14: Multinational Capital Budgeting

Multinational corporations (MNCs) evaluate international projects by using multinational capital budgeting, which compares the benefits and costs of these projects. 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. Proper use of multinational capital budgeting can identify the international projects worthy of implementation.

The most popular method of capital budgeting involves determining the project's net present value by estimating the present value of the project's future cash flows and subtracting the initial outlay required for the project. Multinational capital budgeting typically uses a similar process. However, special circumstances of international projects that affect the future cash flows or the discount rate used to discount cash flows make multinational capital budgeting more complex. Financial managers must understand how to apply capital budgeting to international projects, so that they can maximize the value of the MNC.

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, and
- explain how the risk of international projects can be assessed.

Subsidiary versus Parent Perspective

Should capital budgeting for a multinational project be conducted from the viewpoint of the subsidiary that will administer the project or the parent that will most likely finance much of the project? Some would say the subsidiary's perspective should be used because it will be responsible for administering the project. In addition, since the subsidiary is a subset of the MNC, what is good for the subsidiary would appear to be good for the MNC. This reasoning, however, is not necessarily correct. One could argue that if the parent is financing the project, then it should be evaluating the results from its point of view. The feasibility of the capital budgeting analysis can vary with the perspective because the net after-tax cash inflows to the subsidiary can differ substantially from those to the parent. Such differences can be due to several factors, some of which are discussed here.

Tax Differentials

If the earnings due to the project will someday be remitted to the parent, 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. Under such a scenario, the parent should not consider implementing the project, even though it appears feasible from the subsidiary's perspective.

HTTP://

http://www.kpmg.com
Detailed information on the tax regimes, rates, and regulations of over 75 countries.

Restricted Remittances

Consider a potential project to be implemented in a country where 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. One possible solution is to let the subsidiary obtain partial financing for the project within the host country. In this case, the portion of funds not allowed to be sent to the parent can be used to cover the financing costs over time.

Excessive Remittances

Consider a parent that charges its subsidiary very high administrative fees because management is centralized at the headquarters. To the subsidiary, the fees represent an expense. To the parent, the fees represent revenue that may substantially exceed the actual cost of managing the subsidiary. In this case, the project's earnings may appear low from the subsidiary's perspective and high from the parent's perspective. The feasibility of the project again depends on perspective. In most cases, neglecting the parent's perspective will distort the true value of a foreign project.

Exchange Rate Movements

When earnings are remitted to the parent, they are normally converted from the subsidiary's local currency to the parent's currency. The amount received by the parent is therefore influenced by the existing exchange rate. If the subsidiary project is assessed from the subsidiary's perspective, the cash flows forecasted for the subsidiary do not have to be converted to the parent's currency.

Summary of Factors

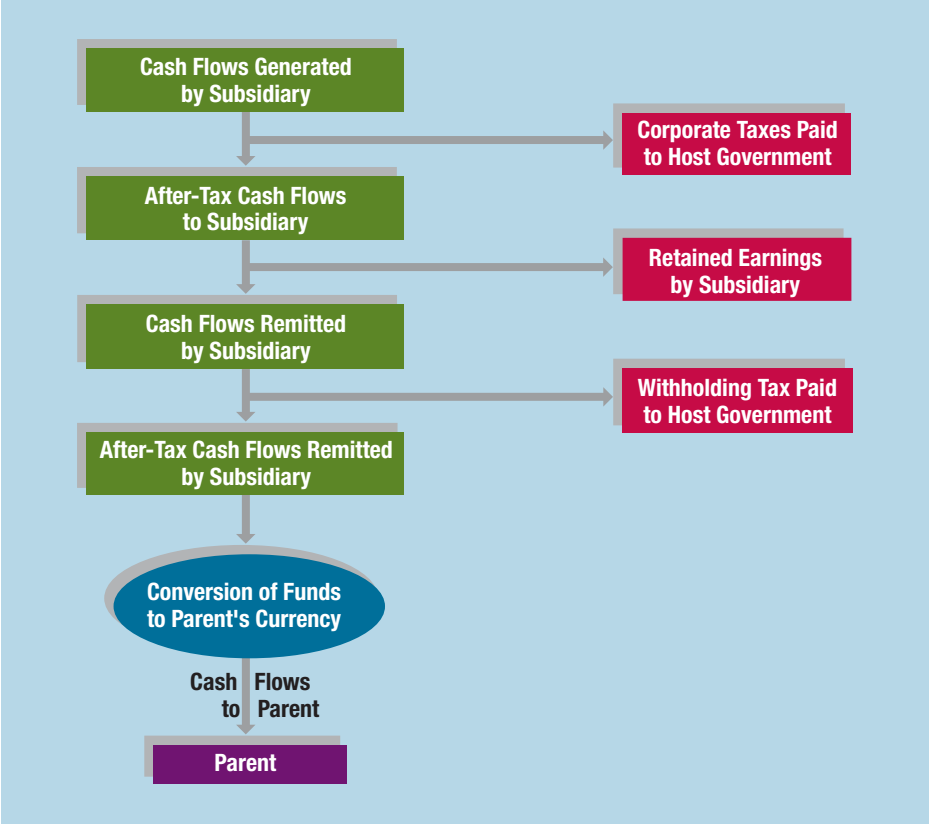
Exhibit 14.1 illustrates the process from the time earnings are generated by the subsidiary until the parent receives the remitted funds. The exhibit shows how the cash flows of the subsidiary may be reduced by the time they reach the parent. The subsidiary's earnings are reduced initially by corporate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

