	Before-tax earnings of subsidiary = (3) − (9)		S$5,000,000	S$5,000,000	S$7,000,000	S$8,000,000
11.	Host government tax (20%)		S$1,000,000	S$1,000,000	S$1,400,000	S$1,600,000
12.	After-tax earnings of subsidiary		S$4,000,000	S$4,000,000	S$5,600,000	S$6,400,000
13.	Net cash flow to subsidiary = (12) + (8)		S$6,000,000	S$6,000,000	S$7,600,000	S$8,400,000
14.	S$ remitted by subsidiary (100% of net cash flow)		S$6,000,000	S$6,000,000	S$7,600,000	S$8,400,000
15.	Withholding tax on remitted funds (10%)		S$600,000	S$600,000	S$760,000	S$840,000
16.	S$ remitted after withholding taxes		S$5,400,000	S$5,400,000	S$6,840,000	S$7,560,000
17.	Salvage value					S$12,000,000
18.	Exchange rate of S$		$.50	$.50	$.50	$.50
19.	Cash flows to parent		$2,700,000	$2,700,000	$3,420,000	$9,780,000
20.	PV of parent cash flows (15% discount rate)		$2,347,826	$2,041,588	$2,248,706	$5,591,747
21.	Initial investment by parent	$10,000,000				
22.	Cumulative NPV		−$7,652,174	−$5,610,586	−$3,361,880	$2,229,867

The depreciation expense is added to the after-tax subsidiary earnings to compute the net cash flow to the subsidiary (line 13). The remitted cash flows are shown in line 14. Because all after-tax earnings are to be remitted by the subsidiary in this example, line 14 is the same as line 13. The subsidiary can afford to send all net cash flow to the parent because the initial investment provided by the parent includes working capital. The funds remitted to the parent (line 14) are subject to a 10 percent withholding tax (line 15), so the actual amount of funds to be sent after these taxes is shown in line 16. The salvage value of the project is shown in line 17. The funds to be remitted must first be converted into dollars at the exchange rate (line 18) existing at that time. The parent's cash flow (in U.S. dollars) from the subsidiary is shown in line 19. The periodic funds received from the subsidiary are not subject to U.S. corporate taxes because it was assumed that the parent would receive credit for the taxes paid in Singapore.

Calculation of Net Present Value The net present value (NPV) of the project is estimated as the present value of the net cash flows to the parent as a result of the project less the initial outlay for the project, as shown here:

$$NPV = -IO + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} + \frac{SV_n}{(1+k)^n}$$

where

IO = initial outlay (investment)
CF_t = cash flow in period t
SV_n = salvage value
k = required rate of return on the project
n = lifetime of the project (number of periods)

The net cash flow per period (line 19) is discounted at the required rate of return (15 percent in this example) to derive the present value (PV) of each period's net cash flow (line 20). Finally, the cumulative NPV (line 22) is determined by consolidating the discounted cash flows for each period and then subtracting the initial investment (in line 21). At the end of year 2, the cumulative NPV was −$5,610,586. This amount was determined by consolidating the $2,347,826 in year 1 and the $2,041,588 in year 2 and then subtracting the initial investment of $10,000,000. The cumulative NPV in each period measures how much of the initial outlay has been recovered up to that point by the receipt of discounted cash flows. Thus, it can be used to estimate how many periods it will take to recover the initial outlay. For some projects, the cumulative NPV remains negative in all periods, which means that the initial outlay is never fully recovered.

The critical value in line 22 is in the last period because it reflects the NPV of the project. In our example, the cumulative NPV at the end of the last period is $2,229,867. Because the NPV is positive, Spartan, Inc., may accept this project if the discount rate of 15 percent has fully accounted for the project's risk. If the analysis has not yet accounted for risk, however, then Spartan may decide to reject the project. The way an MNC can account for risk in capital budgeting is discussed shortly.

14-4 Other Factors to Consider

The example of Spartan, Inc., ignored a variety of factors that may affect the capital budgeting analysis, such as:

- exchange rate fluctuations,
- inflation,

- financing arrangement,
- blocked funds,
- uncertain salvage value,
- impact of project on prevailing cash flows,
- host government incentives, and
- real options

Each of these factors will be discussed in turn.

14-4a Exchange Rate Fluctuations

Recall that Spartan, Inc., uses the Singapore dollar's current spot rate ($.50) as a forecast for all future periods of concern. The company realizes that the exchange rate will typically change over time, but it does not know whether the Singapore dollar will strengthen or weaken in the future. Although the difficulty of accurately forecasting exchange rates is well known, a multinational capital budgeting analysis could at least incorporate other scenarios for exchange rate movements, such as a pessimistic scenario and an optimistic scenario. From the parent's point of view, an appreciation of the Singapore dollar would be favorable because the earnings received by the subsidiary and remitted to the parent would be converted to more U.S. dollars. Conversely, a depreciation would be unfavorable because the earnings received by the subsidiary and remitted to the parent would be converted to fewer U.S. dollars.

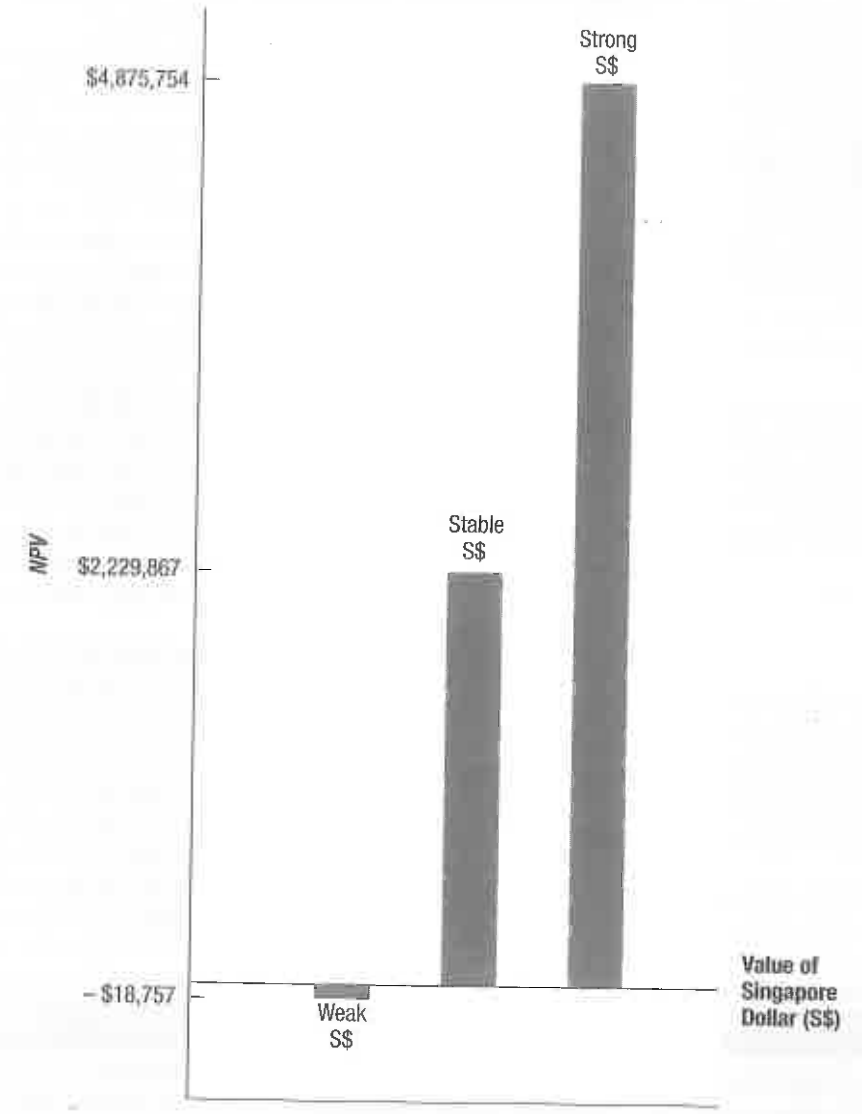
Exhibit 14.3 illustrates both a weak Singapore dollar (weak-S$) scenario and a strong Singapore dollar (strong-S$) scenario. The top row of the table shows the anticipated after-tax Singapore dollar cash flows (including salvage value) for the subsidiary from lines 16 and 17 in Exhibit 14.2. The amount in U.S. dollars to which these Singapore dollars convert depends on the exchange rates prevailing in the various periods when they are converted. The number of Singapore dollars multiplied by the forecasted exchange rate will determine the estimated number of U.S. dollars received by the parent.

Observe from Exhibit 14.3 how the cash flows received by the parent differ depending on the scenario. A strong Singapore dollar is clearly beneficial, as indicated by the increased U.S. dollar value of the cash flows received. The NPV forecasts based on projections for

Exhibit 14.3 Analysis Using Different Exchange Rate Scenarios: Spartan, Inc.

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
S$ remitted after withholding taxes (including salvage value)		S$5,400,000	S$5,400,000	S$6,840,000	S$19,560,000
Strong-S$ Scenario					
Exchange rate of S$		$.54	$.57	$.61	$.65
Cash flows to parent		$2,916,000	$3,078,000	$4,172,400	$12,714,000
PV of cash flows (15% discount rate)		$2,535,652	$2,327,410	$2,743,421	$7,269,271
Initial investment by parent	$10,000,000				
Cumulative NPV		−$7,464,348	−$5,136,938	−$2,393,517	$4,875,754
Weak-S$ Scenario					
Exchange rate of S$		$.47	$.45	$.40	$.37
Cash flows to parent		$2,538,000	$2,430,000	$2,736,000	$7,237,200
PV of cash flows (15% discount rate)		$2,206,957	$1,837,429	$1,798,964	$4,137,893
Initial investment by parent	$10,000,000				
Cumulative NPV		−$7,793,043	−$5,955,614	−$4,156,650	−$18,757

Exhibit 14.4 Sensitivity of the Project's NPV to Different Exchange Rate Scenarios: Spartan, Inc.



exchange rates are illustrated in Exhibit 14.4. The estimated NPV is negative for the weak-S$ scenario but positive for the stable-S$ and strong-S$ scenarios. Thus, the feasibility of this project's depends on the probability distribution of these three scenarios for the Singapore dollar during the project's lifetime. If there is a high probability that the weak-S$ scenario will occur, then this project should not be accepted.

Exchange Rates Tied to Parent Currency Some U.S.-based MNCs consider projects in countries where the local currency is tied to the dollar. They may conduct a

capital budgeting analysis that presumes the exchange rate will remain fixed. It is possible, however, that the local currency will be devalued at some point in the future, which could have a major impact on the cash flows to be received by the parent. Therefore, the MNC may reestimate the project's NPV based on a particular devaluation scenario that it believes might occur. If the project is still feasible under this scenario, then the MNC may be more comfortable pursuing the project.

Hedged Exchange Rates Some MNCs may hedge some of the expected cash flows of a new project. In this case, they should evaluate the project based on hedged exchange rates applied to the expected cash flows that are to be hedged. The following example illustrates how the capital budgeting analysis should be changed if the MNC plans to hedge a portion of the project's expected cash flows.

EXAMPLE

Reconsider the original example in which Spartan, Inc., applied an expected future spot rate of $.50 for the Singapore dollar for all four years of the proposed project. However, assume that because of the uncertainty of the Singapore dollar (S$), Spartan would hedge some of its expected cash flows if it implements the project. Specifically, assume it would hedge cash flows of S$4,000,000 per year because it expects that this is the minimum amount of earnings that the new subsidiary would receive and be able to remit to the parent in any year. Any additional cash flows (beyond S$4,000,000) received by the subsidiary per year would not be hedged.

The hedged cash flows should be separated from the unhedged cash flows because the exchange rate at which the hedged cash flows will convert to U.S. dollars may differ from the exchange rate at which unhedged cash flows will convert to U.S. dollars. Assume that the prevailing forward rate of the Singapore dollar is $.48 for any maturity. Even though the forward rate is slightly lower than the expected future spot rate of the S$, Spartan is willing to use forward contracts to hedge S$4,000,000 of cash flows per year if it implements this project so that it could reduce its exposure to exchange rate risk.

Exhibit 14.5 shows how the capital budgeting analysis of this example would differ from the original analysis shown in Exhibit 14.2. The first 16 rows of that exhibit are not affected by this new example, so the top row of Exhibit 14.5 begins with row (16) pulled from Exhibit 14.2. The capital budgeting process for this new example is the same as the process shown in Exhibit 14.2 except that the total subsidiary funds to be remitted (row 16) are first segmented into hedged cash flows (row 16a) and unhedged cash flows (row 16b) before conversion into U.S. dollar cash flows for the U.S. parent. The unhedged cash flows of the subsidiary (row 16b) are estimated as the difference between the total funds to be remitted (row 16) and the hedged cash flows of the subsidiary (row 16a).

The hedged U.S. dollar cash flows received by the parent (row 19a) are estimated as the hedged cash flows of the subsidiary (row 16a) multiplied by the forward rate of the Singapore dollar (row 18a). The unhedged U.S. dollar cash flows (row 19b) are estimated as the unhedged cash flows of the subsidiary (row 16b) and the salvage value (row 17) multiplied by the expected future spot rate of the Singapore dollar (row 18b). The relatively large unhedged cash flows in year 4 shown in row 19b are due to the salvage value, which would not be hedged. The total U.S. dollar cash flows to the parent (row 19c) are the sum of the hedged U.S. dollar cash flows (row 19a) and unhedged U.S. dollar cash flows (row 19b). The present value of the proposed project in this new example is lower than it was for the original example in Exhibit 14.2 because the partial hedging strategy in this new example would cause some Singapore dollars to be converted into U.S. dollars at the forward rate, which is less than the expected future spot rate that was used in the original example. ●

Exhibit 14.5 Analysis When a Portion of the Expected Cash Flows Are Hedged: Spartan, Inc.

			YEAR 1	YEAR 2	YEAR 3	YEAR 4
16.	Total S$ cash flows remitted after withholding taxes		S$5,400,000	S$5,400,000	S$5,400,000	S$9,400,000
16a.	Hedged S$ cash flows remitted after withholding taxes		S$4,000,000	S$4,000,000	S$4,000,000	S$4,000,000
16b.	Unhedged S$ cash flows = (16) − (16a)		S$1,400,000	S$1,400,000	S$1,40,000	S$13,400,000
17.	Salvage value					S$12,000,000
18a.	Forward rate of S$		$.48	$.48	$.48	$.48
18b.	Expected future spot rate of S$		$.50	$.50	$.50	$.50
19a.	Hedged cash flows to parent = (16a) × (18a)		$1,920,000	$1,920,000	$1,920,000	$1,920,000
19b.	Unhedged cash flows to parent = (16b) × (18b)		$700,000	$700,000	$700,000	$6,700,000
19c.	Total cash flows to parent = (19a) + (19b)		$2,620,000	$2,620,000	$2,620,000	$8,620,000
20.	PV of parent cash flows (based on 15% discount rate)		$2,278,261	$1,981,096	$1,722,692	$4,928,513
21.	Initial investment by parent	$10,000,000				
22.	Cumulative NPV		−$7,721,739	−$5,740,643	−$4,017,951	$910,562

In this example scenario, the payment for salvage value was not hedged. If Spartan knew with certainty when it was going to divest its subsidiary, it might seriously consider hedging at least a portion of the expected proceeds from the sale of the subsidiary.

The discount rate was not changed in this new example. However, it is possible that Spartan might apply a slightly lower discount rate in this example than in the original example because a portion of the project's future cash flows would be hedged. If so, then the net present value of the project in this example could be higher than it was in the original example.

The hedging assumptions used for this example are intended to illustrate how the capital budgeting analysis can be revised when an MNC plans to partially hedge future remitted earnings that are generated by an international project. However, these assumptions will not be used in any other examples in this chapter. Instead, the original example will be used and adapted to illustrate how to account for other factors in multinational capital budgeting.

14-4b Inflation

Capital budgeting analysis implicitly considers inflation because the variable cost per unit and product prices generally have been rising over time. In some countries, yearly inflation can be volatile and thus can strongly influence a project's net cash flows. In countries where the inflation rate is both high and volatile, it will be virtually impossible for a subsidiary to accurately forecast inflation. Inaccurate inflation forecasts can lead to inaccurate net cash flow forecasts.

Although fluctuations in inflation should affect both costs and revenues in the same direction, the magnitude of their changes may be very different. This is especially true when the project involves importing partially manufactured components and selling the finished product locally. The local economy's inflation will most likely have a stronger effect on revenues than on costs in such cases.

The effects of inflation and exchange rate fluctuations may be partially offsetting from the parent's viewpoint. The exchange rates of highly inflated countries tend to weaken over time. Thus, even if subsidiary earnings are inflated, they will be deflated when converted into the parent's home currency should the subsidiary's currency weaken because of its high inflation, as suggested by purchasing power parity (see Chapter 8). However, MNCs cannot count on exchange rate effects perfectly offsetting inflation effects in a host country. Therefore, MNCs should attempt to explicitly account for any effects on inflation by using proper estimates of future costs and prices charged as well as future exchange rates.

14-4c Financing Arrangement

Many foreign projects are partially financed by foreign subsidiaries. To illustrate how this foreign financing can influence a project's feasibility, consider the following revisions to the original example of Spartan, Inc.

Subsidiary Financing Assume that the subsidiary borrows S$10 million to purchase the offices that are leased in the initial example. Assume that the subsidiary will make interest payments on this loan (of S$1 million) annually and will pay the principal (S$10 million) at the end of year 4, when the project is terminated. Since the Singapore government permits a maximum of S$2 million per year in depreciation for this project, the subsidiary's depreciation rate will remain unchanged. Assume the offices are expected to be sold for S$10 million after taxes at the end of year 4.

Domestic capital budgeting problems would not include debt payments in the measurement of cash flows because all financing costs are captured by the discount rate. However, it is important to account for debt payments in multinational capital budgeting in order to accurately estimate the amount of cash flows that are ultimately remitted to the parent and converted into the parent's home currency. When a subsidiary uses a portion of its funds to pay interest expenses on its debt, the amount of funds to be converted into the parent currency would be overstated if the payment of foreign interest expenses is not explicitly considered. Given the revised assumptions in this new example, the following revisions must be made to the capital budgeting analysis.

1. Since the subsidiary is borrowing funds to purchase the offices, the lease payments of S$1 million per year will not be necessary. However, the subsidiary will pay interest of S$1 million per year as a result of the loan. Thus, the annual cash outflows for the subsidiary are still the same.
2. The subsidiary must pay the S$10 million in loan principal at the end of four years. However, since the subsidiary expects to receive S$10 million (in four years) from the sale of the offices that it purchases with the funds provided by the loan, it can use the proceeds of the sale to pay the loan principal.

Since the subsidiary has already taken the maximum depreciation expense allowed by the Singapore government before the offices were considered, it cannot increase its annual depreciation expenses. In this example, the cash flows ultimately received by the parent when the subsidiary obtains financing to purchase offices are similar to the cash flows determined in the original example (when the offices are to be leased). Therefore, the NPV under the condition of subsidiary financing is the same as the NPV in the original example. If the numbers were not offsetting, then the capital budgeting analysis would be repeated to determine whether the NPV from the parent's perspective is higher than in the original example.

Parent Financing Consider one more alternative arrangement in which, instead of the subsidiary leasing the offices or purchasing them with borrowed funds, the parent uses its own funds to purchase the offices. Thus, its initial investment is $15 million, which consists of the original $10 million investment as explained before plus an additional $5 million needed to obtain an extra S$10 million to purchase the offices. This example illustrates how the capital budgeting analysis changes when the parent takes a bigger stake in the investment. If the parent rather than the subsidiary purchases the offices, then the following revisions must be made to the capital budgeting analysis.

1. The subsidiary will not have any loan payments (since it will not need to borrow funds) because the parent will purchase the offices. Since the offices are to be purchased, there will be no lease payments, either.
2. The parent's initial investment is $15 million instead of $10 million.
3. The salvage value to be received by the parent is S$22 million instead of S$12 million because the offices are assumed to be sold for S$10 million after taxes at the end of year 4. The S$10 million to be received from selling the offices can be added to the S$12 million to be received from selling the rest of the subsidiary.