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

Exhibit 14.1 Process of Remitting Subsidiary Earnings to the Parent



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.

Input for Multinational Capital Budgeting

HTTP://

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

Regardless of the long-term project to be considered, an MNC will normally require forecasts of the economic and financial characteristics related to 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 whatever 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 forecasted using competitive products in the markets as a comparison. A long-term capital budgeting analysis requires projections for not only the upcoming period but the expected lifetime of the project as well. 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 forecasted 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, but future demand is often difficult to forecast. For example, if the project is a plant in Germany that produces automobiles, the MNC must forecast what percentage of the auto market in Germany it can pull from prevailing auto producers. Once a market share percentage is forecasted, projected demand can be computed. Demand forecasts can sometimes be aided by historical data on the market share other MNCs in the industry pulled when they entered this market, but historical data are not always an accurate indicator of the future. In addition, many projects reflect a first attempt, so there are no predecessors to review as an indicator of the future.

3. **Costs.** Like the price estimate, variable-cost forecasts can be developed from assessing prevailing 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 demand is inaccurately forecasted.

   On a periodic basis, the fixed cost may be easier to predict than the variable cost since it normally is not sensitive to changes in demand. 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. Under some circumstances, the MNC receives tax deductions or credits for tax payments by a subsidiary to the host country (see the chapter appendix for more details). Withholding taxes must also be considered if they are imposed on remitted funds by the host government. Because after-tax cash flows are necessary for an adequate capital budgeting analysis, international tax effects must be determined on any proposed foreign projects.

5. **Remitted funds.** In some cases, a host government will prevent a subsidiary from sending its earnings to the parent. This restriction may reflect an attempt to encourage additional local spending or to avoid excessive sales of the local currency in exchange for some other currency. Since the restrictions on fund transfers prevent cash from coming back to the parent, projected net cash flows from the parent's perspective will be affected. If the parent is aware of these restrictions, it can incorporate them when projecting net cash flows. Sometimes, however, the host government adjusts its restrictions over time; in that case, the MNC can only forecast the future restrictions and incorporate these forecasts into the analysis.

6. **Exchange rates.** Any international project will be affected by exchange rate fluctuations during the life of the project, but these movements are often very difficult to forecast. There are methods of hedging against them, though most

hedging techniques are used to cover short-term positions. While it is possible to hedge over longer periods (with long-term forward contracts or currency swap arrangements), the MNC has no way of knowing the amount of funds that it should hedge. This is because it is only guessing at its future costs and revenue due to the project. Thus, the MNC may decide not to hedge the projected foreign currency net cash flows.

7. **Salvage (liquidation) value.** The after-tax salvage value of most projects is difficult to forecast. It will depend on several factors, including the success of the project and the attitude of the host government toward the project. As an extreme possibility, the host government could take over the project without adequately compensating the MNC.