Exhibit 14.6 Analysis with an Alternative Financing Arrangement: Spartan, Inc.

		YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
1.	Demand		60,000	60,000	100,000	100,000
2.	Price per unit		S$350	S$350	S$360	S$360
3.	Total revenue = (1) × (2)		S$21,000,000	S$21,000,000	S$36,000,000	S$36,000,000
4.	Variable cost per unit		S$200	S$200	S$250	S$260
5.	Total variable cost = (1) × (4)		S$12,000,000	S$12,000,000	S$25,000,000	S$26,000,000
6.	Annual lease expense		[S$0]	[S$0]	[S$0]	[S$0]
7.	Other fixed annual expenses		S$1,000,000	S$1,000,000	S$1,000,000	S$1,000,000
8.	Noncash expense (depreciation)		S$2,000,000	S$2,000,000	S$2,000,000	S$2,000,000
9.	Total expenses = (5) + (6) + (7) + (8)		S$15,000,000	S$15,000,000	S$28,000,000	S$29,000,000
10.	Before-tax earnings of subsidiary = (3) − (9)		S$6,000,000	S$6,000,000	S$8,000,000	S$9,000,000
11.	Host government tax (20%)		S$1,200,000	S$1,200,000	S$1,600,000	S$1,800,000
12.	After-tax earnings of subsidiary		S$4,800,000	S$4,800,000	S$6,400,000	S$7,200,000
13.	Net cash flow to subsidiary = (12) + (8)		S$6,800,000	S$6,800,000	S$8,400,000	S$9,200,000
14.	S$ remitted by subsidiary (100% of S$)		S$6,800,000	S$6,800,000	S$8,400,000	S$9,200,000
15.	Withholding tax on remitted funds (10%)		S$680,000	S$680,000	S$840,000	S$920,000
16.	S$ remitted after withholding taxes		S$6,120,000	S$6,120,000	S$7,560,000	S$8,280,000
17.	Salvage value					[S$22,000,000]
18.	Exchange rate of S$		$.50	$.50	$.50	$.50
19.	Cash flows to parent		$3,060,000	$3,060,000	$3,780,000	$15,140,000
20.	PV of parent cash flows (15% discount rate)		$2,660,870	$2,313,800	$2,485,411	$8,656,344
21.	Initial investment by parent	[$15,000,000]				
22.	Cumulative NPV		−$12,339,130	−$10,025,330	−$7,539,919	$1,116,425

The capital budgeting analysis for Spartan, Inc., under this revised financing strategy in which the parent finances the entire $15 million investment is shown in Exhibit 14.6. This analysis uses our original exchange rate projections of $.50 per Singapore dollar for each period. The numbers that are directly affected by the revised financing arrangement are bracketed. Other numbers are also affected indirectly as a result. For example, the subsidiary's after-tax earnings increase as a result of avoiding interest or lease payments on its offices. The NPV of the project under this alternative financing arrangement is positive but less than in the original arrangement. Given the lower NPV, this arrangement is not as feasible as the arrangement in which the subsidiary either leases the offices or purchases them with borrowed funds.

Comparison of Parent and Subsidiary Financing One reason that the subsidiary financing is more feasible than complete parent financing is that the financing rate on the loan is lower than the parent's required rate of return on funds provided to the subsidiary. If local loans had a relatively high interest rate, however, then the use of local financing would likely not be as attractive.

In general, this revised example shows that the increased investment by the parent increases its exchange rate exposure for the following reasons. First, since the parent provides the entire investment, no foreign financing is required. Consequently, the subsidiary makes no interest payments and therefore remits larger cash flows to the parent. Second, the salvage value to be remitted to the parent is larger. Given the larger payments to the parent, the cash flows ultimately received by the parent are more susceptible to exchange rate movements.

The parent's exposure is not as large when the subsidiary purchases the offices because the subsidiary incurs some of the financing expenses. The subsidiary financing essentially shifts some of the expenses to the same currency that the subsidiary will receive as revenue, thereby reducing the amount of funds that will ultimately be converted into U.S. dollars for the parent.

Financing with Other Subsidiaries' Retained Earnings Some foreign projects are completely financed with retained earnings of existing foreign subsidiaries. These projects are difficult to assess from the parent's perspective because their direct effects are normally felt by the subsidiaries. One approach is to view a subsidiary's investment in a project as an opportunity cost, since the funds could be remitted to the parent rather than invested in the foreign project. Thus, the initial outlay from the parent's perspective is the amount of funds it would have received from the subsidiary if the funds had been remitted rather than invested in this project. The cash flows from the parent's perspective reflect those cash flows ultimately received by the parent as a result of the foreign project.

Even if the project generates earnings for the subsidiary that are reinvested by the subsidiary, the key cash flows from the parent's perspective are those that it ultimately receives from the project. In this way, any international factors that will affect the cash flows (such as withholding taxes and exchange rate movements) are incorporated into the capital budgeting process.

14-4d Blocked Funds

In some cases, the host country may block funds that the subsidiary attempts to send to the parent. Some countries require that earnings generated by the subsidiary be reinvested locally for at least three years before they can be remitted. Such restrictions can affect the accept/reject decision on a project.

EXAMPLE

Reconsider the example of Spartan, Inc., but now assume that all funds are blocked until the subsidiary is sold. Thus, the subsidiary must reinvest those funds until that time. Blocked funds penalize a project if the return on the reinvested funds is less than the required rate of return on the project.

Suppose the subsidiary uses the funds to purchase marketable securities that are expected to yield 5 percent annually after taxes. A reevaluation of Spartan's cash flows (from Exhibit 14.2) to incorporate the blocked-funds restriction is shown in Exhibit 14.7. The withholding tax is not applied until the funds are remitted to the parent, which is in year 4. The original exchange rate projections are used here. All parent cash flows depend on the exchange rate four years from now. The NPV of the project with blocked funds is still positive, but it is substantially less than the NPV in the original example.

If the foreign subsidiary has a loan outstanding, then it may be able to better utilize the blocked funds by repaying the local loan. For example, the S$6 million at the end of year 1 could be used to reduce the outstanding loan balance instead of being invested in marketable securities, assuming that the lending bank allows early repayment. ●

There may be other situations that deserve to be considered in multinational capital budgeting, such as political conditions in the host country and restrictions that may be imposed by a country's host government. These country risk characteristics are discussed in more detail in Chapter 16.

14-4e Uncertain Salvage Value

The salvage value of an MNC's project typically has a significant impact on the project's NPV. When the salvage value is uncertain, the MNC may incorporate various possible outcomes for the salvage value and reestimate the NPV based on each possible outcome. It may even estimate the break-even salvage value (also called break-even terminal

Exhibit 14.7 Capital Budgeting with Blocked Funds: Spartan, Inc.

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
S$ to be remitted by subsidiary		S$6,000,000	S$6,000,000	S$7,600,000	S$8,400,000
					S$7,980,000
S$ accumulated by reinvesting funds to be remitted					S$6,615,000
					S$6,945,750
					S$29,940,750
Withholding tax (10%)					S$2,994,075
S$ remitted after withholding tax					S$26,946,675
Salvage value					S$12,000,000
Exchange rate					$.50
Cash flows to parent					$19,473,338
PV of parent cash flows (15% discount rate)					$11,133,944
Initial investment by parent	$10,000,000				
Cumulative NPV		−$10,000,000	−$10,000,000	−$10,000,000	$1,133,944

value), which is the salvage value necessary to achieve a zero NPV for the project. If the actual salvage value is expected to equal or exceed the break-even salvage value, then the project is feasible. The break-even salvage value, SV_n, can be determined by setting NPV equal to 0 and then rearranging the capital budgeting equation:

$$NPV = -IO + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} + \frac{SV_n}{(1+k)^n}$$

$$0 = -IO + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} + \frac{SV_n}{(1+k)^n}$$

$$IO - \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} = \frac{SV_n}{(1+k)^n}$$

$$\left[IO - \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t}\right](1+k)^n = SV_n$$

EXAMPLE

Reconsider the Spartan, Inc., example and assume that Spartan is not guaranteed a price for the project. The break-even salvage value for the project can be determined by (1) estimating the present value of future cash flows (excluding the salvage value), (2) subtracting the discounted cash flows from the initial outlay, and (3) multiplying the difference by $(1 + k)n$. Using the original cash flow information from Exhibit 14.2, the present value of cash flows can be determined as follows:

$$\text{PV of parent cash flows} = \frac{\$2,700,000}{(1.15)^1} + \frac{\$2,700,000}{(1.15)^2} + \frac{\$3,420,000}{(1.15)^3} + \frac{\$3,780,000}{(1.15)^4}$$
$$= \$2,347,826 + \$2,041,588 + \$2,248,706 + \$2,161,227$$
$$= \$8,799,347$$

Given the present value of cash flows and the estimated initial outlay, the break-even salvage value is calculated as

$$SV_n = \left[IO - \Sigma \frac{CF_t}{(1+k)^t}\right](1+k)^n$$
$$= (\$10{,}000{,}000 - \$8{,}799{,}347)(1.15)^4$$
$$= \$2{,}099{,}950$$

Given the original information in Exhibit 14.2, Spartan, Inc., will accept the project only if the salvage value is estimated to be at least $2,099,950 (assuming that the project's required rate of return is 15 percent). ●

14-4f Impact of Project on Prevailing Cash Flows

Thus far, in our example, we have assumed that the new project has no impact on Spartan's prevailing cash flows. In reality, however, there may often be an impact.

EXAMPLE

Reconsider the Spartan, Inc., example, assuming this time that (1) Spartan currently exports tennis rackets from its U.S. plant to Singapore; (2) Spartan, Inc., still considers establishing a subsidiary in Singapore because it expects production costs to be lower in Singapore than in the United States; and (3) without a subsidiary, Spartan's export business to Singapore is expected to generate net cash flows of $1 million over the next four years. With a subsidiary, these cash flows would be forgone. The effects of these assumptions are shown in Exhibit 14.8. The previously estimated cash flows to the parent from the subsidiary (drawn from Exhibit 14.2) are restated in Exhibit 14.8. These estimates do not account for forgone cash flows because the possible export business was not considered. If the export business is established, however, the forgone cash flows attributable to this business must be considered (as shown in Exhibit 14.8). The adjusted cash flows to the parent account for the project's impact on prevailing cash flows.

The present value of adjusted cash flows and cumulative NPV are also shown in Exhibit 14.8. The project's NPV is now negative as a result of the adverse effect on prevailing cash flows. Thus, the project will not be feasible if the exporting business is eliminated. ●

Some foreign projects may have a favorable impact on prevailing cash flows. For example, if a manufacturer of computer components establishes a foreign subsidiary to manufacture computers, the subsidiary might order the components from the parent. In this case, the sales volume of the parent would increase.

14-4g Host Government Incentives

Foreign projects proposed by MNCs may have a favorable impact on economic conditions in the host country and are therefore encouraged by the host government. Any incentives offered by the host government must be incorporated into the capital budgeting analysis.

Exhibit 14.8 Capital Budgeting When Prevailing Cash Flows Are Affected: Spartan, Inc.

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Cash flows to parent, ignoring impact on prevailing cash flows		$2,700,000	$2,700,000	$3,420,000	$9,780,000
Impact of project on prevailing cash flows		−$1,000,000	−$1,000,000	−$1,000,000	−$1,000,000
Cash flows to parent, incorporating impact on prevailing cash flows		$1,700,000	$1,700,000	$2,420,000	$8,780,000
PV of cash flows to parent (15% discount rate)		$1,478,261	$1,285,444	$1,591,189	$5,019,994
Initial investment	$10,000,000				
Cumulative NPV		−$8,521,739	−$7,236,295	−$5,645,106	−$625,112

For example, a low-rate host government loan or a reduced tax rate offered to the subsidiary will enhance periodic cash flows. If the government subsidizes the initial establishment of the subsidiary, the MNC's initial investment will be reduced.

14-4h Real Options

A real option is an option on specified real assets such as machinery or a facility. Some capital budgeting projects contain real options in that they may allow opportunities to obtain or eliminate real assets. Since these opportunities can generate cash flows, they can enhance the value of a project.

EXAMPLE

Reconsider the Spartan example and assume that the government in Singapore promised that, if Spartan established the subsidiary to produce tennis rackets in Singapore, then the company would be allowed to purchase some government buildings in the future at a discounted price. This offer does not directly affect the cash flows of the project that is presently being assessed, but it reflects an implicit call option that Spartan could exercise in the future. In some cases, real options can be so valuable that MNCs consider accepting a project that they would have rejected without the real option. ●

The value of a real option within a project is primarily influenced by two factors: (1) the probability that the real option will be exercised; and (2) the NPV that would result from exercising the real option. In the example just considered, Spartan's real option is influenced by (1) the probability that Spartan will capitalize on the opportunity to purchase government buildings at a discount and (2) the NPV that would be generated from this opportunity.

14-5 Adjusting Project Assessment for Risk

If an MNC is unsure of the estimated cash flows of a proposed project, then it needs to incorporate an adjustment for this risk. Three methods are commonly used to adjust the evaluation for risk:

- risk-adjusted discount rate,
- sensitivity analysis, and
- simulation

Each method will be described in a separate section.

14-5a Risk-Adjusted Discount Rate

The greater the uncertainty about a project's forecasted cash flows, the larger should be the discount rate applied to cash flows (other things being equal). The application of a risk-adjusted discount rate is easy, but is criticized for being somewhat arbitrary. Some managers might use a higher discount rate than other managers for a particular project with a given level of expected cash flows, which means that the project might be feasible when assessed by some managers but rejected when assessed by other managers.

In addition, an equal adjustment to the discount rate over all periods does not reflect differences in uncertainty from one period to another. If the projected cash flows among periods have different degrees of uncertainty, the risk adjustment of the cash flows should vary also. Consider a country where the political situation is slowly destabilizing. The probability of blocked funds, expropriation, and other adverse events is increasing over time. Thus, cash flows sent to the parent are less certain in the distant future than they are in the near future. A different discount rate should therefore be applied to each

period in accordance with its corresponding risk. Even so, the adjustment will be subjective and may not accurately reflect the actual risk.

Despite its subjectivity, the risk-adjusted discount rate is a commonly used method—perhaps because of the ease with which it can be arbitrarily adjusted. In addition, there is no alternative technique that will perfectly adjust for risk, although in certain cases some others (discussed next) may better reflect a project's risk.

14-5b Sensitivity Analysis

Once the MNC has estimated the NPV of a proposed project, it may want to consider alternative estimates for its input variables.

EXAMPLE

Recall that the demand for the Spartan subsidiary's tennis rackets was originally estimated to be 60,000 in the first two years and 100,000 in the next two years. If demand turns out to be 60,000 in all four years, how will the NPV results change? Alternatively, what if demand is 100,000 in all four years? The use of such *what-if* scenarios is referred to as sensitivity analysis. The objective is to determine how sensitive the NPV is to alternative values of the input variables. The estimates of any input variables can be revised to create new estimates for NPV. If the NPV is consistently positive during these revisions, then the MNC should feel more comfortable about the project; if it is negative in many cases, the accept/reject decision for the project becomes more difficult. ●

The two exchange rate scenarios developed earlier represent a form of sensitivity analysis. Sensitivity analysis can be more useful than simple point estimates because it reassesses the project based on various circumstances that may occur. Computer software packages are available to perform sensitivity analysis.

14-5c Simulation

Simulation can be used for a variety of tasks, including the generation of a probability distribution for NPV based on a range of possible values for one or more input variables. Simulation is typically performed with the aid of a computer package.

EXAMPLE

Reconsider Spartan, Inc., and assume that it expects the exchange rate to depreciate by 3 to 7 percent per year (with an equal probability of all values in this range occurring). Unlike a single point estimate, simulation can consider the range of possibilities for the Singapore dollar's exchange rate at the end of each year. It considers all point estimates for the other variables and randomly picks one of the possible values of the Singapore dollar's depreciation level for each of the four years. Based on this random selection process, the NPV is determined.

The procedure just described constitutes one iteration. Then the process is repeated: the Singapore dollar's depreciation for each year is again randomly selected (within the range of possibilities assumed earlier) and the NPV of the project is computed. The simulation program may be run for, say, 100 iterations. This means that 100 different possible scenarios are created for the possible exchange rates of the Singapore dollar during the four-year project period. Each iteration reflects a different scenario. The NPV of the project based on each scenario is then computed. In this way, simulation generates a distribution of NPVs for the project. The major advantage of simulation is that the MNC can examine a range of possible NPVs that might occur. From this information, it can determine the probability that the NPV will be positive (or greater than a particular level). The greater the uncertainty of the exchange rate, the greater will be the uncertainty of the NPV. The risk of a project will be greater if it involves transactions in more volatile currencies, other things being equal. ●

In reality, many or all of the input variables necessary for multinational capital budgeting may be uncertain in the future. Probability distributions can be developed for all variables with uncertain future values. The final result is a distribution of possible NPVs that might occur for the project. The simulation technique does not put all of its emphasis on any one NPV forecast but instead provides a distribution of the possible outcomes that may occur.

The project's cost of capital can be used as a discount rate when simulation is performed. The probability that the project will be successful can be estimated by measuring the area within the probability distribution for which NPV > 0. This area represents the probability that the present value of future cash flows will exceed the initial outlay. An MNC can also use the probability distribution to estimate the probability that the project will backfire by measuring the area for which NPV < 0.

Simulation is difficult to perform manually because of the iterations necessary to develop a distribution of NPVs. Computer programs can run 100 iterations and generate results within a matter of seconds. The user of a simulation program must provide the probability distributions for the input variables that will affect the project's NPV. As with any model, the accuracy of results generated by simulation will depend on the accuracy of the input.

Summary

- Capital budgeting may generate different results and a different conclusion depending on whether it is conducted from the perspective of an MNC's subsidiary or from the perspective of the MNC's parent. When a parent is deciding whether to implement an international project, it should determine whether the project is feasible from its own perspective.
- Multinational capital budgeting requires any input that will help estimate the initial outlay, periodic cash flows, salvage value, and required rate of return on the project. Once these factors are estimated, the international project's net present value can be estimated, just as if it were a domestic project. However, it is normally more difficult to estimate these factors for an international project. Exchange rates create an additional source of uncertainty because they affect the cash flows ultimately received by the parent as a result of the project. Other international conditions that can influence the cash flows ultimately received by the parent include the financing arrangement (parent versus subsidiary financing of the project), blocked funds by the host government, and host government incentives.
- The risk of international projects can be accounted for by adjusting the discount rate used to estimate the project's net present value. However, the adjustment to the discount rate is subjective. An alternative method is to estimate the net present value based on various possible scenarios for exchange rates or any other uncertain factors. This method is facilitated by the use of sensitivity analysis or simulation.

Point Counter-Point

Should MNCs Use Forward Rates to Estimate Dollar Cash Flows of Foreign Projects?

Point Yes. An MNC's parent should use the forward rate for each year in which it will receive net cash flows in a foreign currency. The forward rate is market determined and serves as a useful forecast for future years.

Counter-Point No. An MNC should use its own forecasts for each year in which it will receive net cash flows in a foreign currency. If the forward rates for future time periods are higher than the MNC's expected spot rates, the MNC may accept a project that it should not accept.

Who Is Correct? Use the Internet to learn more about this issue. Which argument do you support? Offer your own opinion on this issue.

SELF-TEST

Answers are provided in Appendix A at the back of the text.