   Some projects have indefinite lifetimes that can be difficult to assess, while other projects have designated specific lifetimes, at the end of which they will be liquidated. This makes the capital budgeting analysis easier to apply. It should be recognized that 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, which may differ from the MNC's cost of capital because of that particular project's risk.

   An MNC can estimate its cost of capital in order to decide what return it would require in order to approve proposed projects. The manner by which an MNC determines its cost of capital is discussed in Chapter 17.

HTTP://

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

Additional considerations will be discussed after a simplified multinational capital budgeting example is provided. In the real world, magic numbers aren't provided to MNCs for insertion into their computers. The challenge revolves around accurately forecasting the variables relevant to the project evaluation. If garbage (inaccurate forecasts) is input into the computer, the analysis output by the computer will also be garbage. Consequently, an MNC may take on a project by mistake. Since such a mistake may be worth 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.

Multinational Capital Budgeting Example

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. This section presents an example involving the possible development of a new subsidiary. It begins with assumptions that simplify the capital budgeting analysis. Then, additional considerations are introduced to emphasize the potential complexity of such an analysis.

This example illustrates one of many possible methods available that would achieve the same result. Also, keep in mind that a real-world problem may involve more extenuating circumstances than those shown here.

Background

Spartan, Inc., is considering the development of a subsidiary in Singapore that would manufacture and sell tennis rackets locally. Spartan's management has asked various departments to supply relevant information for a capital budgeting analysis. In addition, some Spartan executives have met with government officials in Singapore to dis-

cuss the proposed subsidiary. The project would end in 4 years. All relevant information follows.

1. **Initial investment.** An estimated 20 million Singapore dollars (S$), which includes funds to support working capital, would be needed for the project. Given the existing spot rate of $.50 per Singapore dollar, the U.S. dollar amount of the parent's initial investment is $10 million.
2. **Price and 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 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 Racket	S$200	S$200	S$250	S$260

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. **Depreciation.** 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.
5. **Taxes.** 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.
6. **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 earlier.
7. **Salvage value.** The Singapore government will pay the parent S$12 million to assume ownership of the subsidiary at the end of 4 years. Assume that there is no capital gains tax on the sale of the subsidiary.
8. **Exchange rates.** The spot exchange rate of the Singapore dollar is $.50. Spartan uses the spot rate as its best forecast of the exchange rate that will exist in future periods. Thus, the forecasted exchange rate for all future periods is $.50.
9. **Required rate of return.** Spartan, Inc., requires a 15 percent return on this project.

Analysis

The capital budgeting analysis will be conducted from the parent's perspective, based on the assumption that the subsidiary is intended to generate cash flows that will ultimately be passed on to the parent. Thus, the net present value (*NPV*) from the parent's perspective is based on a comparison of the present value of the cash flows received by the parent to the initial outlay by the parent. As explained earlier in this

chapter, an international project's *NPV* is dependent on whether a parent or subsidiary perspective is used. Since the U.S. parent's perspective is used, the cash flows of concern are the dollars ultimately received by the parent as a result of the project.

The required rate of return is based on the cost of capital used by the parent to make its investment, with an adjustment for the risk of the project. For the establishment of the subsidiary to benefit Spartan's parent, the present value of future cash flows (including the salvage value) ultimately received by the parent should exceed 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

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

first step is to incorporate demand and price estimates in order to forecast total revenue (see lines 1 through 3). Then, the expenses 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).

The depreciation expense is added to the after-tax subsidiary earnings to compute the net cash flow to the subsidiary (line 13). All of these funds are to be remitted by the subsidiary, so line 14 is the same as line 13. The subsidiary can afford to send all net cash flow to the parent since the initial investment provided by the parent includes working capital. The funds remitted to the parent 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 from the subsidiary is shown in line 19. The periodic funds received from the subsidiary are not subject to U.S. corporate taxes since it was assumed that the parent would receive credit for the taxes paid in Singapore that would offset taxes owed to the U.S. government.

Calculation of *NPV*. Although several capital budgeting techniques are available, a commonly used technique is to estimate the cash flows and salvage value to be received by the parent and compute the *NPV* of 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 rate 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 subtracting the initial investment (in line 21). For example, as of the end of Year 2, the cumulative *NPV* was −$5,610,586. This was determined by consolidating the $2,347,826 in Year 1, the $2,041,588 in Year 2, and 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 suggests that the discounted cash flows never exceed the initial outlay. That is, the initial outlay is never fully recovered. The critical value in line 22 is the one for the last period because it reflects the *NPV* of the project.

In our example, the cumulative *NPV* as of 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, Spartan may decide to reject the project. The way an MNC can account for risk in capital budgeting is discussed shortly.

Factors to Consider in Multinational Capital Budgeting

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
- Real options

Each of these factors is discussed in turn.

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. Though the difficulty in 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, appreciation of the Singapore dollar would be favorable since the Singapore dollar inflows would someday be converted to more U.S. dollars. Conversely, depreciation would be unfavorable since the weakened Singapore dollars would convert to fewer U.S. dollars over time.

Exhibit 14.3 illustrates both a weak Singapore dollar (weak-S$) scenario and a strong Singapore dollar (strong-S$) scenario. At the top of the table, the anticipated after-tax Singapore dollar cash flows (including salvage value) are shown for the subsidiary from lines 16 and 17 in Exhibit 14.2. The amount in U.S. dollars that these Singapore dollars convert to depends on the exchange rates existing 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.

Notice 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 large differences in cash flows received by the parent in the different scenarios illustrate the impact of exchange rate expectations on the feasibility of an international project.

The *NPV* forecasts based on projections for exchange rates are illustrated in Exhibit 14.4. The estimated *NPV* is highest if the Singapore dollar is expected to strengthen and lowest if it is expected to weaken. The estimated *NPV* is negative for the weak-S$ scenario but positive for the stable-S$ and strong-S$ scenarios. This project's true feasibility would depend 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, this project should not be accepted.

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

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

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 could possibly occur. If the project is still feasible under this scenario, the MNC may be more comfortable pursuing the project.