1. Two managers of Marshall, Inc., assessed a proposed project in Jamaica. Each manager used exactly the same estimates of the earnings to be generated by the project, as these estimates were provided by other employees. The managers agree on the proportion of funds to be remitted each year, the life of the project, and the discount rate to be applied. Both managers also assessed the project from the U.S. parent's perspective. Nevertheless, one manager determined that this project had a large net present value, while the other manager determined that the project had a negative net present value. Explain the possible reasons for such a difference.
2. Pinpoint the parts of a multinational capital budgeting analysis for a proposed sales distribution center in Ireland that are sensitive when the forecast of a stable economy in Ireland is revised to predict a recession.
3. New Orleans Exporting Co. produces small computer components, which are then sold to Mexico. It plans to expand by establishing a plant in Mexico that will produce the components and sell them locally. This plant will reduce the amount of goods that are transported from New Orleans. The firm has determined that the cash flows to be earned in Mexico would yield a positive net present value after accounting for tax and exchange rate effects, converting cash flows to dollars, and discounting them at the proper discount rate. What other major factor must be considered to estimate the project's NPV?
4. Explain how the present value of the salvage value of an Indonesian subsidiary will be affected (from the U.S. parent's perspective) by (a) an increase in the risk of the foreign subsidiary and (b) an expectation that Indonesia's currency (rupiah) will depreciate against the dollar over time.
5. Wilmette Co. and Niles Co. (both from the United States) are assessing the acquisition of the same firm in Thailand and have obtained the future cash flow estimates (in Thailand's currency, baht) from the firm. Wilmette would use its retained earnings from U.S. operations to acquire the subsidiary. Niles Co. would finance the acquisition mostly with a term loan (in baht) from Thai banks. Neither firm has any other business in Thailand. Which firm's dollar cash flows would be affected more by future changes in the value of the baht (assuming that the Thai firm is acquired)?
6. Review the capital budgeting example of Spartan, Inc., discussed in this chapter. Identify the specific variables assessed in the process of estimating a foreign project's net present value (from a U.S. perspective) that would cause the most uncertainty about the NPV.

QUESTIONS AND APPLICATIONS

1. **MNC Parent's Perspective** Why should capital budgeting for subsidiary projects be assessed from the parent's perspective? What additional factors that normally are not relevant for a purely domestic project deserve consideration in multinational capital budgeting?
2. **Accounting for Risk** What is the limitation of using point estimates of exchange rates in the capital budgeting analysis?

   List the various techniques for adjusting risk in multinational capital budgeting. Describe any advantages or disadvantages of each technique.

   Explain how simulation can be used in multinational capital budgeting. What can it do that other risk adjustment techniques cannot?
3. **Uncertainty of Cash Flows** Using the capital budgeting framework discussed in this chapter, explain the sources of uncertainty surrounding a proposed project in Hungary by a U.S. firm. In what ways is the estimated net present value of this project more uncertain than that of a similar project in a more developed European country?
4. **Accounting for Risk** Your employees have estimated the net present value of Project X to be $1.2 million. Their report says that they have not accounted for risk but that, with such a large NPV, the project should be accepted since even a risk-adjusted NPV would likely be positive. You have the final decision as to whether to accept or reject the project. What is your decision?
5. **Impact of Exchange Rates on NPV**

   a. Describe in general terms how future appreciation of the euro will likely affect the value (from the parent's perspective) of a project established in Germany today by a U.S.-based MNC. Will the sensitivity of the project value be affected by the percentage of earnings remitted to the parent each year?

   b. Repeat this question, but assume the future depreciation of the euro.
6. **Impact of Financing on NPV** Explain how the financing decision can influence the sensitivity of the net present value to exchange rate forecasts.
7. **Change in Required Return on Projects** Woodsen, Inc., of Pittsburgh, Pennsylvania, considered the development of a large subsidiary in Greece. In response to a crisis in Greece, its expected cash flows and earnings from this acquisition were reduced only slightly. Yet, the firm decided to retract its offer because of an increase in its required rate of return on the project, which caused the NPV to be negative. Explain why the required rate of return on its project may have increased.
8. **Assessing a Foreign Project** Huskie Industries, a U.S.-based MNC, considers purchasing a small manufacturing company in France that sells products only within France. Huskie has no other existing business in France and no cash flows in euros. Would the proposed acquisition likely be more feasible if the euro is expected to appreciate or depreciate over the long run? Explain.
9. **Relevant Cash Flows in Disney's French Theme Park** When Walt Disney World considered establishing a theme park in France, were the forecasted revenues and costs associated with the French park sufficient to assess the feasibility of this project? Were there any other "relevant cash flows" that deserved to be considered?
10. **Capital Budgeting Logic** Athens, Inc., established a subsidiary in the United Kingdom that was independent of its operations in the United States. The subsidiary's performance was well above what was expected. Consequently, when a British firm approached Athens about the possibility of acquiring the subsidiary, Athens' chief financial officer replied that the subsidiary was performing so well that it was not for sale. Comment on this strategy.
11. **Capital Budgeting Logic** Lehigh Co. established a subsidiary in Switzerland that was performing below the cash flow projections developed before the subsidiary was established. Lehigh anticipated that future cash flows would also be lower than the original cash flow projections. Consequently, Lehigh decided to inform several potential acquiring firms of its plan to sell the subsidiary. Lehigh then received a few bids. Even the highest bid was very low, but Lehigh accepted the offer. It justified its decision by stating that any existing project whose cash flows are not sufficient to recover the initial investment should be divested. Comment on this statement.
12. **Impact of Reinvested Foreign Earnings on NPV** Flagstaff Corp. is a U.S.-based firm with a subsidiary in Mexico. It plans to reinvest its earnings in Mexican government securities for the next 10 years, since the interest rate earned on these securities is so high. Then, after 10 years, it will remit all accumulated earnings to the United States. What is a drawback of using this approach? (Assume the securities have no default or interest rate risk.)
13. **Capital Budgeting Example** Brower, Inc., just constructed a manufacturing plant in Ghana. The construction cost 9 billion Ghanaian cedi. Brower intends to leave the plant open for 3 years. During the 3 years of operation, cedi cash flows are expected to be 3 billion cedi, 3 billion cedi, and 2 billion cedi, respectively. Operating cash flows will begin 1 year from today and are remitted back to the parent at the end of each year. At the end of the third year, Brower expects to sell the plant for 5 billion cedi. Brower has a required rate of return of 17 percent. It currently takes 8,700 cedi to buy 1 U.S. dollar, and the cedi is expected to depreciate by 5 percent per year.

    a. Determine the NPV for this project. Should Brower build the plant?

    b. How would your answer change if the value of the cedi was expected to remain unchanged from its current value of 8,700 cedi per U.S. dollar over the course of the 3 years? Should Brower construct the plant then?
14. **Impact of Financing on NPV** Ventura Corp., a U.S.-based MNC, plans to establish a subsidiary in Japan. It is confident that the Japanese yen will appreciate against the dollar over time. The subsidiary will retain only enough revenue to cover expenses and will remit the rest to the parent each year. Will Ventura benefit more from exchange rate effects if its parent provides equity financing for the subsidiary or if the subsidiary is financed by local banks in Japan? Explain.
15. **Accounting for Changes in Risk** Santa Monica Co., a U.S.-based MNC, was considering establishing a consumer products division in Germany, which would be financed by German banks. Santa Monica completed its capital budgeting analysis in August. Then, in November, the government leadership stabilized and political conditions improved in Germany. In response,

Santa Monica increased its expected cash flows by 20 percent but did not adjust the discount rate applied to the project. Should the discount rate be affected by the change in political conditions?

16. Estimating the NPV Assume that a less developed country called LDC encourages direct foreign investment (DFI) in order to reduce its unemployment rate, currently at 15 percent. Also assume that several MNCs are likely to consider DFI in this country. The inflation rate in recent years has averaged 4 percent. The hourly wage in LDC for manufacturing work is the equivalent of about $5 per hour. When Piedmont Co. develops cash flow forecasts to perform a capital budgeting analysis for a project in LDC, it assumes a wage rate of $5 in Year 1 and applies a 4 percent increase for each of the next 10 years. The components produced are to be exported to Piedmont's headquarters in the United States, where they will be used in the production of computers. Do you think Piedmont will overestimate or underestimate the net present value of this project? Why? (Assume that LDC's currency is tied to the dollar and will remain that way.)

17. PepsiCo's Project in Brazil PepsiCo recently decided to invest more than $300 million for expansion in Brazil. Brazil offers considerable potential because it has 150 million people and their demand for soft drinks is increasing. However, the soft drink consumption is still only about one-fifth of the soft drink consumption in the United States. PepsiCo's initial outlay was used to purchase three production plants and a distribution network of almost 1,000 trucks to distribute its products to retail stores in Brazil. The expansion in Brazil was expected to make PepsiCo's products more accessible to Brazilian consumers.

a. Given that PepsiCo's investment in Brazil was entirely in dollars, describe its exposure to exchange rate risk resulting from the project. Explain how the size of the parent's initial investment and the exchange rate risk would have been affected if PepsiCo had financed much of the investment with loans from banks in Brazil.

b. Describe the factors that PepsiCo likely considered when estimating the future cash flows of the project in Brazil.

c. What factors did PepsiCo likely consider in deriving its required rate of return on the project in Brazil?

d. Describe the uncertainty that surrounds the estimate of future cash flows from the perspective of the U.S. parent.

e. PepsiCo's parent was responsible for assessing the expansion in Brazil. Yet, PepsiCo already had some existing operations in Brazil. When capital budgeting analysis was used to determine the feasibility of this project, should the project have been assessed from a Brazilian perspective or a U.S. perspective? Explain.

18. Impact of Asian Crisis Assume that Fordham Co. was evaluating a project in Thailand (to be financed with U.S. dollars). All cash flows generated from the project were to be reinvested in Thailand for several years. Explain how the Asian crisis would have affected the expected cash flows of this project and the required rate of return on this project. If the cash flows were to be remitted to the U.S. parent, explain how the Asian crisis would have affected the expected cash flows of this project.

19. Tax Effects on NPV When considering the implementation of a project in one of various possible countries, what types of tax characteristics should be assessed among the countries? (See the chapter appendix.)

20. Capital Budgeting Analysis A project in South Korea requires an initial investment of 2 billion South Korean won. The project is expected to generate net cash flows to the subsidiary of 3 billion and 4 billion won in the 2 years of operation, respectively. The project has no salvage value. The current value of the won is 1,100 won per U.S. dollar, and the value of the won is expected to remain constant over the next 2 years.

a. What is the NPV of this project if the required rate of return is 13 percent?

b. Repeat the question, except assume that the value of the won is expected to be 1,200 won per U.S. dollar after 2 years. Further assume that the funds are blocked and that the parent company will only be able to remit them back to the United States in 2 years. How does this affect the NPV of the project?

21. Accounting for Exchange Rate Risk Carson Co. is considering a 10-year project in Hong Kong, where the Hong Kong dollar is tied to the U.S. dollar. Carson Co. uses sensitivity analysis that allows for alternative exchange rate scenarios. Why would Carson use this approach rather than using the pegged exchange rate as its exchange rate forecast in every year?

22. Decisions Based on Capital Budgeting Marathon, Inc., considers a 1-year project with the Belgian government. Its euro revenue would be guaranteed. Its consultant states that the percentage change in the euro is represented by a normal distribution and that, based on a 95 percent confidence interval, the percentage change in the euro is expected to be between 0 and 6 percent. Marathon uses this information to create three scenarios: 0, 3, and 6 percent for the euro. It derives an estimated NPV based on each scenario and then determines the mean NPV. The NPV was positive for the 3 and 6 percent scenarios, but it was slightly negative for the 0 percent scenario. This led Marathon to reject the project. Its manager stated that it did not want to pursue a project that had a one-in-three chance of having a negative NPV. Do you agree with the manager's interpretation of the analysis? Explain.

23. Estimating Cash Flows of a Foreign Project Assume that Nike decides to build a shoe factory in Brazil; half the initial outlay will be funded by the parent's equity and half by borrowing funds in Brazil. Assume that Nike wants to assess the project from its own perspective to determine whether the project's future cash flows will provide a sufficient return to the parent to warrant the initial investment. Why will the estimated cash flows be different from the estimated cash flows of Nike's shoe factory in New Hampshire? Why will the initial outlay be different? Explain how Nike can conduct multinational capital budgeting in a manner that will achieve its objective.

Advanced Questions

24. Break-Even Salvage Value A project in Malaysia costs $4 million. Over the next 3 years, the project will generate total operating cash flows of $3.5 million, measured in today's dollars using a required rate of return of 14 percent. What is the break-even salvage value of this project?

25. Capital Budgeting Analysis Zistine Co. considers a 1-year project in New Zealand so that it can capitalize on its technology. It is risk averse but is attracted to the project because of a government guarantee. The project will generate a guaranteed NZ$8 million in revenue, paid by the New Zealand government at the end of the year. The payment by the New Zealand government is also guaranteed by a credible U.S. bank. The cash flows earned on the project will be converted to U.S. dollars and remitted to the parent in 1 year. The prevailing nominal 1-year interest rate in New Zealand is 5 percent, while the nominal 1-year interest rate in the United States is 9 percent. Zistine's chief executive officer believes that the movement in the New Zealand dollar is highly uncertain over the next year, but his best guess is that the change in its value will be in accordance with the international Fisher effect (IFE). He also believes that interest rate parity holds. He provides this information to three recent finance graduates that he just hired as managers and asks them for their input.

a. The first manager states that due to the parity conditions, the feasibility of the project will be the same whether the cash flows are hedged with a forward contract or are not hedged. Is this manager correct? Explain.

b. The second manager states that the project should not be hedged. Based on the interest rates, the IFE suggests that Zistine Co. will benefit from the future exchange rate movements, so the project will generate a higher NPV if Zistine does not hedge. Is this manager correct? Explain.

c. The third manager states that the project should be hedged because the forward rate contains a premium and, therefore, the forward rate will generate more U.S. dollar cash flows than the expected amount of dollar cash flows if the firm remains unhedged. Is this manager correct? Explain.

26. Accounting for Uncertain Cash Flows Blustream, Inc., considers a project in which it will sell the use of its technology to firms in Mexico. It already has received orders from Mexican firms that will generate 3 million Mexican pesos (MXP) in revenue at the end of the next year. However, it might also receive a contract to provide this technology to the Mexican government. In this case, it will generate a total of MXP5 million at the end of the next year. It will not know whether it will receive the government order until the end of the year.

Today's spot rate of the peso is $.14. The 1-year forward rate is $.12. Blustream expects that the spot rate of the peso will be $.13 1 year from now. The only initial outlay will be $300,000 to cover development expenses (regardless of whether the Mexican government purchases the technology). Blustream will pursue the project only if it can satisfy its required rate of return of 18 percent. Ignore possible tax effects. It decides to hedge the maximum amount of revenue that it will receive from the project.

a. Determine the NPV if Blustream receives the government contract.

b. If Blustream does not receive the contract, it will have hedged more than it needed to and will offset the excess forward sales by purchasing pesos in the spot market at the time the forward sale is executed.

etermine the NPV of the project assuming that ustream does not receive the government contract.

Now consider an alternative strategy in which Blu-eam only hedges the minimum peso revenue that it ll receive. In this case, any revenue due to the gov-nment contract would not be hedged. Determine the PV based on this alternative strategy and assume that ustream receives the government contract.

If Blustream uses the alternative strategy of only edging the minimum peso revenue that it will receive, etermine the NPV assuming that it does not receive he government contract.

If there is a 50 percent chance that Blustream will eceive the government contract, would you advise Blu-tream to hedge the maximum amount or the minimum mount of revenue that it may receive? Explain.

Blustream recognizes that it is exposed to exchange ate risk whether it hedges the minimum amount or he maximum amount of revenue it will receive. It considers a new strategy of hedging the minimum mount it will receive with a forward contract and edging the additional revenue it might receive with a ut option on Mexican pesos. The 1-year put option as an exercise price of $.125 and a premium of $.01. Determine the NPV if Blustream uses this strategy and receives the government contract. Also, determine the NPV if Blustream uses this strategy and does not receive the government contract. Given that there is a 50 percent probability that Blustream will receive the government contract, would you use this new strategy or the strategy that you selected in question (e)?

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

- The initial investment required is $50 million in New Zealand dollars (NZ$). Given the existing spot rate of $.50 per New Zealand dollar, the initial investment in U.S. dollars is $25 million. In addition to the NZ$50 million initial investment for plant and equipment, NZ$20 million is needed for working capital and will be borrowed by the subsidiary from a New Zealand bank. The New Zealand subsidiary will pay interest only on the loan each year, at an interest rate of 14 percent. The loan principal is to be paid in 10 years.
- The project will be terminated at the end of Year 3, when the subsidiary will be sold.
- The price, demand, and variable cost of the product in New Zealand are as follows:

YEAR	PRICE	DEMAND	VARIABLE COST
1	NZ$500	40,000 units	NZ$30
2	NZ$511	50,000 units	NZ$35
3	NZ$530	60,000 units	NZ$40

- The fixed costs, such as overhead expenses, are estimated to be NZ$6 million per year. The exchange rate of the New Zealand dollar is expected to be $.52 at the end of Year 1, $.54 at the end of Year 2, and $.56 at the end of Year 3.
- The New Zealand government will impose an income tax of 30 percent on income. In addition, it will impose a withholding tax of 10 percent on earnings remitted by the subsidiary. The U.S. government will allow a tax credit on the remitted earnings and will not impose any additional taxes.
- All cash flows received by the subsidiary are to be sent to the parent at the end of each year. The subsidiary will use its working capital to support ongoing operations.
- The plant and equipment are depreciated over 10 years using the straight-line depreciation method. Since the plant and equipment are initially valued at NZ$50 million, the annual depreciation expense is NZ$5 million.
- In 3 years, the subsidiary is to be sold. Wolverine plans to let the acquiring firm assume the existing New Zealand loan. The working capital will not be liquidated but will be used by the acquiring firm that buys the subsidiary. Wolverine expects to receive NZ$52 million after subtracting capital gains taxes. Assume that this amount is not subject to a withholding tax.
- Wolverine requires a 20 percent rate of return on this project.

a. Determine the net present value of this project. Should Wolverine accept this project?

b. Assume that Wolverine is also considering an alternative financing arrangement in which the parent would invest an additional $10 million to cover the working capital requirements so that the subsidiary would not need the New Zealand loan. If this arrangement is used, the selling price of the subsidiary (after subtracting any capital gains taxes) is expected to be NZ$18 million higher. Is this alternative financing arrangement more feasible for the parent than the original proposal? Explain.

c. From the parent's perspective, would the NPV of this project be more sensitive to exchange rate movements if the subsidiary uses New Zealand financing to cover the working capital or if the parent invests more of its own funds to cover the working capital? Explain.

d. Assume Wolverine used the original financing proposal and that funds are blocked until the subsidiary is sold. The funds to be remitted are reinvested at a rate of 6 percent (after taxes) until the end of Year 3. How is the project's NPV affected?

e. What is the break-even salvage value of this project if Wolverine uses the original financing proposal and funds are not blocked?

f. Assume that Wolverine decides to implement the project using the original financing proposal. Also assume that after 1 year, a New Zealand firm offers Wolverine a price of $27 million after taxes for the subsidiary and that Wolverine's original forecasts for Years 2 and 3 have not changed. Compare the present value of the expected cash flows if Wolverine keeps the subsidiary to the selling price. Should Wolverine divest the subsidiary? Explain.

28. Capital Budgeting with Hedging Baxter Co. considers a project with Thailand's government. If it accepts the project, it will definitely receive one lump-sum cash flow of 10 million Thai baht in 5 years. The spot rate of the Thai baht is presently $.03. The annualized interest rate for a 5-year period is 4 percent in the United States and 17 percent in Thailand. Interest rate parity exists. Baxter plans to hedge its cash flows with a forward contract. What is the dollar amount of cash flows that Baxter will receive in 5 years if it accepts this project?

29. Capital Budgeting and Financing Cantoon Co. is considering the acquisition of a unit from the French government. Its initial outlay would be $4 million. It will reinvest all the earnings in the unit. It expects that at the end of 8 years, it will sell the unit for 12 million euros after capital gains taxes are paid. The spot rate of the euro is $1.20 and is used as the forecast of the euro in the future years. Cantoon has no plans to hedge its exposure to exchange rate risk. The annualized U.S. risk-free interest rate is 5 percent regardless of the maturity of the debt, and the annualized risk-free interest rate on euros is 7 percent, regardless of the maturity of the debt. Assume that interest rate parity exists. Cantoon's cost of capital is 20 percent. It plans to use cash to make the acquisition.

a. Determine the NPV under these conditions.

b. Rather than use all cash, Cantoon could partially finance the acquisition. It could obtain a loan of 3 million euros today that would be used to cover a portion of the acquisition. In this case, it would have to pay a lump-sum total of 7 million euros at the end of 8 years to repay the loan. There are no interest payments on this debt. This financing deal is structured such that none of the payment is tax deductible. Determine the NPV if Cantoon uses the forward rate instead of the spot rate to forecast the future spot rate of the euro and elects to partially finance the acquisition. You need to derive the 8-year forward rate for this question.

30. Sensitivity of NPV to Conditions Burton Co., based in the United States, considers a project in which it has an initial outlay of $3 million and expects to receive 10 million Swiss francs (SF) in 1 year. The spot rate of the franc is $.80. Burton Co. decides to purchase put options on Swiss francs with an exercise price of $.78 and a premium of $.02 per unit to hedge its receivables. It has a required rate of return of 20 percent.

a. Determine the net present value of this project for Burton Co. based on the forecast that the Swiss franc will be valued at $.70 at the end of 1 year.

b. Assume the same information as in part (a), but with the following adjustment. While Burton expected to receive 10 million Swiss francs, assume that there were unexpected weak economic conditions in Switzerland after Burton initiated the project. Consequently, Burton received only 6 million Swiss francs at the end of the year. Also assume that the spot rate of the franc at the end of the year was $.79. Determine the net present value of this project for Burton Co. if these conditions occur.

31. Hedge Decision on a Project Carlotto Co. (a U.S. firm) will definitely receive 1 million British pounds in 1 year based on a business contract it has with the British government. Like most firms, Carlotto Co. is risk averse and only takes risk when the potential benefits outweigh the risk. It has no other international business and is considering various methods to hedge its exchange rate risk. Assume that interest rate parity exists. Carlotto Co. recognizes that exchange rates are very difficult to forecast with accuracy, but it believes that the 1-year forward rate of the pound yields the best forecast of the pound's spot rate in 1 year. Today the pound's spot rate is $2.00, while the 1-year forward rate of the pound is $1.90. Carlotto Co. has determined that a forward hedge is better than alternative forms of hedging. Should Carlotto Co. hedge with a forward contract or should it remain unhedged? Briefly explain.

32. NPV of Partially Hedged Project Sazer Co. (a U.S. firm) is considering a project in which it

produces special safety equipment. It will incur an initial outlay of $1 million for the research and development of this equipment. It expects to receive 600,000 euros in 1 year from selling the products in Portugal where it already does much business. In addition, it also expects to receive 300,000 euros in 1 year from sales to Spain, but these cash flows are very uncertain because it has no existing business in Spain. Today's spot rate of the euro is $1.50 and the 1-year forward rate is $1.50. It expects that the euro's spot rate will be $1.60 in 1 year. It will pursue the project only if it can satisfy its required rate of return of 24 percent. It decides to hedge all the expected receivables due to business in Portugal but none of the expected receivables due to business in Spain. Estimate the net present value of the project.

33. Project Financing Strategy Konk Co., a U.S. firm, considers a project in which it would build a subsidiary in Belgium that would generate net cash flows of about 10 million euros per year for 5 years and would remit that amount to the parent each year. It has no other international business. It needs about 20 million euros as the initial outlay to establish the subsidiary. It can finance this initial outlay in the following ways and the subsidiary would repay the amount of the investment evenly over the next 5 years: (a) the parent can borrow dollars from a U.S. bank and convert them to euros, (b) the parent can borrow euros from a Belgian bank, (c) the parent can use its equity (retained earnings from existing business in the U.S.) and convert the funds into euros, (d) the parent can borrow dollars from a Belgian bank and convert them to euros, and (e) the parent can diversify its financing by obtaining one-fourth of the funds from each of the preceding sources. Assume that there is no cost advantage to any financing method. If Konk Co. wants to use a financing method to minimize its project's exposure to exchange rate risk, which method should it use? Briefly explain.

34. NPV and Financing Louisville Co. is a U.S. firm considering a project in Austria which it has an initial cash outlay of $7 million. Louisville will accept the project only if it can satisfy its required rate of return of 18 percent. The project would definitely generate 2 million euros in one year from sales to a large corporate customer in Austria. In addition, it also expects to receive 4 million euros in one year from sales to other customers in Austria. Louisville's best guess is that the euro's spot rate will be $1.26 in one year. Today, the spot rate of the euro is $1.40, while the one-year forward rate of the euro is $1.34. If Louisville accepts the project, it would hedge all the receivables resulting from sales to the large corporate customer but none of the expected receivables due to expected sales to other customers.

a. Estimate the net present value of the project.

b. Assume that Louisville considers alternative financing for the project in which it would use $5 million cash while the remaining initial outlay would come from borrowing euros. In this case, it would need 1,600,000 euros to repay the loan (principal plus interest) at the end of one year. Assume no tax effects due to this alternative financing. Estimate the NPV of the project under these conditions.

c. Do you think the Louisville's exposure to exchange rate risk due to the project if it uses the alternative financing (explained in part b) is higher, lower, or the same as if it has an initial cash outlay of $7 million (and does not borrow any funds)? Briefly explain.

Discussion in the Boardroom

This exercise can be found in Appendix E at the back of this textbook.

Running Your Own MNC

This exercise can be found on the *International Financial Management* text companion website. Go to www.cengagebrain.com (students) or www.cengage.com/login (instructors) and search using **ISBN 9781133947837**.

Blades, Inc. Case

Decision by Blades, Inc., to Invest in Thailand

Since Ben Holt, Blades' chief financial officer, believes the growth potential for the roller blade market in Thailand is very high, he has decided to invest in Thailand. The investment would involve establishing a subsidiary in Bangkok consisting of a manufacturing plant to produce Speedos, Blades' high-quality roller blades. Holt believes that economic conditions in Thailand will be relatively strong in 10 years, when he expects to sell the subsidiary.

Blades will continue exporting to the United Kingdom under an existing agreement with Jogs, Ltd., a British retailer. Furthermore, it will continue its sales in the United States. Under an existing agreement with Entertainment Products, Inc., a Thai retailer, Blades is committed to selling 180,000 pairs of Speedos to the retailer at a fixed price of 4,594 Thai baht per pair. Once operations in Thailand commence, the agreement will last another year, at which time it may be renewed. Thus, during its first year of operations in Thailand, Blades will sell 180,000 pairs of roller blades to Entertainment Products under the existing agreement whether it has operations in the country or not. If it establishes the plant in Thailand, Blades will produce 108,000 of the 180,000 Entertainment Products Speedos at the plant during the last year of the agreement. Therefore, the new subsidiary would need to import 72,000 pairs of Speedos from the United States so that it can accommodate its agreement with Entertainment Products. It will save the equivalent of 300 baht per pair in variable costs on the 108,000 pairs not previously manufactured in Thailand.

Entertainment Products has already declared its willingness to renew the agreement for another 3 years under identical terms. Because of recent delivery delays, however, it is willing to renew the agreement only if Blades has operations in Thailand. Moreover, if Blades has a subsidiary in Thailand, Entertainment Products will keep renewing the existing agreement as long as Blades operates in Thailand. If the agreement is renewed, Blades expects to sell a total of 300,000 pairs of Speedos annually during its first 2 years of operation in Thailand to various retailers, including 180,000 pairs to Entertainment Products. After this time, it expects to sell 400,000 pairs annually (including 180,000 to Entertainment Products). If the agreement is not renewed, Blades will be able to sell only 5,000 pairs to Entertainment Products annually but not at a fixed price. Thus, if the agreement is not renewed, Blades expects to sell a total of 125,000 pairs of Speedos annually during its first 2 years of operation in Thailand and 225,000 pairs annually thereafter. Pairs not sold under the contractual agreement with Entertainment Products will be sold for 5,000 Thai baht per pair, since Entertainment Products had required a lower price to compensate it for the risk of being unable to sell the pairs it purchased from Blades.

Holt wishes to analyze the financial feasibility of establishing a subsidiary in Thailand. As a Blades' financial analyst, you have been given the task of analyzing the proposed project. Since future economic conditions in Thailand are highly uncertain, Holt has also asked you to conduct some sensitivity analyses. Fortunately, he has provided most of the information you need to conduct a capital budgeting analysis. This information is detailed here:

- The building and equipment needed will cost 550 million Thai baht. This amount includes additional funds to support working capital.
- The plant and equipment, valued at 300 million baht, will be depreciated using straight-line depreciation. Thus, 30 million baht will be depreciated annually for 10 years.
- The variable costs needed to manufacture Speedos are estimated to be 3,500 baht per pair next year.
- Blades' fixed operating expenses, such as administrative salaries, will be 25 million baht next year.
- The current spot exchange rate of the Thai baht is $.023. Blades expects the baht to depreciate by an average of 2 percent per year for the next 10 years.
- The Thai government will impose a 25 percent tax rate on income and a 10 percent withholding tax on any funds remitted by the subsidiary to Blades. Any earnings remitted to the United States will not be taxed again.
- After 10 years, Blades expects to sell its Thai subsidiary. It expects to sell the subsidiary for about 650 million baht, after considering any capital gains taxes.
- The average annual inflation in Thailand is expected to be 12 percent. Unless prices are contractually fixed, revenue, variable costs, and fixed costs are subject to inflation and are expected to change by the same annual rate as the inflation rate.

Blades could continue its current operations of exporting to and importing from Thailand, which have generated a return of about 20 percent. Blades requires a return of 25 percent on this project in order to justify its investment in Thailand. All excess funds generated by the Thai subsidiary will be remitted to Blades and will be used to support U.S. operations.

Holt has asked you to answer the following questions:

1. Should the sales and the associated costs of 180,000 pairs of roller blades to be sold in Thailand under the existing agreement be included in the capital budgeting analysis to decide whether Blades should establish a subsidiary in Thailand? Should the sales resulting from a renewed agreement be included? Why or why not?
2. Using a spreadsheet, conduct a capital budgeting analysis for the proposed project, assuming that Blades renews the agreement with Entertainment Products.

Should Blades establish a subsidiary in Thailand under these conditions?

3. Using a spreadsheet, conduct a capital budgeting analysis for the proposed project assuming that Blades does not renew the agreement with Entertainment Products. Should Blades establish a subsidiary in Thailand under these conditions? Should Blades renew the agreement with Entertainment Products?

4. Since future economic conditions in Thailand are uncertain, Holt would like to know how critical the salvage value is in the alternative you think is most feasible.

5. The future value of the baht is highly uncertain. Under a worst-case scenario, the baht may depreciate by as much as 5 percent annually. Revise your spreadsheet to illustrate how this would affect Blades' decision to establish a subsidiary in Thailand. (Use the capital budgeting analysis you have identified as the most favorable from questions 2 and 3 to answer this question.)

Small Business Dilemma

Multinational Capital Budgeting by the Sports Exports Company

Jim Logan, owner of the Sports Exports Company, has been pleased with his success in the United Kingdom. He began his business by producing footballs and exporting them to the United Kingdom. While American-style football is still not nearly as popular in the United Kingdom as it is in the United States, his firm controls the market in the United Kingdom. Logan is considering an application of the same business in Mexico. He would produce the footballs in the United States and export them to a distributor of sporting goods in Mexico, who would sell the footballs to retail stores. The distributor likely would want to pay for the product each month in Mexican pesos. Logan would need to hire one full-time employee in the United States to produce the footballs. He would also need to lease one warehouse.

1. Describe the capital budgeting steps that would be necessary to determine whether this proposed project is feasible, as related to this specific situation.
2. Explain why there is uncertainty surrounding the cash flows of this project.

Internet/Excel Exercises

Assume that you invested equity to establish a project in Portugal in January about 7 years ago. At the time the project began, you could have supported it with a 7-year loan either in dollars or in euros. If you borrowed U.S. dollars, your annual loan payment (including principal) would have been $2.5 million. If you borrowed euros, your annual loan payment (including principal) would have been 2 million euros. The project generated 5 million euros per year in revenue.

1. Use an Excel spreadsheet to determine the dollar net cash flows (after making the debt payment) that you would receive at the end of each of the last 7 years if you partially financed the project by borrowing dollars.
2. Determine the standard deviation of the dollar net cash flows that you would receive at the end of each of the last 7 years if you partially financed the project by borrowing dollars.
3. Reestimate the dollar net cash flows and the standard deviation of the dollar net cash flows if you partially financed the project by borrowing euros. (You can obtain the end-of-year exchange rate of the euro for the last 7 years at www.oanda.com or similar Web sites.) Are the project's net cash flows more volatile if you had borrowed dollars or euros? Explain your results.

Online Articles with Real-World Examples

Find a recent article online that describes an actual international finance application or a real-world example about a specific MNC's actions that reinforces one or more of the concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary there and provide the Web link of the article so that other students can access it. If your class is live, your professor may ask you to summarize your application in class. Your professor may assign specific students to complete this assignment for this chapter or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples applied to this chapter, consider using the following search terms (and include the current year as a search term to ensure that the online articles are recent).

1. policy for repatriating earnings
2. tax on foreign earnings
3. company AND international expansion
4. Inc. AND international expansion
5. foreign subsidiary AND expansion
6. [name of an MNC] AND international project
7. Inc. AND international project
8. [name of an MNC] AND foreign project
9. company AND foreign project
10. Inc. AND foreign project

APPENDIX 14

Incorporating International Tax Law in Multinational Capital Budgeting

Tax laws can vary among countries in many ways, but any type of tax causes an MNC's after-tax cash flows to differ from its before-tax cash flows. To estimate the future cash flows that are to be generated by a proposed foreign project (such as the establishment of a new subsidiary or the acquisition of a foreign firm), MNCs must first estimate the taxes that they will incur due to the foreign project. This appendix provides a general background on some of the more important international tax characteristics that an MNC must consider when assessing foreign projects. Financial managers do not necessarily have to be international tax experts because they may be able to rely on the MNC's international tax department or on independent tax consultants for guidance. Nevertheless, they should at least be aware of international tax characteristics that can affect the cash flows of a foreign project and recognize how those characteristics can vary among the countries where foreign projects are considered.

Variation in Tax Laws among Countries

Each country generates tax revenue in different ways. The United States relies on corporate and individual income taxes for federal revenue. Other countries may depend more on a *value-added tax* (VAT) or excise taxes. Since each country has its own philosophy on whom to tax and how much, it is not surprising that the tax treatment of corporations differs among countries. Because each country has a unique tax system and tax rates, MNCs need to recognize the various tax provisions of each country where they consider investing in a foreign project. The more important tax characteristics of a country to be considered in an MNC's international tax assessment are (1) corporate income taxes, (2) withholding taxes, (3) personal and excise tax rates, (4) provision for carrybacks and carryforwards, (5) tax treaties, (6) tax credits, and (7) taxes on income from intercompany transactions. A discussion of each characteristic follows.

Corporate Income Taxes

In general, countries impose taxes on corporate income generated within their borders even if the parents of those corporations are based in other countries. Each country has its unique corporate income tax laws. The United States, for example, taxes the worldwide

WEB

www.pwc.com
Access to country-specific information such as general business rules and regulations and tax environments.

WEB

www.worldwide-tax.com
Information about taxes imposed by each country.

income of U.S. "persons," a term that includes corporations. As a general rule, however, foreign income of a foreign subsidiary of a U.S. company is not taxed until it is transferred to the U.S. parent by payment of dividends or a liquidation distribution. This is the concept of *deferral*.

An MNC planning direct foreign investment in foreign countries must determine how the anticipated earnings from a foreign project will be affected. Tax rates imposed on income earned by businesses (including foreign subsidiaries of MNCs) or income remitted to a parent are shown in Exhibit 14A.1 for several countries. The tax rates may be lower than what is shown for corporations that have relatively low levels of earnings. This exhibit shows the extent to which corporate income tax rates can vary among host countries and illustrates why MNCs closely assess the tax guidelines in any foreign country where they consider conducting direct foreign investment. Given differences in tax deductions, depreciation, business subsidies, and other factors, corporate tax differentials cannot be measured simply by comparing quoted tax rates across countries.

Corporate tax rates can also differ within a country depending on whether the entity is a domestic corporation. Also, if an unregistered foreign corporation is considered to have a permanent establishment in a country, it may be subject to that country's tax laws on income earned within its borders. Generally, a permanent establishment includes an office or fixed place of business or a specified kind of agency (independent agents are normally excluded) through which active and continuous business is conducted. In some cases, the tax depends on the industry or on the form of business used (e.g., corporation, branch, partnership).

Exhibit 14A.1 Comparison of Tax Characteristics among Countries

COUNTRY	CORPORATE INCOME TAX	COUNTRY	CORPORATE INCOME TAX
Argentina	35%	Israel	27
Australia	30	Italy	28
Austria	25	Japan	30
Belgium	33	Korea	25
Brazil	15	Malaysia	26
Canada	21	Mexico	28
Chile	17	Netherlands	26
China	25	New Zealand	33
Czech Republic	20	Singapore	18
France	33	Spain	30
Germany	15	Switzerland	25
Hong Kong	18	Taiwan	25
Hungary	16	United Kingdom	30
India	30	United States	35
Indonesia	30	Venezuela	34
Ireland	13		

Source: Worldwide Corporate Tax Guide, 2008, Ernst & Young. *The numbers provided are for illustrative purposes only; the actual tax rate may depend on specific characteristics of the MNC.*

Withholding Taxes

The following types of payments by an MNC's subsidiary are commonly subject to a withholding tax by the host government. (1) A subsidiary may remit a portion of its earnings, referred to as *dividends*, to its parent because the parent is the shareholder of the subsidiary. (2) The subsidiary may pay interest to the parent or to other nonresident debt holders from which it received loans. (3) The subsidiary may make payments to the parent or to other nonresident firms in return for the use of patents (such as technology) or other rights. The payment of dividends reduces the amount of reinvestment by the subsidiary in the host country. The payments by the subsidiary to nonresident firms to cover interest or patents reflect expenses by the subsidiary, which will normally reduce its taxable income and therefore will reduce the corporate income taxes paid to the host government. Thus, withholding taxes may be a way for host governments to tax MNCs that make interest or patent payments to nonresident firms.

Since withholding taxes imposed on the subsidiary can reduce the funds remitted by the subsidiary to the parent, the withholding taxes must be accounted for in a capital budgeting analysis conducted by the parent. As with corporate tax rates, the withholding tax rate can vary substantially among countries.

Reducing Exposure to Withholding Taxes Withholding taxes can be reduced by income tax treaties (discussed shortly). Because of tax treaties between some countries, the withholding taxes may be lower when the MNC is based in a county participating in the treaties.

If the host country government of a particular subsidiary imposes a high withholding tax on subsidiary earnings remitted to the parent, then the MNC may instruct the subsidiary to temporarily refrain from remitting earnings and to reinvest them in the host country instead. As an alternative approach, the MNC may instruct the subsidiary to set up a research and development division that will enhance subsidiaries elsewhere. The main purpose behind this strategy is to efficiently use the funds abroad when the funds cannot be sent to the parent without excessive taxation. Since international tax laws can influence the timing of the transfer of funds to the parent, they affect the timing of cash flows on proposed foreign projects. Therefore, the international tax implications must be understood before the cash flows of a foreign project can be estimated.

Personal and Excise Tax Rates

An MNC is more likely to be concerned with corporate tax rates and withholding tax rates than individual tax rates because its cash flows are directly affected by the taxes incurred. However, a country's individual tax rates can indirectly affect an MNC's cash flows because the MNC may have to pay higher wages to employees in countries (such as in Europe) where personal income is taxed at a relatively high rate. In addition, a country's value-added tax or excise tax may affect cash flows to be generated from a foreign project because it may make the products less competitive on a global basis (reducing the expected quantity of products to be sold).