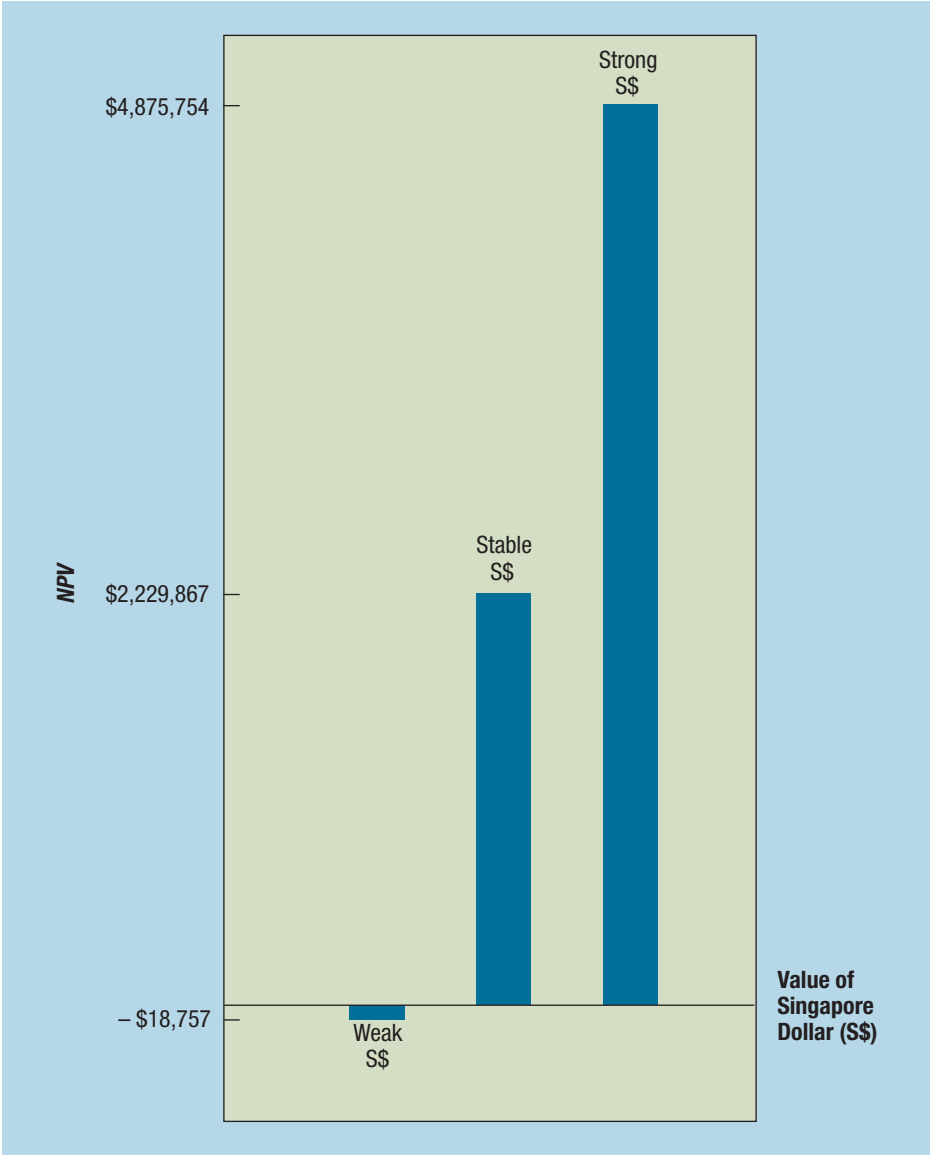
Inflation

Capital budgeting analysis implicitly considers inflation, since variable cost per unit and product prices generally have been rising over time. In some countries, inflation can be quite volatile from year to year and can therefore strongly influence a project's net cash flows. In countries where the inflation rate is high and volatile, it will be virtually impossible for a subsidiary to accurately forecast inflation each year. 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 impact on revenues than on costs in such cases.

The joint impact of inflation and exchange rate fluctuations on a subsidiary's net cash flows may produce a partial offsetting effect from the viewpoint of the parent. 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 (if the subsidiary's currency has weakened). Such an offsetting effect is not exact or consistent, though. Because inflation is only one of many factors that influence exchange rates, there is no guarantee that a currency will depreciate

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



when the local inflation rate is relatively high. Therefore, one cannot ignore the impact of inflation and exchange rates on net cash flows.

Financing Arrangement

Many foreign projects are partially financed by foreign subsidiaries. To illustrate how this foreign financing can influence the feasibility of the project, consider the following revisions in the 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. Foreign projects are more complicated, however, especially when the foreign subsidary partially finances the investment in the foreign project. Although consolidating the initial investments made by the parent and the subsidiary simplifies the capital budgeting process, it can cause significant estimation errors. The estimated foreign cash flows that are ultimately remitted to the parent and are subject to exchange rate risk will be overstated if the foreign interest expenses are not explicitly considered as cash outflows for the foreign subsidiary. Thus, a more accurate approach is to separate the investment made by the subsidiary from the investment made by the parent. The capital budgeting analysis can focus on the parent's perspective by comparing the present value of the cash flows received by the parent to the initial investment by the parent.

Given the revised assumptions, 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 4 years. However, since the subsidiary expects to receive S$10 million (in 4 years) from the sale of the offices 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). If the numbers were not offsetting, the capital budgeting analysis would be repeated to determine whether the *NPV* from the parent's perspective is higher than in the initial 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, composed of the original $10 million investment as explained earlier, plus an additional $5 million 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, 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.

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 14.5. This analysis uses our original exchange rate projections of $.50 per

Exhibit 14.5 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$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$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

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 higher initial outlay of the parent and 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 versus 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, 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 the parent's 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 and therefore reduces the amount that will ultimately be converted into dollars for remittance to 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.

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 3 years before they can be remitted. Such restrictions can affect the accept/reject decision on a project.

EXAMPLE Reconsider the example of Spartan, Inc., assuming 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.

Assume that 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 14.6. 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 4 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, 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.