Provision for Carrybacks and Carryforwards

Negative earnings from operations can often be carried back or forward to offset earnings in other years. The laws pertaining to these so-called **net operating loss carrybacks** and **carryforwards** can vary among countries. An MNC generally does not plan to generate negative earnings in foreign countries. If negative earnings do occur, however, it is desirable to be able to use them to offset other years of positive earnings. Most foreign countries do not allow negative earnings to be carried back but allow some flexibility in carrying losses forward. Since many foreign projects are expected to result in negative earnings in the early years, the tax laws for the country of concern will affect the future tax deductions resulting from these losses and will therefore affect the future cash flows of the foreign project.

Tax Treaties

Countries often establish income tax treaties, whereby one partner will reduce its taxes by granting a credit for taxes imposed on corporations operating within the other treaty partner's tax jurisdiction. Income tax treaties help corporations avoid exposure to double taxation. Some treaties apply to taxes paid on income earned by MNCs in foreign countries. Other treaties apply to withholding taxes imposed by the host country on foreign earnings that are remitted to the parent.

Without such treaties, subsidiary earnings could be taxed by the host country and then again by the parent's country when received by the parent. To the extent that the parent uses some of these earnings to provide cash dividends for shareholders, triple taxation could result (since the dividend income is also taxed at the shareholder level). Because income tax treaties reduce taxes on earnings generated by MNCs, they help stimulate direct foreign investment. Many foreign projects that are perceived as feasible would not be feasible without income tax treaties because the expected cash flows would be reduced by excessive taxation.

Tax Credits

Even without income tax treaties, an MNC may be allowed a credit for income and withholding taxes paid in another country against taxes owed in the home country if it meets certain requirements. Like income tax treaties, tax credits help to avoid double taxation and stimulate direct foreign investment.

Tax credit policies vary somewhat among countries, but they generally work like this. Consider a U.S.-based MNC subject to a U.S. tax rate of 35 percent. Assume that a foreign subsidiary of this corporation has generated earnings taxed at less than 35 percent by the host country's government. The earnings remitted to the parent from the subsidiary will be subject to an additional amount of U.S. tax to bring the total tax up to 35 percent. From the parent's point of view, the tax on its subsidiary's remitted earnings are 35 percent overall, so it does not matter whether the host country of the subsidiary or the United States receives most of the taxes. From the perspective of the governments of these two countries, however, the allocation of taxes is very important. If a subsidiary is established in a foreign country that taxes income at nearly 35 percent, that country can generate large tax revenues from income earned by the subsidiary. The host country receives the tax revenues at the expense of the parent's country (the United States, in this case).

If the corporate income tax rate in a foreign country is greater than 35 percent, the United States generally does not impose any additional taxes on earnings remitted to a U.S. parent by foreign subsidiaries in that country. In fact, under current law, the United States allows the excess foreign tax to be credited against other taxes owed by the parent on the same type of income generated by subsidiaries in other lower-tax countries. This suggests that some host countries could charge abnormally high corporate income tax rates to foreign subsidiaries and still attract direct foreign investment. If the MNC in our example has subsidiaries located in some countries with low corporate income taxes, then the U.S. tax on earnings remitted to the U.S. parent will normally bring the total tax up to 35 percent. However, credits against excessive income taxes by high-tax

countries on foreign subsidiaries could offset these taxes that would otherwise be paid to the U.S. government. Thus tax credits could make an MNC more willing to invest in a project in a country with excessive tax rates.

Basic information on a country's current taxes may not be sufficient for determining the tax effects of a particular foreign project because tax incentives may be offered in particular circumstances and tax rates can change over time. Consider an MNC that plans to establish a manufacturing plant in Country Y rather than Country X. Assume that while many economic characteristics favor Country X, the current tax rates in Country Y are lower. However, whereas tax rates in Country X have been historically stable and are expected to continue that way, they have been changing every few years in Country Y. In this case, the MNC must assess the future uncertainty of the tax rates. It cannot treat the current tax rate of Country Y as a constant when conducting a capital budgeting analysis. Instead, it must consider possible changes in the tax rates over time and, based on these possibilities, determine whether Country Y's projected tax advantages *over time* sufficiently outweigh the advantages of Country X. One approach to account for possible changes in the tax rates is to use sensitivity analysis, which measures the sensitivity of the net present value (NPV) of after-tax cash flows to various possible tax changes over time. For each tax scenario, a different NPV is projected. By accounting for each possible tax scenario, the MNC can develop a distribution of possible NPVs that may occur and can then compare these for each country.

Two critical and broadly defined functions are necessary to determine how international tax laws affect the cash flows of a foreign project. The first is to be aware of all the current (and possible future) tax laws that exist for each country where the MNC does (or plans to do) business. The second is to take the information generated from the first function and apply it to forecasted earnings and remittances to determine the taxes, so that the proposed project's cash flows can be estimated.

Taxes on Income from Intercompany Transactions

Many of an MNC's proposed foreign projects will involve intercompany transactions. For example, a U.S.-based MNC may consider acquiring a foreign firm that will produce and deliver supplies to its U.S. subsidiaries. Under these conditions, the MNC must use transfer pricing, which involves pricing the transactions between two entities (such as subsidiaries) of the same corporation. When MNCs consider new foreign projects, they must incorporate their transfer pricing to properly estimate cash flows that will be generated from these projects. This means that, before the feasibility of a foreign project can be determined, transfer pricing decisions must be made on any anticipated intercompany transactions that would result from the new project. Multinational corporations are subject to certain guidelines on transfer pricing, but they usually have some flexibility and tend to use a transfer pricing policy that will minimize taxes while satisfying the guidelines.

EXAMPLE

Oakland Corp. has established two subsidiaries to capitalize on low production costs. One of these subsidiaries (called Hitax Sub) is located in a country whose government imposes a 50 percent tax rate on before-tax earnings. Hitax Sub produces partially finished products and sends them to the other subsidiary (called Lotax Sub) where the final assembly takes place. The host government of Lotax Sub imposes a 20 percent tax on before-tax earnings. To simplify the example, assume that no dividends are to be remitted to the parent in the near future. Given this information, pro forma income statements would be as shown in the top part of Exhibit 14A.2 for Hitax Sub (second column), Lotax Sub (third column), and the combined subsidiaries (last column). The income statement items are reported in U.S. dollars to more easily illustrate how a revised transfer pricing policy can affect earnings and cash flows.

Exhibit 14A.2 Impact of Transfer Pricing Adjustment on Pro Forma Earnings and Taxes: Oakland Corp. (thousands of U.S. dollars)

	ORIGINAL ESTIMATES		
	HITAX SUB	LOTAX SUB	COMBINED*
Sales	$100,000	$150,000	$250,000
Less: Cost of goods sold	50,000	100,000	150,000
Gross profit	50,000	50,000	100,000
Less: Operating expenses	20,000	20,000	40,000
Earnings before interest and taxes	30,000	30,000	60,000
Interest expense	5,000	5,000	10,000
Earnings before taxes	25,000	25,000	50,000
Taxes (50% for Hitax and 20% for Lotax)	12,500	5,000	17,500
Earnings after taxes	$12,500	$20,000	$32,500
	REVISED ESTIMATES BASED ON ADJUSTING TRANSFER PRICING POLICY		
	HITAX SUB	LOTAX SUB	COMBINED
Sales	$80,000	$150,000	$230,000
Less: Cost of goods sold	50,000	80,000	130,000
Gross profit	30,000	70,000	100,000
Less: Operating expenses	20,000	20,000	40,000
Earnings before interest and taxes	10,000	50,000	60,000
Interest expense	5,000	5,000	10,000
Earnings before taxes	5,000	45,000	50,000
Taxes (50% for Hitax and 20% for Lotax)	2,500	9,000	11,500
Earnings after taxes	$2,500	$36,000	$38,500

*The combined numbers are shown here for illustrative purposes only and do not reflect the firm's official consolidated financial statements. When consolidating sales for financial statements, intercompany transactions (between subsidiaries) would be eliminated. This example is intended simply to illustrate how total taxes paid by subsidiaries are lower when transfer pricing is structured to shift some gross profit from a high-tax subsidiary to a low-tax subsidiary.

The sales level shown for Hitax Sub matches the cost of goods sold for Lotax Sub, indicating that all Hitax Sub sales are to Lotax Sub. The additional expenses incurred by Lotax Sub to complete the product are classified as operating expenses.

Notice from Exhibit 14A.2 that both subsidiaries have the same earnings before taxes. Yet because of the different tax rates, Hitax Sub's after-tax income is $7.5 million less than Lotax Sub's. If Oakland Corp. can revise its transfer pricing, then its combined earnings after taxes will be increased. To illustrate, suppose that the price of products sent from Hitax Sub to Lotax Sub is reduced, causing Hitax Sub's sales to decline from $100 million to $80 million. This also reduces Lotax Sub's cost of goods sold by $20 million. The revised pro forma income statement resulting from the change in the transfer pricing policy is shown in the bottom part of Exhibit 14A.2. The two subsidiaries' forecasted earnings before taxes now differ by $40 million, although the combined amount has not changed. Because earnings have been shifted from Hitax Sub to Lotax Sub, the total tax payments are reduced to $11.5 million from the original estimate of $17.5 million. Thus, the corporate taxes imposed on earnings are now forecasted to be $6 million lower than originally expected. ●

It should be mentioned that possible adjustments in the transfer pricing policies may be limited because host governments may restrict such practices when the intent is to avoid taxes. Transactions between subsidiaries of a firm are supposed to be priced using

the principle of "arm's-length" transactions. That is, the price should be set as if the buyer is unrelated to the seller and should not be adjusted simply to shift tax burdens. Nevertheless, there is some flexibility on transfer pricing policies that enables MNCs from all countries to establish policies that are within legal limits but also reduce tax burdens. As long as the transfer price reflects the "fair" price that would normally be charged in the market, one subsidiary can charge another for technology transfers, research and development expenses, or other forms of overhead expenses incurred.

The actual mechanics of international transfer pricing go far beyond the example provided here. The U.S. laws in this area are particularly strict. Nevertheless, there are various ways that MNCs can justify increasing prices at one subsidiary and reducing them at another.

There is substantial evidence that MNCs based in numerous countries use transfer pricing strategies to reduce their taxes. Moreover, transfer pricing restrictions can be circumvented in several ways. Various fees can be implemented for services, research and development, royalties, and administrative duties. Although the fees may minimize taxes by shifting earnings, they have the effect of distorting the actual performance of each subsidiary. To correct for any distortion, the MNC can use a centralized approach to account for the transfer pricing strategy when assessing the performance of each subsidiary.

15
International Corporate Governance and Control

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- describe the common forms of corporate governance by MNCs,
- explain how MNCs use corporate control as a form of governance,
- identify the factors that are considered when valuing a foreign target,
- explain why valuations of a target firm vary among MNCs that consider corporate control strategies, and
- identify other types of international corporate control actions.

When multinational corporations (MNCs) expand internationally, they are subject to various types of agency problems. Many of the agency problems occur because incentives for managers of the parent or its subsidiaries are not properly structured to ensure that managers focus on maximizing the value of the firm (and therefore shareholder wealth). International corporate governance and corporate control can ensure that managerial goals are aligned with those of shareholders.

15-1 International Corporate Governance

Most MNCs use a number of methods to ensure that their foreign subsidiary managers own shares of the firm in order to align their interests with those of the corporation. They may offer bonuses in the form of stock that cannot be sold for a few years, which encourages the managers of foreign subsidiaries to focus on the goal of maximizing the MNC's stock price when making decisions for the subsidiaries. Under these conditions, the high-level managers may properly govern themselves. However, since the stock ownership by high-level managers of an MNC is typically limited, managers' first priority on decision making may be to protect their jobs even if doing so reduces the stock price. For example, they might make decisions that will expand their subsidiary in order to justify their position, even if these decisions adversely affect the value of the MNC overall. Furthermore, expansion might improve their potential for more responsibility and therefore a promotion. Thus, governance may be needed to ensure that managerial decisions serve shareholder interests. Forms of governance of MNCs are described next.

15-1a Governance by Board Members

The board of directors is responsible for appointing high-level managers of the firm, including the chief executive officer (CEO). It oversees major decisions of the firm such as restructuring and expansion, and it is supposed to make sure that key management decisions are in the best interest of shareholders. However, boards of MNCs are not always effective at governance.

First, some boards of directors allow the firm's chief executive officer to serve as the chair of the board, which may reduce the board's ability to control management because the chair may have sufficient power to control the board. For example, the chair normally organizes the agenda for a board meeting and might establish the process by which decisions are made. Second, boards typically contain insiders (managers working for the firm)

16
Country Risk Analysis

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- identify the common factors used by MNCs to measure country risk,
- explain how to measure country risk,
- explain how MNCs use the assessment of country risk when making financial decisions, and
- explain how MNCs can prevent host government takeovers.

Country risk represents the potentially adverse impact of a country's environment on an MNC's cash flows. An MNC conducts country risk analysis when it applies capital budgeting (explained in Chapter 14) to determine whether to implement a new project in a particular country or whether to continue conducting business in a particular country. Financial managers must understand how to measure country risk and incorporate country risk within their capital budgeting analysis so that they can make investment decisions that maximize their MNC's value.

16-1 Country Risk Characteristics

Country risk characteristics can be partitioned into political risks and financial risks.

16-1a Political Risk Characteristics

Political risk can impede the performance of a local subsidiary. An extreme form of political risk is the possibility that the host country will take over a subsidiary. In some cases of expropriation, compensation (in an amount determined by the host country government) is awarded. In other cases, the assets are confiscated and no compensation is provided. Expropriation can take place peacefully or by force. The following are some of the more common characteristics of political risk:

- attitude of consumers in the host country,
- actions of host government,
- blockage of fund transfers,
- currency inconvertibility,
- war,
- inefficient bureaucracy, and
- corruption.

Each of these characteristics will be discussed in turn.

Attitude of Consumers in the Host Country A mild form of political risk (to an exporter) is the tendency of residents to purchase only locally produced goods. Even if the exporter decides to set up a subsidiary in the foreign country, that tendency could prevent its success. All countries tend to exert some pressure on consumers to purchase from locally owned manufacturers. An MNC that considers entering a foreign market (or has already entered that market) must monitor the general loyalty of consumers

toward locally produced products. If consumers are very loyal to local products, then a joint venture with a local company may be more feasible than an exporting strategy.

Actions of Host Government Various actions of the host government can affect an MNC's cash flow. A host government might impose pollution control standards (which affect costs) and additional corporate taxes (which affect after-tax earnings) as well as withholding taxes and fund transfer restrictions (which affect after-tax cash flows sent to the parent).

EXAMPLE

When residents in China use Google to conduct online searches of information, some results and suggested Web sites are blocked by the Chinese government. Hence Google's popularity in China might be limited by these restrictions, and this restricts Google's ability to attract advertisers in China.

When Facebook went public in 2012, its registration statement disclosed its exposure to political risk as follows. "It is possible that governments of one of more countries may seek to censor content available on Facebook in their country, restrict access to Facebook from their country entirely, or impose other restrictions that may affect the accessibility in their country.... In the event that access to Facebook is restricted, ... we may not be able to maintain or grow our revenue as anticipated and our financial results could be adversely affected." ●

WEB

www.cia.gov
Valuable information about political risk that should be considered by MNCs engaging in direct foreign investment.

Some MNCs use turnover in government members or change in government philosophy as a proxy for a country's political risk. Although such change can significantly influence the MNC's future cash flows, it alone does not serve as a suitable representation of political risk. A subsidiary is not necessarily affected by changing governments. Furthermore, a subsidiary can be affected by new policies of the host government or by a changed attitude toward the subsidiary's home country (and therefore the subsidiary) even when the host government has no risk of being overthrown.

A host government can use various means to make an MNC's operations coincide with its own goals. It may, for example, require the use of local employees for managerial positions at a subsidiary. In addition, it may require special environmental controls (such as air pollution controls). Furthermore, a host government may require special permits, impose extra taxes, or subsidize competitors. It may also impose restrictions or fines to protect local competition.

In some cases, MNCs are adversely affected by a *lack* of restrictions in a host country, which allows illegitimate business behavior to capture market share. One of the most troubling issues for MNCs is the failure by host governments to enforce copyright laws against local firms that illegally copy the MNC's product. For example, local firms in Asia commonly copy software produced by MNCs and sell it to customers at lower prices. Software producers lose an estimated $3 billion in sales annually in Asia for this reason. Furthermore, the legal systems in some countries do not adequately protect a firm against copyright violations or other illegal means of obtaining market share.

Blockage of Fund Transfers Subsidiaries of MNCs often send funds back to headquarters for loan repayments, purchases of supplies, administrative fees, remitted earnings, or other purposes. In some cases, a host government may block fund transfers, which could force subsidiaries to undertake projects that are not optimal (just to make use of the funds). Alternatively, the MNC may invest the funds in local securities that provide some return while the funds are blocked. But this return may be inferior to what could have been earned on funds remitted to the parent.

Currency Inconvertibility Some governments do not allow the home currency to be exchanged into other currencies. Thus, the earnings generated by a subsidiary in these countries cannot be remitted to the parent through currency conversion. When the currency is inconvertible, an MNC's parent may need to exchange it for goods to extract benefits from projects in that country.

War Some countries tend to engage in conflicts with neighboring countries or to experience internal turmoil. This can affect the safety of employees hired by an MNC's subsidiary or by salespeople who attempt to establish export markets for the MNC. In addition, countries plagued by the threat of war typically have volatile business cycles, which make cash flows generated from such countries more uncertain. Multinational corporations in all countries have some exposure to terrorist attacks, but this exposure is much higher in certain countries than in others. Even if an MNC is not directly damaged due to a war, it may incur costs from ensuring the safety of its employees.

Some firms may contend that no risk is too high when considering a project. Their reasoning is that if the potential return is high enough, the project is worth undertaking. When employee safety is a concern, however, the project may be rejected regardless of its potential return. If the country risk is too high, MNCs do not need to analyze the feasibility of the proposed project any further.

WEB

finance.yahoo.com
Assessments of various political risk characteristics by outside evaluators.

Inefficient Bureaucracy Another country risk factor is a government's bureaucracy, which can complicate an MNC's business. Although this factor may seem irrelevant, it has been a major deterrent for MNCs that consider projects in various emerging countries. Bureaucracy can delay an MNC's efforts to establish a new subsidiary or expand business in a country. In some cases, the bureaucratic problem is caused by government employees who expect "gifts" before they approve applications by MNCs. In other cases, the problem is caused by a lack of government organization, so the development of a new business is delayed until various applications are approved by different sections of the bureaucracy.

WEB

www.heritage.org
Interesting insight into international political risk issues that should be considered by MNCs conducting international business.

Corruption Corruption can adversely affect an MNC's international business because it can increase the cost of conducting business or reduce revenue. Various forms of corruption can occur at the firm level or with firm–government interactions. For example, an MNC may lose revenue because a government contract is awarded to a local firm that paid off a government official. Laws defining corruption and their enforcement vary among countries, however. In the United States, for instance, it is illegal to pay a high-ranking government official in return for political favors but it is legal for U.S. firms to contribute to a politician's election campaign.

Transparency International has derived a corruption index for most countries (see www.transparency.org). The index for selected countries is shown in Exhibit 16.1.

16-1b Financial Risk Characteristics

Along with political characteristics, financial characteristics should be considered when assessing country risk. Financial characteristics can have a strong impact on international projects that MNCs have proposed or implemented.

Economic Growth The most obvious financial characteristic is the current and potential state of the country's economy. An MNC that exports to a country or develops a subsidiary there is naturally concerned about that country's demand for its products, which is influenced by the country's economy. A recession could severely reduce demand for the MNC's exports or for products sold by the MNC's local subsidiary. Multinational corporations, including 3M, DuPont, IBM, and Nike, were adversely affected by a weak European economy in the 2008–2010 period. Recent levels of a country's gross domestic product (GDP) may be used to measure recent economic growth; in some cases, these levels may be used to forecast future economic growth. A country's economic growth is influenced by interest rates, exchange rates, and inflation.

- *Interest rates.* Higher interest rates tend to slow the growth of an economy and reduce demand for the MNC's products. Governments commonly attempt to

Exhibit 16.1 Corruption Index Ratings for Selected Countries (maximum rating = 10; high ratings indicate low corruption)

COUNTRY	INDEX RATING	COUNTRY	INDEX RATING
Finland	9.6	Chile	7.3
New Zealand	9.6	United States	7.3
Denmark	9.5	Spain	6.8
Singapore	9.4	Uruguay	6.4
Sweden	9.2	Taiwan	5.9
Switzerland	9.1	Hungary	5.2
Netherlands	8.9	Malaysia	5.0
Austria	8.6	Italy	4.9
United Kingdom	8.6	Czech Republic	4.8
Canada	8.5	Greece	4.4
Hong Kong	8.3	Brazil	3.9
Germany	8.0	China	3.3
Belgium	7.4	India	3.3
France	7.4	Mexico	3.3
Ireland	7.4	Russia	2.5

Source: *Transparency International, 2009.*

maintain low interest rates when they want to stimulate the economy. Low interest rates can encourage more borrowing by firms and consumers and thus can result in more spending. However, during and after the recent financial crisis, low interest rates had limited effects because many firms and consumers were already at their debt capacity and were not in a position to borrow more funds.

- *Exchange rates.* Exchange rates can influence the demand for the country's exports, which affects the country's production and income level. A strong currency may reduce demand for the country's exports, increase the volume of products imported by the country, and therefore reduce the country's production and national income.
- *Inflation.* Inflation can affect consumers' purchasing power and their demand for an MNC's goods. In addition, it affects the expenses associated with operations in the country. Inflation may also influence a country's financial condition by affecting the country's interest rates and currency value.

A country's financial risk characteristics are strongly influenced by the government's fiscal policy. Some countries use expansionary fiscal policies that involve massive spending and low taxes in order to stimulate their economy. However, this type of policy results in a large national budget deficit and therefore increases the amount of funds borrowed by the government. An expansionary fiscal policy can have long-term adverse effects if the level of government borrowing is so high that it causes concerns about the government's ability to repay its loans.

EXAMPLE

During the 2008-2010 period, the government of Greece continued to pay generous salaries and pensions to government employees, and it spent much more money than it received in taxes. In 2010, some existing loans to the government were about to mature, and the government needed to borrow more money so that it could pay off the loans. However, creditors were no longer as willing to extend loans because of concerns that the government might default on them. Thus, the government had to take actions to correct its debt problems so that it could obtain new loans from creditors. To reduce its budget deficit, the government was forced to reduce its spending and to raise taxes, which adversely affected the economy. These concerns about the economy restricted the amount of loans that creditors would provide to MNCs doing business in Greece, and it also increased the cost of capital because creditors charged high loan rates to reflect a high credit risk premium. Many other countries (such as Portugal and Spain) also experienced weak economies when they attempted to resolve their own budget deficit problems, but the impact was not as pronounced as it was in Greece. ●

16-2 Measuring Country Risk

WEB

http://lcweb2.loc.gov/frd/cs/
Detailed studies of 85 countries provided by the Library of Congress.

A **macro-assessment of country risk** is an overall risk assessment of a country and involves consideration of all variables that affect country risk *except* those that are unique to a particular firm or industry. This type of assessment is convenient because it remains the same for a given country regardless of the firm or industry of concern; however, it excludes relevant information that could improve the assessment's accuracy. A macro-assessment of country risk serves as a foundation that can then be modified to reflect the particular business of the MNC, as explained next.

A **micro-assessment of country risk** involves the assessment of a country as it relates to the MNC's type of business. It is used to determine how the country risk relates to the specific MNC. The specific impact of a particular form of country risk can affect MNCs in different ways, which is why a micro-assessment of country risk is needed.

EXAMPLE

Country Z has been assigned a relatively low macro-assessment by most experts because of its poor financial condition. Two MNCs are deciding whether to set up subsidiaries in Country Z. Carco, Inc., is considering developing a subsidiary that would produce automobiles and sell them locally, while Milco, Inc., plans to build a subsidiary that would produce military supplies. Carco's plan to build an automobile subsidiary does not appear to be feasible unless Country Z does not already have enough automobile producers.

Country Z's government may be committed to purchasing a given amount of military supplies, regardless of how weak the economy is. Thus, Milco's plan to build a military supply subsidiary may still be feasible even though Country Z's financial condition is poor.

It is possible, however, that Country Z's government will order its military supplies from a locally owned firm because it wants its supply needs to remain confidential. This possibility is an element of country risk because it is a country characteristic (or attitude) that can affect the feasibility of a project. Yet that particular characteristic is relevant only to Milco, Inc., and not to Carco, Inc. ●

This example illustrates how an appropriate country risk assessment varies with the firm, industry, and project of concern, so it also illustrates the limitations of using only a macro-assessment of country risk. Therefore, a micro-assessment is also necessary when evaluating the country risk related to a specific project proposed by a particular firm.

16-2a Techniques for Assessing Country Risk

Once a firm identifies all the macro- and micro-factors that deserve consideration in the country risk assessment, it may wish to implement a system for evaluating these factors and determining a country risk rating. Various techniques are available to achieve this objective. Among the most popular techniques are the following:

- checklist approach,
- Delphi technique,
- quantitative analysis,
- inspection visits, and
- combination of techniques.

Each technique is briefly discussed in turn.

Checklist Approach A checklist approach involves making a judgment on all the political and financial factors (both macro and micro) that contribute to a firm's assessment of country risk. Ratings are assigned to a list of various financial and political factors, and these ratings are then consolidated to derive an overall assessment of country risk. Some factors (such as real GDP growth) can be measured from available data, whereas others (such as probability of entering a war) must be subjectively measured.

A substantial amount of information about countries is available on the Internet. This information can be used to develop ratings of various factors used to assess country risk. The factors are then converted to a numerical rating in order to assess a particular country. Those factors thought to have a greater influence on country risk should be assigned greater weights. Both the measurement of some factors and the weighting scheme implemented are subjective.

Delphi Technique The **Delphi technique** involves the collection of independent opinions without group discussion. As applied to country risk analysis, the MNC could survey specific employees or outside consultants who have some expertise in assessing a given country's risk characteristics. The MNC receives responses from its survey and attempts to determine some consensus opinions (without attaching names to any of the opinions) about the country's perceived risk. The firm then sends this summary of the survey back to the survey respondents and asks for additional feedback regarding its summary of the country's risk.

Quantitative Analysis Once the financial and political variables have been measured for a period of time, models for quantitative analysis can attempt to identify the characteristics that influence the level of country risk. For example, regression analysis may be used to assess risk, since it can measure the sensitivity of one variable to other variables. A firm could regress a measure of its business activity (such as its percentage increase in sales) against country characteristics (such as real growth in GDP) over a series of previous months or quarters. Results from such an analysis will indicate the susceptibility of a particular business to a country's economy. This is valuable information to incorporate into the overall evaluation of country risk.

Although quantitative models can quantify the impact of variables on each other, they cannot always indicate a country's problems *before* they actually occur (preferably before the firm's decision to pursue a project in that country). Nor can such models evaluate subjective data that cannot be quantified. In addition, historical trends of various country characteristics are not always useful for anticipating an upcoming crisis.

Inspection Visits Inspection visits involve travelling to a country and meeting with government officials, business executives, and/or consumers. Such meetings can help clarify any uncertain opinions the firm has about a country. Indeed, some variables (such as intercountry relationships) may be difficult to assess without a trip to the host country.

Combination of Techniques Many MNCs do not have a formal method to assess country risk. This does not mean that they neglect to assess country risk but rather that there is no proven method that is always most appropriate. Consequently, many MNCs use a combination of techniques to assess country risk.

16-2b Deriving a Country Risk Rating

An overall country risk rating using a checklist approach can be developed from separate ratings for political and financial risk. First, the political factors are assigned values within some arbitrarily chosen range (such as values from 1 to 5, where 5 is the lowest risk and thus the best value). Next, these political factors are assigned weights (representing relative degree of importance), which should add up to 100 percent. The assigned values of the factors multiplied by their respective weights can then be summed to derive a political risk rating.

The process is then repeated to derive the financial risk rating. All financial factors are assigned values from 1 to 5 and, just as for political risk, the assigned values of the factors multiplied by their respective weights are summed to derive a financial risk rating.

Once the political and financial ratings have been derived, a country's overall country risk rating as it relates to a specific project can be determined by assigning weights to the overall political and financial ratings according to their perceived importance. The importance of political risk versus financial risk varies with the intent of the MNC. An MNC considering direct foreign investment to attract demand in that country must be highly concerned about financial risk. An MNC establishing a foreign manufacturing plant and planning to export the goods from there should be more concerned with political risk.

If a project's political risk is considered to be much more relevant than its financial risk, then the political risk rating will receive a higher weight than the financial risk rating (as before, both weights must sum to 100 percent). The political and financial ratings multiplied by their respective weights will determine the overall country risk rating for a country as it relates to a particular project.

EXAMPLE

Assume that Cougar Co. plans to build a steel plant in Mexico. It has used the Delphi technique and quantitative analysis to derive ratings for various political and financial factors. The discussion here focuses on how to consolidate the ratings to derive an overall country risk rating.

Exhibit 16.2 illustrates Cougar's country risk assessment of Mexico. The exhibit shows that two political factors and five financial factors contribute to the overall country risk rating in this

Exhibit 16.2 Determining the Overall Country Risk Rating

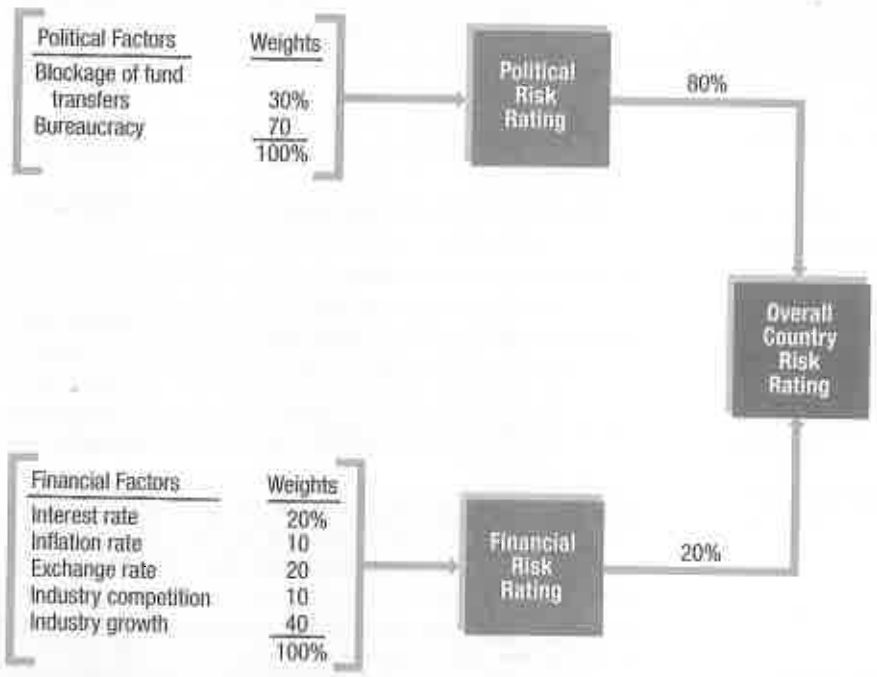


Exhibit 16.3 Derivation of the Overall Country Risk Rating Based on Assumed Information

(1) POLITICAL RISK FACTORS	(2) RATING ASSIGNED BY COMPANY TO FACTOR (WITHIN A RANGE OF 1–5)	(3) WEIGHT ASSIGNED BY COMPANY TO FACTOR ACCORDING TO IMPORTANCE	(4) = (2) × (3) WEIGHTED VALUE OF FACTOR
Blockage of fund transfers	4	30%	1.2
Bureaucracy	3	70	2.1
		100%	3.3 = Political risk rating
FINANCIAL RISK FACTORS			
Interest rate	5	20%	1.0
Inflation rate	4	10	.4
Exchange rate	4	20	.8
Industry competition	5	10	.5
Industry growth	3	40	1.2
		100%	3.9 = Financial risk rating

(1) CATEGORY	(2) RATING AS DETERMINED ABOVE	(3) WEIGHT ASSIGNED BY COMPANY TO EACH RISK CATEGORY	(4) = (2) × (3) WEIGHTED RATING
Political risk	3.3	80%	2.64
Financial risk	3.9	20	.78
		100%	3.42 = Overall country risk rating

example. Cougar Co. will consider projects only in countries for which its country risk rating is 3.5 or higher.

Cougar Co. has assigned the values and weights to the factors as shown in Exhibit 16.3. In this example, the company generally assigns the financial factors higher ratings than the political factors. The financial condition of Mexico has therefore been assessed more favorably than the political condition. Industry growth is the most important financial factor in Mexico, based on its 40 percent weighting. The bureaucracy is thought to be the most important political factor, based on a weighting of 70 percent; regulation of international fund transfers receives the remaining 30 percent weighting. The political risk rating is estimated at 3.3 by adding the products of the assigned ratings (column 2) and weights (column 3) of the political risk factors.

The financial risk is computed to be 3.9, based on adding the products of the assigned ratings and the weights of the financial risk factors. Once the political and financial ratings are determined, the overall country risk rating can be derived (as shown at the bottom of Exhibit 16.3), given the weights assigned to political and financial risk. Column 3 at the bottom of Exhibit 16.3 indicates that Cougar perceives political risk (receiving an 80 percent weight) to be much more important than financial risk (receiving a 20 percent weight) in Mexico for the proposed project. The overall country risk rating of 3.42 may appear low given the individual category ratings. This is because of the heavy weighting given to political risk, which in this example is crucial from the firm's perspective. In particular, Cougar views Mexico's bureaucracy as a critical factor and assigns it a low rating. Given that Cougar considers projects only in countries that have a rating of at least 3.5, it decides not to pursue the project in Mexico. ●

The weighting procedure described here is just one of many that could be used to derive an overall measure of country risk. Most procedures are similar, though, in that they somehow assign ratings and weights to all individual characteristics relevant to country risk assessment.

Governance of the Country Risk Assessment Many international projects by MNCs last for 20 years or more. When managers want to pursue a project because of its potential success during the next few years, they may overlook the potential for increased country risk surrounding the project over time. In their minds, they may no longer be held accountable if the project fails several years from now. Consequently, MNCs need a proper governance system to ensure that managers fully consider country risk when assessing potential projects. One solution is to require that major long-term projects use input from an external source (such as a consulting firm) regarding the country risk assessment of a specific project and that this assessment be directly incorporated into the project analysis. This procedure might allow for a better assessment of country risk over the long term.

WEB

www.standardandpoors.com/ratings/fi/analytic initiatives/en/us
This Web site provides country ratings assigned by Standard & Poor's.

16-2c Comparing Risk Ratings among Countries

An MNC may evaluate country risk for several countries, perhaps to determine where to establish a subsidiary. One approach to comparing political and financial ratings among countries, advocated by some foreign risk managers, is a **foreign investment risk matrix (FIRM)** that displays the financial (or economic) and political risk by intervals ranging across the matrix from "poor" to "good." Each country can be positioned in its appropriate location on the matrix based on its political rating and financial rating.

Country Risk Ratings Exhibit 16.4 is a map showing actual risk ratings assigned to various countries. This exhibit is not necessarily applicable to a particular MNC that wants to pursue international business because the risk assessment here may not focus on the factors that are relevant to that MNC. Nevertheless, the exhibit illustrates how the risk rating can vary substantially among countries. Many industrialized countries have high ratings, indicating low risk. Emerging countries tend to have lower ratings. Country risk ratings change over time in response to the factors that influence a country's rating. Therefore, MNCs need to periodically update their assessments of each country where they do business.

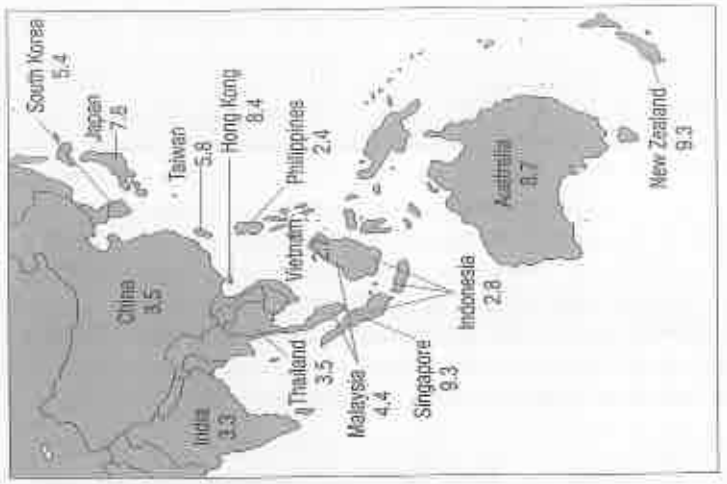
Impact of the Credit Crisis Many countries experienced a decline in their country risk rating due to the credit crisis in 2008. The decline in housing prices created severe financial problems for commercial banks and other financial institutions. These institutions then became more cautious when providing credit. The international credit crunch contributed to the weak global economy. Countries especially reliant on international credit were adversely affected when credit was difficult to access.

16-3 Incorporating Risk in Capital Budgeting

When MNCs assess the feasibility of a proposed project, country risk can be incorporated in the capital budgeting analysis by adjusting the discount rate or by adjusting the estimated cash flows. Each method is discussed here.

16-3a Adjustment of the Discount Rate

The discount rate of a proposed project is supposed to reflect the required rate of return on that project. Thus, the discount rate can be adjusted to account for the country risk. The lower the country risk rating, the higher the perceived risk and the higher the



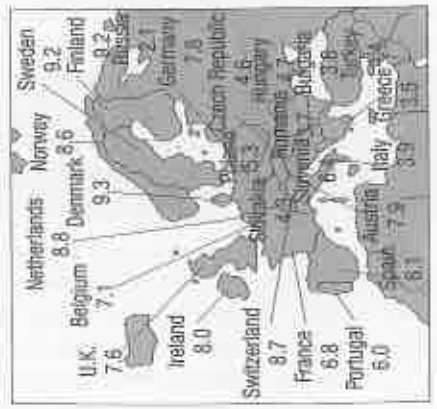


Exhibit 16.4 Country Risk Ratings

Source: Transparency International is a global civil society organization that has developed a Corruption Perceptions Index, which represents the perception of corruption in a country's public sector. The index relies on assessments and business surveys by institutions.

discount rate applied to the project's cash flows. This approach is convenient in that one adjustment to the capital budgeting analysis can capture country risk. However, there is no precise formula for adjusting the discount rate to incorporate country risk. The adjustment is somewhat arbitrary and may therefore cause feasible projects to be rejected or infeasible projects to be accepted.

16-3b Adjustment of the Estimated Cash Flows

Perhaps the most appropriate method for incorporating forms of country risk in a capital budgeting analysis is to estimate how the cash flows would be affected by each form of country risk. For example, if there is a 20 percent probability that the host government will temporarily block funds from the subsidiary to the parent, the MNC should estimate the project's net present value (NPV) under these circumstances, realizing that there is a 20 percent chance that this NPV will occur.

If there is a chance that a host government will impose higher taxes on the subsidiary, then the foreign project's NPV to the MNC should be estimated under these conditions. Each possible form of risk has an estimated effect on the foreign project's cash flows and therefore on the project's NPV. By analyzing each possible effect, the MNC can determine the probability distribution of NPVs for the project. Its accept/reject decision on the project will be based on its assessment of the probability that the project will generate a positive NPV and of the size of possible NPV outcomes.

EXAMPLE

Reconsider the example of Spartan, Inc., introduced in Chapter 14, in which Spartan plans to establish a subsidiary in Singapore. Assume for the moment that all the initial assumptions regarding Spartan's initial investment, project life, pricing policy, exchange rate projections, and so on still apply. Now, however, assume two adjustments to the country risk situation that Spartan must consider.