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 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, the project is feasible. The break-even salvage value (called SV_n) can

Exhibit 14.6 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

be determined by setting *NPV* equal to zero and rearranging the capital budgeting equation, as follows:

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

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

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

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

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 times $(1 + k)^n$. Using the original cash flow information from Exhibit 14.2, the present value of cash flows can be determined:

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

Given the present value of cash flows and the estimated initial outlay, the break-even salvage value is determined this way:

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

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).

Assuming the forecasted exchange rate of $.50 per Singapore dollar (2 Singapore dollars per U.S. dollar), the project must sell for more than S$4,199,900 (computed as $2,099,950 divided by $.50) to exhibit a positive *NPV* (assuming no taxes are paid on this amount). If Spartan did not have a guarantee from the Singapore government, it could assess the probability that the subsidiary would sell for more than the break-even salvage value and then incorporate this assessment into its decision to accept or reject the project. ■

Impact of Project on Prevailing Cash Flows

Thus far, in our example, we have assumed that the new project has no impact on 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 Sin-

gapore 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 4 years. With a subsidiary, these cash flows would be forgone. The effects of these assumptions are shown in Exhibit 14.7. The previously estimated cash flows to the parent from the subsidiary (drawn from Exhibit 14.2) are restated in Exhibit 14.7. These estimates do not account for forgone cash flows since 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 14.7. 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 14.7. 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 to Singapore 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.

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. 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.

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.

Exhibit 14.7 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

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, it would be allowed to purchase some government buildings at a future point in time 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 very valuable and may encourage MNCs to accept 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 will result from exercising the real option. In the previous example, Spartan's real option is influenced by (1) the probability that Spartan will capitalize on the opportunity to purchase government builds at a discount, and (2) the *NPV* that would be generated from this opportunity.

Adjusting Project Assessment for Risk

If an MNC is unsure of the estimated cash flows of a proposed project, 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
- Simulation

Each method is described in turn.

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. This risk-adjusted discount rate tends to reduce the worth of a project by a degree that reflects the risk the project exhibits. This approach is easy to use, but it is criticized for being somewhat arbitrary. In addition, an equal adjustment to the discount rate over all periods does not reflect differences in the degree of 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 risk.

Despite its subjectivity, the risk-adjusted discount rate is a commonly used technique, 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.

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 (in our earlier example) was estimated to be 60,000 in the first 2 years and 100,000 in the next 2 years. If

demand turns out to be 60,000 in all 4 years, how will the *NPV* results change? Alternatively, what if demand is 100,000 in all 4 years? 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. Many computer software packages are available to perform sensitivity analysis.

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 4 years. Based on this random selection process, the NPV is determined.

The procedure just described represents 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 4-year project period. Each iteration reflects a different scenario. The *NPV* of the project based on each scenario is then computed. Thus, simulation generates a distribution of *NPV*s for the project. The major advantage of simulation is that the MNC can examine the range of possible *NPV*s that may occur. From the 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 *NPV*s that might occur for the project. The simulation technique does not put all of its emphasis on any one particular *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 in which the $NPV > 0$. 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 in which $NPV < 0$.

Simulation is difficult to do manually because of the iterations necessary to develop a distribution of *NPV*s. 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 be dependent on the accuracy of the input.

GOVERNANCE

Controls over International Project Proposals

The feasibility of a project proposed by managers of an MNC is highly dependent on their estimates of revenue and cost-related cash flows. To the extent that managers are rewarded based on sales growth within their division, they may be tempted to exaggerate their estimates of cash inflows in order to ensure that their projects are approved. Proper governance can prevent this type of agency problem. First, the estimates should be thoroughly examined to determine whether they are reasonable. Second, a project's feasibility can be assessed after it has been implemented to determine whether the estimated cash flows by managers were reasonably accurate. However, many international projects are irreversible, so an ideal control system would assess the proposal closely before investing the funds in the project. ■

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. The subsidiary's perspective does not consider possible exchange rate and tax effects on cash flows transferred by the subsidiary to the 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. **September 11 Effects on *NPV.*** In August 2001, Woodsen, Inc., of Pittsburgh, Pennsylvania, considered the development of a large subsidiary in Greece. In response to the September 11, 2001, terrorist attack on the United States, 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 after the attack.