1. *Higher withholding tax.* The original example assumed that Singapore would impose a 10 percent withholding tax on any funds remitted by the subsidiary to the parent (with 100 percent certainty). Now assume that there is a 30 percent chance that Singapore will impose a 20 percent withholding tax rate instead of the 10 percent rate. This means that the probability of the originally assumed 10 percent withholding tax is reduced from 100 percent to 70 percent, since the sum of probabilities of possible outcomes for the withholding tax must add to 100 percent:

POSSIBLE TAX RATE OUTCOME	PROBABILITY OF OUTCOME OCCURRING
10%	70%
20%	30%
	100%

2. *Lower salvage value.* The original example assumed that the Singapore government will buy the subsidiary from Spartan (salvage value) for S$12 million after 4 years. Now assume that there is a 40 percent chance that the Singapore government will buy the subsidiary from Spartan for S$7 million instead of S$12 million. Thus, the probability distribution of possible outcomes for the salvage value is now as follows:

POSSIBLE SALVAGE VALUE OUTCOME	PROBABILITY OF OUTCOME OCCURRING
S$12 million	60%
S$7 million	40%
	100%

Exhibit 16.5 Analysis of Project Based on a 20 Percent Withholding Tax: Spartan, Inc.

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
14. S$ remitted by subsidiary		S$6,000,000	S$6,000,000	S$7,600,000	S$8,400,000
15. Withholding tax imposed on remitted funds (20%)		S$1,200,000	S$1,200,000	S$1,520,000	S$1,680,000
16. S$ remitted after withholding taxes		S$4,800,000	S$4,800,000	S$6,080,000	S$6,720,000
17. Salvage value					S$12,000,000
18. Exchange rate of S$		$.50	$.50	$.50	$.50
19. Cash flows to parent		$2,400,000	$2,400,000	$3,040,000	$9,360,000
20. PV of parent cash flows (15% discount rate)		$2,086,956	$1,814,745	$1,998,849	$5,351,610
21. Initial investment by parent	$10,000,000				
22. Cumulative NPV		−$7,913,044	−$6,098,299	−$4,099,450	$1,252,160

To determine how the NPV is affected by each of these country risk situations, a capital budgeting analysis similar to that shown in Exhibit 14.2 can be used. If this analysis is already on a spreadsheet, then the NPV can easily be estimated by adjusting line items 15 (withholding tax on remitted funds) and 17 (salvage value). The capital budgeting analysis measures the effect of a 20 percent withholding tax rate (while using the original assumption of S$12 million salvage value) in Exhibit 16.5. Since items before line 14 are not affected, these items are not shown here. If the 20 percent withholding tax rate is imposed, the NPV of the four-year project is $1,252,160.

Now consider the possibility of the lower salvage value while using the initial assumption of a 10 percent withholding tax rate. The capital budgeting analysis accounts for the lower salvage value in Exhibit 16.6. The estimated NPV is $800,484 based on this country risk situation.

Finally, consider the possibility that both the higher withholding tax and the lower salvage value occur. The capital budgeting analysis in Exhibit 16.7 accounts for both of these country risk situations; the NPV is estimated to be −$177,223.

Once estimates for the NPV are derived for each country risk situation, Spartan, Inc., can attempt to determine whether the project is feasible. There are two country risk variables that are uncertain, and there are four possible NPV outcomes; see Exhibit 16.8. Given the probability of each possible situation and the assumption that the withholding tax outcome is independent of the salvage value outcome, joint probabilities can be determined for each pair of outcomes by multiplying the probabilities of the two outcomes of concern. Because the probability of a 20 percent withholding tax is 30 percent, it follows that the probability of a 10 percent withholding tax is 70 percent. Likewise, given that the probability of a lower salvage value is 40 percent, the probability

Exhibit 16.6 Analysis of Project Based on a Reduced Salvage Value: Spartan, Inc.

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
14. S$ remitted by subsidiary		S$6,000,000	S$6,000,000	S$7,600,000	S$8,400,000
15. Withholding tax imposed on remitted funds (10%)		S$600,000	S$600,000	S$760,000	S$840,000
16. S$ remitted after withholding taxes		S$5,400,000	S$5,400,000	S$6,840,000	S$7,560,000
17. Salvage value					S$7,000,000
18. Exchange rate of S$		$.50	$.50	$.50	$.50
19. Cash flows to parent		$2,700,000	$2,700,000	$3,420,000	$7,280,000
20. PV of parent cash flows (15% discount rate)		$2,347,826	$2,041,588	$2,248,706	$4,162,364
21. Initial investment by parent	$10,000,000				
22. Cumulative NPV		−$7,652,174	−$5,610,586	−$3,361,880	$800,484

Exhibit 16.7 Analysis of Project Based on a 20 Percent Withholding Tax and a Reduced Salvage Value: Spartan, Inc.

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4
14. S$ remitted by subsidiary		S$6,000,000	S$6,000,000	S$7,600,000	S$8,400,000
15. Withholding tax imposed on remitted funds (20%)		S$1,200,000	S$1,200,000	S$1,520,000	S$1,680,000
16. S$ remitted after withholding taxes		S$4,800,000	S$4,800,000	S$6,080,000	S$6,720,000
17. Salvage value					S$7,000,000
18. Exchange rate of S$		$.50	$.50	$.50	$.50
19. Cash flows to parent		$2,400,000	$2,400,000	$3,040,000	$6,860,000
20. PV of parent cash flows (15% discount rate)		$2,086,956	$1,814,745	$1,998,849	$3,922,227
21. Initial investment by parent	$10,000,000				
22. Cumulative NPV		−$7,913,044	−$6,098,299	−$4,099,450	−$177,223

that the originally assumed salvage value will occur is 60 percent. Thus, scenario 1 (10 percent withholding tax and S$12 million salvage value, as in Chapter 14) has a joint probability of 70% × 60% = 42%; this is the probability that *both* outcomes will occur. The joint probabilities for the other three scenarios shown in Exhibit 16.8 are determined in the same manner.

In Exhibit 16.8, scenario 4 is the only scenario in which there is a negative NPV. Since this scenario has a 12 percent chance of occurring, there is a 12 percent chance that the project will adversely affect the value of the firm. Put another way, there is an 88 percent chance that the project will enhance the firm's value. The expected value of the project's NPV can be measured as the sum of each scenario's estimated NPV multiplied by its respective probability across all four scenarios, as shown at the bottom of Exhibit 16.8. Most MNCs would accept the proposed project, given the likelihood that the project will have a positive NPV and the limited loss that would occur under even the worst-case scenario. ●

Accounting for Uncertainty In the previous example, the initial assumptions for most input variables were used as if they were known with certainty. However, Spartan, Inc., could account for the uncertainty of country risk characteristics (as in the current example) while also allowing for uncertainty in the other variables as well. This process is facilitated by performing the analysis with the aid of a computer spreadsheet.

EXAMPLE If Spartan, Inc., wishes to allow for three possible exchange rate trends, it can adjust the exchange rate projections for each of the four scenarios assessed in the current example. Each scenario will

Exhibit 16.8 Summary of Estimated NPVs across the Possible Scenarios: Spartan, Inc.

SCENARIO	WITHHOLDING TAX IMPOSED BY SINGAPORE GOVERNMENT	SALVAGE VALUE OF PROJECT	NPV	PROBABILITY
1	10%	S$12,000,000	$2,229,867	(70%)(60%) = 42%
2	20%	S$12,000,000	$1,252,160	(30%)(60%) = 18%
3	10%	S$7,000,000	$800,484	(70%)(40%) = 28%
4	20%	S$7,000,000	−$177,223	(30%)(40%) = 12%
		E(NPV) = $2,229,867(42%) + $1,252,160(18%) + $800,484(28%) − $177,223(12%) = $1,364,801		

reflect a specific withholding tax outcome, a specific salvage value outcome, and a specific exchange rate trend. There will now be a total of 12 scenarios, each with its associated NPV estimate and probability of occurrence. Based on the estimated NPV and the probability of each scenario, Spartan, Inc., can then measure the expected NPV and the probability that it will be positive, which leads to a decision regarding whether the project is feasible. ●

16-3c Analysis of Existing Projects

An MNC should consider country risk not only when assessing a new project but should also review the country risk periodically after a project has been implemented. If an MNC has a subsidiary in a country that experiences adverse political conditions, it may need to reassess the feasibility of maintaining this subsidiary.

EXAMPLE

Three years ago, California Co. established a subsidiary in Zinland. As a result of a new higher tax imposed by the government of Zinland, the cash flows generated by the subsidiary are reduced. Based on a new capital budgeting analysis, California Co. determines that the present value of the subsidiary is 30 percent less than before the higher tax rate was imposed by the government. Because it believes that the high tax rate will continue in Zinland, California Co. decides to seek a buyer for its subsidiary. If it can find a buyer that is willing to pay more than the subsidiary's present value, it will sell its subsidiary and do its future business in Zinland by exporting products there. ●

MNCs commonly respond to adverse country risk conditions by restructuring their operations in a manner that will reduce their exposure to country risk. However, strategies such as selling a subsidiary can be difficult and costly. If California Co. had anticipated, three years earlier, the actions by the Zinland government to impose higher tax rates, then the company might never have established a subsidiary there. Although MNCs are not capable of anticipating all changes in country risk conditions that can occur, they should at least consider various scenarios that might occur, especially when considering a long-term project in a foreign country.

16-4 Preventing Host Government Takeovers

The most severe country risk is a host government takeover. This type of takeover may result in major losses, especially when the MNC does not have any power to negotiate with the host government.

The following are the most common strategies used to reduce exposure to a host government takeover:

- use a short-term horizon,
- rely on unique supplies or technology,
- hire local labor,
- borrow local funds,
- purchase insurance, and
- use project finance.

16-4a Use a Short-Term Horizon

An MNC may concentrate on recovering cash flow quickly so that losses are minimized in the event of expropriation. An MNC might make only a minimum effort to replace worn-out equipment and machinery at the subsidiary. It may even phase out its overseas investment by selling off its assets to local investors or the government in stages over time. As a result, there would be little incentive for a host government to take over an MNC's subsidiary.

16-4b Rely on Unique Supplies or Technology

If the subsidiary can bring in supplies from its headquarters (or a sister subsidiary) that cannot be duplicated locally, then the host government will not be able to take over and operate the subsidiary without those supplies. The MNC can also cut off supplies if the subsidiary is treated unfairly.

If the subsidiary can hide the technology in its production process, then a government takeover will be less likely. A takeover would be successful in this case only if the MNC would provide the necessary technology, and the MNC would do so only under conditions of a friendly takeover that would ensure it received adequate compensation.

16-4c Hire Local Labor

If local employees of the subsidiary would be affected by the host government's takeover, they can pressure their government to avoid such action. However, the government could still keep those employees after taking over the subsidiary. Thus, this strategy has only limited effectiveness in avoiding or limiting a government takeover.

16-4d Borrow Local Funds

If the subsidiary borrows funds locally, then local banks will be concerned about its future performance. If for any reason a government takeover would reduce the probability that the banks would receive their loan repayments promptly, they might attempt to prevent a takeover by the host government. However, the host government may guarantee repayment to the banks, so this strategy has only limited effectiveness. Nevertheless, it could still be preferable to a situation in which the MNC not only loses the subsidiary but also still owes home country creditors.

16-4e Purchase Insurance

Insurance can be purchased to cover the risk of expropriation. For example, the U.S. government provides insurance through the Overseas Private Investment Corporation (OPIC). The insurance premiums paid by a firm depend on the extent of insurance coverage and the risk associated with the firm. Typically, however, any insurance policy will cover only a portion of the company's total exposure to country risk.

Many home countries of MNCs have investment guarantee programs that insure to some extent the risks of expropriation, wars, or currency blockage. Some guarantee programs have a one-year waiting period (or longer) before compensation is actually paid on losses due to expropriation. Also, some insurance policies do not cover all forms of expropriation. Furthermore, to be eligible for such insurance, the subsidiary might be required by the country to concentrate on exporting rather than on local sales. Even if a subsidiary qualifies for insurance, there is a cost. Any insurance will typically cover only a portion of the assets and may specify a maximum duration of coverage, such as 15 or 20 years. A subsidiary must weigh the benefits of this insurance against the cost of the policy's premiums and potential losses in excess of coverage. The insurance can be helpful, but it does not by itself prevent losses due to expropriation.

The World Bank has established an affiliate, called the Multilateral Investment Guarantee Agency (MIGA) to provide political insurance for MNCs with direct foreign investment in less developed countries. This agency offers insurance against expropriation, breach of contract, currency inconvertibility, war, and civil disturbances.

16-4f Use Project Finance

Many of the world's largest infrastructure projects are structured as "project finance" deals, which limit the exposure of the MNCs. First, project finance deals are heavily

financed with credit. Thus, the MNC's exposure is limited because it invests only a limited amount of equity in the project. Second, a bank may guarantee the payments to the MNC. Third, project finance deals are unique in that they are secured by the project's future revenues from production. That is, the project is separate from the MNC that manages the project. The loans are "nonrecourse" so that the creditor is entitled only to the assets and cash flows of the project itself. Given the transparency of the process, which arises from the single purpose and finite plan for termination, project finance enables funding for projects that might not obtain financing under conventional terms. A host government is unlikely to take over this type of project because it would have to assume the existing liabilities due to the credit arrangement.

Summary

- The characteristics used by MNCs to measure a country's political risk include the attitude of consumers toward purchasing locally produced goods, the host government's actions toward the MNC, the blockage of fund transfers, currency inconvertibility, war, bureaucratic problems, and corruption. These characteristics can increase the costs of international business.

  The characteristics used by MNCs to measure a country's financial risk are the country's gross domestic product, interest rate, exchange rate, and inflation rate.
- The techniques typically used by MNCs to measure the country risk are the checklist approach, the Delphi technique, quantitative analysis, and inspection visits. Since no one technique covers all aspects of country risk, a combination of these techniques may be used. An overall measure of country risk is essentially a weighted average of the political or financial factors that are perceived to constitute country risk. Each MNC has its own view as to the weights that should be assigned to each factor and its own view about each factor's importance as related to its business. Thus, the overall rating for a country varies among MNCs.
- Once country risk is measured, it can be incorporated into a capital budgeting analysis by adjustment of the discount rate. The adjustment is somewhat arbitrary, however, and may lead to improper decision making. An alternative method of incorporating country risk analysis into capital budgeting is to explicitly account for each factor that affects country risk. For each possible form of risk, the MNC can recalculate the foreign project's net present value under the condition that the event (such as blocked funds or increased taxes) occurs.
- MNCs can reduce the likelihood of a host government takeover of their subsidiary by using a short-term horizon for their operations whereby the investment in the subsidiary is limited. In addition, reliance on unique technology (that cannot be copied), local citizens for labor, and local financial institutions for financing may create some protection from the host government.

Point Counter-Point

Does Country Risk Matter for U.S. Projects?

Point No. U.S.-based MNCs should consider country risk for foreign projects only. A U.S.-based MNC can account for U.S. economic conditions when estimating cash flows of a U.S. project or deriving the required rate of return on a project, but it does not need to consider country risk.

Counter-Point Yes. Country risk should be considered for U.S. projects. Country risk can indirectly affect the cash flows of a U.S. project. Consider a U.S. project in which supplies are produced and sent to a U.S. exporter. The demand for the supplies will be dependent on the demand for the exports over time, and the demand for exports over time may be dependent on country risk.

Who Is Correct? Use the Internet to learn more about this issue. Which argument do you support? Offer your own opinion on this issue.

Self-Test

Answers are provided in Appendix A at the back of the text.

1. Key West Co. exports highly advanced phone system components to its subsidiary shops on islands in the Caribbean. The components are purchased by consumers to improve their phone systems. These components are not produced in other countries. Explain how political risk factors could adversely affect the profitability of Key West Co.
2. Using the information in question 1, explain how financial risk factors could adversely affect the profitability of Key West Co.
3. Given the information in question 1, do you expect that Key West Co. is more concerned about the adverse effects of political risk or of financial risk?
4. Explain what types of firms would be most concerned about an increase in country risk as a result of the terrorist attack on the United States on September 11, 2001.
5. Rockford Co. plans to expand its successful business by establishing a subsidiary in Canada. However, it is concerned that after 2 years the Canadian government will either impose a special tax on any income sent back to the U.S. parent or order the subsidiary to be sold at that time. The executives have estimated that each of these scenarios has a 15 percent chance of occurring. They have decided to add four percentage points to the project's required rate of return to incorporate the country risk that they are concerned about in the capital budgeting analysis. Is there a better way to more precisely incorporate the country risk of concern here?

Questions and Applications

1. **Forms of Country Risk** List some forms of political risk other than a takeover of a subsidiary by the host government, and briefly elaborate on how each factor can affect the risk to the MNC. Identify common financial factors for an MNC to consider when assessing country risk. Briefly elaborate on how each factor can affect the risk to the MNC.
2. **Country Risk Assessment** Describe the steps involved in assessing country risk once all relevant information has been gathered.
3. **Uncertainty Surrounding the Country Risk Assessment** Describe the possible errors involved in assessing country risk. In other words, explain why country risk analysis is not always accurate.
4. **Diversifying Away Country Risk** Why do you think that an MNC's strategy of diversifying projects internationally could achieve low exposure to country risk?
5. **Monitoring Country Risk** Once a project is accepted, country risk analysis for the foreign country involved is no longer necessary, assuming that no other proposed projects are being evaluated for that country. Do you agree with this statement? Why or why not?
6. **Country Risk Analysis** If the potential return is high enough, any degree of country risk can be tolerated. Do you agree with this statement? Why or why not? Do you think that a proper country risk analysis can replace a capital budgeting analysis of a project considered for a foreign country? Explain.
7. **Country Risk Analysis** Niagara, Inc., has decided to call a well-known country risk consultant to conduct a country risk analysis in a small country where it plans to develop a large subsidiary. Niagara prefers to hire the consultant since it plans to use its employees for other important corporate functions. The consultant uses a computer program that has assigned weights of importance linked to the various factors. The consultant will evaluate the factors for this small country and insert a rating for each factor into the computer. The weights assigned to the factors are not adjusted by the computer, but the factor ratings are adjusted for each country that the consultant assesses. Do you think Niagara, Inc., should use this consultant? Why or why not?
8. **Micro-Assessment** Explain the micro-assessment of country risk.
9. **Incorporating Country Risk in Capital Budgeting** How could a country risk assessment be used to adjust a project's required rate of return? How could such an assessment be used instead to adjust a project's estimated cash flows?
10. **Reducing Country Risk** Explain some methods of reducing exposure to existing country risk while maintaining the same amount of business within a particular country.

11. Managing Country Risk Why do some subsidiaries maintain a low profile as to where their parents are located?

12. Country Risk Analysis When NYU Corp. considered establishing a subsidiary in Zenland, it performed a country risk analysis to help make the decision. It first retrieved a country risk analysis performed about 1 year earlier, when it had planned to begin a major exporting business to Zenland firms. Then it updated the analysis by incorporating all current information on the key variables that were used in that analysis, such as Zenland's willingness to accept exports, its existing quotas, and existing tariff laws. Is this country risk analysis adequate? Explain.

13. Reducing Country Risk MNCs such as Alcoa, DuPont, Heinz, and IBM donated products and technology to foreign countries where they had subsidiaries. How could these actions have reduced some forms of country risk?

14. Country Risk Ratings Assauer, Inc., would like to assess the country risk of Glovanskia. Assauer has identified various political and financial risk factors, as shown below. Assauer has assigned an overall rating of 80 percent to political risk factors and of 20 percent to financial risk factors. Assauer is not willing to consider Glovanskia for investment if the country risk rating is below 4.0. Should Assauer consider Glovanskia for investment?