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 implied 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 Ghanian 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 one 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 one 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 very 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 one-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 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 one-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 one year. The prevailing nominal one-year interest rate in New Zealand is 5 percent, while the nominal one-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 MXP3 million 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 one-year forward rate is $.12. Blustream expects that the spot rate of the peso will be $.13 one 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. Determine the *NPV* of the project assuming that Blustream does not receive the government contract.

c. Now consider an alternative strategy in which Blustream only hedges the minimum peso revenue that it will receive. In this case, any revenue due to the government contract would not be hedged. Determine the *NPV* based on this alternative strategy and assume that Blustream receives the government contract.

d. If Blustream uses the alternative strategy of only hedging the minimum peso revenue that it will receive, determine the *NPV* assuming that it does not receive the government contract.

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

f. Blustream recognizes that it is exposed to exchange rate risk whether it hedges the minimum amount or the maximum amount of revenue it will receive. It considers a new strategy of hedging the minimum amount it will receive with a forward contract and hedging the additional revenue it might receive with a put option on Mexican pesos. The one-year put option has 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 avoid the New Zealand loan. If this arrangement is used, the selling price of the subsidiary (after subtracting any capital gains taxes) is expected to be 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 one 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. The way in which this financing deal is structured, 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 specific question.

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 Xtra! website at http://maduraxtra.swlearning.com.

BLADES, INC. CASE

Decision by Blades, Inc., to Invest in Thailand

Since Ben Holt, Blades' chief financial officer (CFO), believes the growth potential for the roller blade market in Thailand is very high, he, together with Blades' board of directors, 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 varible 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.

Ben 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.

Ben 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, Ben 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. Jim 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. Jim 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 of 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 **http://www.oanda.com** or other websites.) Are the project's net cash flows more volatile if you had borrowed dollars or euros? Explain your results.

APPENDIX 14

Incorporating International Tax Laws 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 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

HTTP://

http://www.pwcglobal.com
Access to country-specific information such as general business rules and regulations and tax environments.

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).

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 since the parent is the shareholder of the subsidiary. (2) The subsidiary may pay interest to the parent or to other non-

Exhibit 14A.1 Comparison of Tax Characteristics among Countries

Country	Corporate Income Tax	Country	Corporate Income Tax
Argentina	35%	Israel	36
Australia	30	Italy	37
Austria	34	Japan	42
Belgium	34	Korea	30
Brazil	34	Malaysia	28
Canada	36	Mexico	33
Chile	17	Netherlands	35
China	33	New Zealand	33
Czech Republic	28	Singapore	22
France	34	Spain	35
Germany	38	Switzerland	24
Hong Kong	17	Taiwan	25
Hungary	16	United Kingdom	30
India	36	United States	35
Indonesia	30	Venezuela	34
Ireland	13		

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

HTTP://

http://finance.yahoo.com/ Information about taxes imposed by each country.

resident debtholders 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's parent 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, the parent of 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 one country against taxes owed by the parent 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 subsidiaries of U.S. corporations are established in foreign countries, and if these countries tax income at a rate close to 35 percent, they can generate large tax revenues from income earned by the subsidiaries. The host countries receive 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, due on the same type of income generated by subsidiaries in other lower-tax countries. In a sense, 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, the U.S. tax on earnings remitted to the U.S. parent will normally bring the total tax up to 35 percent. Yet, 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. Due to tax credits, therefore, an MNC might be 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 Coun-

try 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 *NPV*s that may occur and can then compare these for each country.

Two critical, 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. Therefore, 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. MNCs are subject to some 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.

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, its combined earnings after taxes will be increased. To illustrate, suppose that the price of products sent from Hitax Sub to Lotax

Exhibit 14A.2 Impact of Transfer Pricing Adjustment on Pro Forma Earnings and Taxes: Oakland Corp. (in Thousands)

	Original Estimates		
	Hitax Sub	**Lotax Sub**	**Combined[1]**
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[1]**
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

[1] 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.

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, enabling

MNCs from all countries to attempt to establish policies that are within legal limits, but also reduce tax burdens. Even if the transfer price reflects the "fair" price that would normally be charged in the market, one subsidiary can still 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 be imposed to shift earnings and minimize taxes, 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.