POLITICAL RISK FACTOR	ASSIGNED RATING	ASSIGNED WEIGHT
Blockage of fund transfers	5	40%
Bureaucracy	3	60%

FINANCIAL RISK FACTOR	ASSIGNED RATING	ASSIGNED WEIGHT
Interest rate	1	10%
Inflation	4	20%
Exchange rate	5	30%
Competition	4	20%
Growth	5	20%

15. Effects of September 11 Arkansas, Inc., exports to various less developed countries, and its receivables are denominated in the foreign currencies of the importers. It considers reducing its exchange rate risk by establishing small subsidiaries to produce products. By incurring some expenses in the countries where it generates revenue, it reduces its exposure to exchange rate risk. Since September 11, 2001, when terrorists attacked the United States, it has questioned whether it should restructure its operations. Its CEO believes that its cash flows may be less exposed to exchange rate risk but more exposed to other types of risk as a result of restructuring. What is your opinion?

Advanced Questions

16. How Country Risk Affects NPV Hoosier, Inc., is planning a project in the United Kingdom. It would lease space for 1 year in a shopping mall to sell expensive clothes manufactured in the United States. The project would end in 1 year, when all earnings would be remitted to Hoosier, Inc. Assume that no additional corporate taxes are incurred beyond those imposed by the British government. Since Hoosier, Inc., would rent space, it would not have any long-term assets in the United Kingdom and expects the salvage (terminal) value of the project to be about zero.

Assume that the project's required rate of return is 18 percent. Also assume that the initial outlay required by the parent to fill the store with clothes is $200,000. The pretax earnings are expected to be £300,000 at the end of 1 year. The British pound is expected to be worth $1.60 at the end of 1 year, when the after-tax earnings are converted to dollars and remitted to the United States. The following forms of country risk must be considered:

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

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

17. How Country Risk Affects NPV Explain how the capital budgeting analysis in the previous question would need to be adjusted if there were three possible outcomes for the British pound along with the possible outcomes for the British economy and corporate tax rate.

18. JCPenney's Country Risk Analysis Recently, JCPenney decided to consider expanding into various foreign countries; it applied a comprehensive country risk analysis before making its expansion decisions. Initial screenings of 30 foreign countries were based on political and economic factors that contribute to country risk. For the remaining 20 countries where country risk was considered to be tolerable, specific country risk characteristics of each country were considered. One of JCPenney's biggest targets is Mexico, where it planned to build and operate seven large stores.

a. Identify the political factors that you think may possibly affect the performance of the JCPenney stores in Mexico.

b. Explain why the JCPenney stores in Mexico and in other foreign markets are subject to financial risk (a subset of country risk).

c. Assume that JCPenney anticipated that there was a 10 percent chance that the Mexican government would temporarily prevent conversion of peso profits into dollars because of political conditions. This event would prevent JCPenney from remitting earnings generated in Mexico and could adversely affect the performance of these stores (from the U.S. perspective).

d. Offer a way in which this type of political risk could be explicitly incorporated into a capital budgeting analysis when assessing the feasibility of these projects.

e. Assume that JCPenney decides to use dollars to finance the expansion of stores in Mexico. Second, assume that JCPenney decides to use one set of dollar cash flow estimates for any project that it assesses. Third, assume that the stores in Mexico are not subject to political risk. Do you think that the required rate of return on these projects would differ from the required rate of return on stores built in the United States at that same time? Explain.

f. Based on your answer to the previous question, does this mean that proposals for any new stores in the United States have a higher probability of being accepted than proposals for any new stores in Mexico?

19. How Country Risk Affects NPV Monk, Inc., is considering a capital budgeting project in Tunisia. The project requires an initial outlay of 1 million Tunisian dinars; the dinar is currently valued at $.70. In the first and second years of operation, the project will generate 700,000 dinars in each year. After 2 years, Monk will terminate the project, and the expected salvage value is 300,000 dinars. Monk has assigned a discount rate of 12 percent to this project. The following additional information is available:

- There is currently no withholding tax on remittances to the United States, but there is a 20 percent chance that the Tunisian government will impose a withholding tax of 10 percent beginning next year.
- There is a 50 percent chance that the Tunisian government will pay Monk 100,000 dinar after 2 years instead of the 300,000 dinars it expects.
- The value of the dinar is expected to remain unchanged over the next 2 years.

a. Determine the net present value of the project in each of the four possible scenarios.

b. Determine the joint probability of each scenario.

c. Compute the expected NPV of the project and make a recommendation to Monk regarding its feasibility.

20. How Country Risk Affects NPV In the previous question, assume that instead of adjusting the estimated cash flows of the project, Monk had decided to adjust the discount rate from 12 to 17 percent. Reevaluate the NPV of the project's expected scenario using this adjusted discount rate.

21. Risk and Cost of Potential Kidnapping In 2004 during the war in Iraq, some MNCs capitalized on opportunities to rebuild Iraq. However, in April 2004, some employees were kidnapped by local militant groups. How should an MNC account for this potential risk when it considers direct foreign investment (DFI) in any particular country? Should it avoid DFI in any country in which such an event could occur? If so, how would it screen the countries to determine which are acceptable? For whatever countries the MNC is willing to consider, should it adjust its feasibility analysis to account for the possibility of kidnapping? Should it attach a cost to reflect this possibility or increase the discount rate when estimating the net present value? Explain.

22. Integrating Country Risk and Capital Budgeting Tovar Co. is a U.S. firm that has been asked to provide consulting services to help Grecia Co. (in Greece) improve its performance. Tovar would need to spend $300,000 today on expenses related to this project. In 1 year, Tovar will receive payment from Grecia, which will be tied to Grecia's performance during the year. There is uncertainty about Grecia's performance and about Grecia's tendency for corruption.

Tovar expects that it will receive 400,000 euros if Grecia achieves strong performance following the consulting job. However, there are two forms of country risk that are a concern to Tovar Co. There is an 80 percent chance that Grecia will achieve strong

formance. There is a 20 percent chance that Grecia perform poorly, and in this case, Tovar will receive ayment of only 200,000 euros.

While there is a 90 percent chance that Grecia will ke its payment to Tovar, there is a 10 percent nce that Grecia will become corrupt, and in this e, Grecia will not submit any payment to Tovar. Assume that the outcome of Grecia's performance is lependent of whether Grecia becomes corrupt. The evailing spot rate of the euro is $1.30, but Tovar pects that the euro will depreciate by 10 percent in ear, regardless of Grecia's performance or whether s corrupt.

Tovar's cost of capital is 26 percent. Determine the pected value of the project's net present value. etermine the probability that the project's NPV will negative.

. Capital Budgeting and Country Risk Wyoming . is a nonprofit educational institution that wants to port educational software products from Hong Kong d sell them in the United States. It wants to assess e net present value of this project since any profits it rns will be used for its foundation. It expects to pay K$5 million for the imports. Assume the existing change rate is HK$1 = $.12. It would also incur lling expenses of $1 million to sell the products in the nited States. It would be able to sell the products in e United States for $1.7 million. However, it is con- rned about two forms of country risk. First, there is a 0 percent chance that the Hong Kong dollar will be valued to be worth HK$1 = $.16 by the Hong Kong overnment. Second, there is a 70 percent chance that e Hong Kong government will impose a special tax of 0 percent on the amount that U.S. importers must pay r Hong Kong exports. These two forms of country sk are independent, meaning that the probability that e Hong Kong dollar will be revalued is independent f the probability that the Hong Kong government will mpose a special tax. Wyoming's required rate of return n this project is 22 percent. What is the expected alue of the project's net present value? What is the robability that the project's NPV will be negative?

4. Accounting for Country Risk of a Project ansas Co. wants to invest in a project in China. It ould require an initial investment of 5 million yuan. is expected to generate cash flows of 7 million yuan t the end of 1 year. The spot rate of the yuan is $.12, nd Kansas thinks this exchange rate is the best fore- ast of the future. However, there are two forms of ountry risk.

First, there is a 30 percent chance that the Chinese government will require that the yuan cash flows earned by Kansas at the end of 1 year be reinvested in China for 1 year before it can be remitted (so that cash would not be remitted until 2 years from today). In this case, Kansas would earn 4 percent after taxes on a bank deposit in China during that second year.

Second, there is a 40 percent chance that the Chinese government will impose a special remittance tax of 400,000 yuan at the time that Kansas Co. remits cash flows earned in China back to the United States.

The two forms of country risk are independent. The required rate of return on this project is 26 percent. There is no salvage value. What is the expected value of the project's net present value?

25. Accounting for Country Risk of a Project Slidell Co. (a U.S. firm) considers a foreign project in which it expects to receive 10 million euros at the end of this year. It plans to hedge receivables of 10 million euros with a forward contract. Today, the spot rate of the euro is $1.20, the 1-year forward rate of the euro is presently $1.24, and the expected spot rate of the euro in 1 year is $1.19. The initial outlay is $7 million. Slidell has a required return of 18 percent.

There is a 20 percent chance that political problems will cause a reduction in foreign business, such that Slidell would only receive 4 million euros at the end of 1 year. Determine the expected value of the net present value of this project.

26. Political Risk and Currency Derivative Values Assume that interest rate parity exists. At 10:30 a.m., the media reported news that the Mexican government's political problems were reduced, which reduced the expected volatility of the Mexican peso against the dollar over the next month. However, this news had no effect on the prevailing 1-month interest rates of the U.S. dollar or Mexican peso, or on the expected exchange rate of the Mexican peso in 1 month. The spot rate of the Mexican peso was $.13 as of 10 a.m. and remained at that level all morning.

a. At 10 a.m., Piazza Co. purchased a call option at the money on 1 million Mexican pesos with a December expiration date. At 11:00 a. m., Corradetti Co. purchased a call option at the money on 1 million pesos with a December expiration date. Did Corradetti Co. pay more, less, or the same as Piazza Co. for the options? Briefly explain.

b. Teke Co. purchased futures contracts on 1 million Mexican pesos with a December settlement date at 10 a.m. Malone Co. purchased futures contracts on 1 million Mexican pesos with a December settlement date at 11 a.m. Did Teke Co. pay more, less, or the same as Malone Co. for the futures contracts? Briefly explain.

27. Political Risk and Project NPV Drysdale Co. (a U.S. firm) is considering a new project that would result in cash flows of 5 million Argentine pesos in 1 year under the most likely economic and political conditions. The spot rate of the Argentina peso in 1 year is expected to be $.40 based on these conditions. However, it wants to also account for the 10 percent probability of a political crisis in Argentina, which would change the expected cash flows to 4 million Argentine pesos in 1 year. In addition, it wants to account for the 20 percent probability that the exchange rate may only be $.36 at the end of 1 year. These two forms of country risk are independent. Drysdale's required rate of return is 25 percent and its initial outlay for this project is $1.4 million. Show the distribution of possible outcomes for the project's net present value.

28. Country Risk and Project NPV Atro Co. (a U.S. firm) considers a foreign project in which it expects to receive 10 million euros at the end of 1 year. While it realizes that its receivables are uncertain, it decides to hedge receivables of 10 million euros with a forward contract today. As of today, the spot rate of the euro is $1.20, while the 1-year forward rate of the euro is presently $1.24, and the expected spot rate of the euro in 1 year is $1.19. The initial outlay of this project is $7 million. Atro has a required return of 18 percent.

a. Estimate the NPV of this project based on the expectation of 10 million euros in receivables.

b. Now estimate the NPV based on the possibility that country risk could cause a reduction in foreign business such that Atro Co. only receives 4 million euros instead of 10 million euros at the end of 1 year. Estimate the net present value of the project if this form of country risk occurs.

29. Accounting for Political Risk and the Hedging Decision

a. Duv Co. (a U.S. firm) is planning to invest $2.5 million in a project in Portugal that will exist for one year. Its required rate of return on this project is 18 percent. It expects to receive cash flows of 2 million euros in one year from this project. The spot rate of the euro in one year is expected to be $1.50. The one-year forward rate of the euro is presently $1.40. Duv Co. wants to account also for the 20 percent probability of a crisis in Portugal. If this crisis occurs, Duv would reduce its expected cash flows to 1 million euros in one year. Duv Co. does not plan to hedge its expected cash flows. Show the distribution of possible outcomes for the project's estimated net present value, including the probability of each possible outcome.

b. Now assume that Duv plans to hedge the cash flows that it believes it will receive if a crisis in Portugal occurs. However, it decides not to hedge additional cash flows that it would receive if the crisis does not occur. Estimate what the net present value of the project will be based on the hedging strategy described here and assuming that a crisis in Portugal does not occur.

Discussion in the Boardroom

This exercise can be found in Appendix E at the back of this textbook.

Running Your Own MNC

This exercise can be found on the *International Financial Management* text companion website. Go to www.cengagebrain.com (students) or www.cengage.com/login (instructors) and search using **ISBN 9781133947837**.

Blades, Inc. Case

Country Risk Assessment

Recently, Ben Holt, Blades' chief financial Officer, has assessed whether it would be more beneficial for Blades to establish a subsidiary in Thailand to manufacture roller blades or to acquire an existing manufacturer, Skates'n'Stuff, which has offered to sell the business to Blades for 1 billion Thai baht. In Holt's view, establishing a subsidiary in Thailand yields a higher net present value than acquiring the existing business. Furthermore, the Thai manufacturer has rejected an offer by Blades, Inc., of 900 million baht. A purchase price of 900 million baht for Skates'n'Stuff would make the acquisition as attractive as the establishment of a subsidiary in Thailand in terms of NPV Skates'n'Stuff has indicated that it is not willing to accept less than 950 million baht.

Although Holt is confident that the NPV analysis was conducted correctly, he is troubled by the fact that the same discount rate, 25 percent, was used in each analysis. In his view, establishing a subsidiary in Thailand

may be associated with a higher level of country risk than acquiring Skates'n'Stuff. Although either approach would result in approximately the same level of financial risk, the political risk associated with establishing a subsidiary in Thailand may be higher then the political risk of operating Skates'n'Stuff. If the establishment of a subsidiary in Thailand is associated with a higher level of country risk overall, then a higher discount rate should have been used in the analysis. Based on these considerations, Holt wants to measure the country risk associated with Thailand on both a macro and a micro level and then to reexamine the feasibility of both approaches.

First, Holt has gathered some more detailed political information for Thailand. For example, he believes that consumers in Asian countries prefer to purchase goods produced by Asians, which might prevent a subsidiary in Thailand from being successful. This cultural characteristic might not prevent an acquisition of Skates'n'Stuff from succeeding, however, especially if Blades retains the company's management and employees. Furthermore, the subsidiary would have to apply for various licenses and permits to be allowed to operate in Thailand, whereas Skates'n'Stuff obtained these licenses and permits long ago. However, the number of licenses required for Blades' industry is relatively low compared to other industries. Moreover, there is a high possibility that the Thai government will implement capital controls in the near future, which would prevent funds from leaving Thailand. Since Blades, Inc., has planned to remit all earnings generated by its subsidiary or by Skates'n'Stuff back to the United States, regardless of which approach to direct foreign investment it takes, capital controls may force Blades to reinvest funds in Thailand.

Holt has also gathered some information regarding the financial risk of operating in Thailand. Thailand's economy has been weak lately, and recent forecasts indicate that a recovery may be slow. A weak economy may affect the demand for Blades' products, roller blades. The state of the economy is of particular concern to Blades since it produces a leisure product. In the case of an economic turndown, consumers will first eliminate these types of purchases. Holt is also worried about the high interest rates in Thailand, which may further slow economic growth if Thai citizens begin saving more. Furthermore, Holt is also aware that inflation levels in Thailand are expected to remain high. These high inflation levels can affect the purchasing power of Thai consumers, who may adjust their spending habits to purchase more essential products than roller blades. However, high levels of inflation also indicate that consumers in Thailand are still spending a relatively high proportion of their earnings.

Another financial factor that may affect Blades' operations in Thailand is the baht-dollar exchange rate. Current forecasts indicate that the Thai baht may depreciate in the future. However, recall that Blades will sell all roller blades produced in Thailand to Thai consumers. Therefore, Blades is not subject to a lower level of U.S. demand resulting from a weak baht. Blades will remit the earnings generated in Thailand back to the United States, however, and a weak baht would reduce the dollar amount of these translated earnings. Based on these initial considerations, Holt feels that the level of political risk of operating may be higher if Blades decides to establish a subsidiary to manufacture roller blades (as opposed to acquiring Skates'n'Stuff). The financial risk of operating in Thailand will be roughly the same whether Blades establishes a subsidiary or acquires Skates'n'Stuff. Holt is not satisfied with this initial assessment, however, and would like to have numbers at hand when he meets with the board of directors next week. Thus, he would like to conduct a quantitative analysis of the country risk associated with operating in Thailand. He has asked you, a financial analyst at Blades, to develop a country risk analysis for Thailand and to adjust the discount rate for the riskier venture (i.e., establishing a subsidiary or acquiring Skates'n'Stuff). Holt has provided the following information for your analysis:

- Since Blades produces leisure products, it is more susceptible to financial risk factors than political risk factors. You should use weights of 60 percent for financial risk factors and 40 percent for political risk factors in your analysis.
- You should use the attitude of Thai consumers, capital controls, and bureaucracy as political risk factors in your analysis. Holt perceives capital controls as the most important political risk factor. In his view, the consumer attitude and bureaucracy factors are of equal importance.
- You should use interest rates, inflation levels, and exchange rates as the financial risk factors in your analysis. In Holt's view, exchange rates and interest rates in Thailand are of equal importance, while inflation levels are slightly less important.
- Each factor used in your analysis should be assigned a rating in a range of 1 to 5, where 5 indicates the most unfavorable rating.

Holt has asked you to provide answers to the following questions for him, which he will use in his meeting with the board of directors:

1. Based on the information provided in the case, do you think the political risk associated with Thailand is higher or lower for a manufacturer of leisure products such as Blades as opposed to, say, a food producer? That is, conduct a micro-assessment of political risk for Blades, Inc.
2. Do you think the financial risk associated with Thailand is higher or lower for a manufacturer of leisure products such as Blades as opposed to, say, a food producer? That is, conduct a micro-assessment of financial risk for Blades, Inc. Do you think a leisure product manufacturer such as Blades will be more affected by political or financial risk factors?
3. Without using a numerical analysis, do you think establishing a subsidiary in Thailand or acquiring Skates'n'Stuff will result in a higher assessment of political risk? Of financial risk? Substantiate your answer.
4. Using a spreadsheet, conduct a quantitative country risk analysis for Blades, Inc., based on the information Holt has provided for you. Use your judgment to assign weights and ratings to each political and financial risk factor and determine an overall country risk rating for Thailand. Conduct two separate analyses for the establishment of a subsidiary in Thailand and the acquisition of Skates'n'Stuff.
5. Which method of direct foreign investment should utilize a higher discount rate in the capital budgeting analysis? Would this strengthen or weaken the tentative decision of establishing a subsidiary in Thailand?

Small Business Dilemma

Country Risk Analysis at the Sports Exports Company

The Sports Exports Company produces footballs in the United States and exports them to the United Kingdom. It also has an ongoing joint venture with a British firm that produces some sporting goods for a fee. The Sports Exports Company is considering the establishment of a small subsidiary in the United Kingdom.

1. Under the current conditions, is the Sports Exports Company subject to country risk?
2. If the firm does decide to develop a small subsidiary in the United Kingdom, will its exposure to country risk change? If so, how?

Internet/Excel Exercise

Go to the website (www.cia.gov/library/publications/the-world-factbook/index.html) of the CIA *World Factbook*. Select a country and review the information about the country's political conditions. Explain whether these conditions would likely discourage an MNC from engaging in direct foreign investment. Explain how the political conditions could adversely affect the cash flows of the MNC.

Online Articles with Real-World Examples

Find a recent article online that describes an actual international finance application or a real-world example about a specific MNC's actions that reinforces one or more of the concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary there and provide the Web link of the article so that other students can access it. If your class is live, your professor may ask you to summarize your application in class. Your professor may assign specific students to complete this assignment for this chapter or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples applied to this chapter, consider using the following search terms (and include the current year as a search term to ensure that the online articles are recent).

1. company AND political risk
2. Inc. AND political risk
3. [name of an MNC] AND political risk
4. [name of an MNC] AND country risk
5. exposure to political risk
6. exposure to country risk
7. country risk rating
8. risk AND foreign project
9. risk AND foreign subsidiary
10. multinational AND government takeover