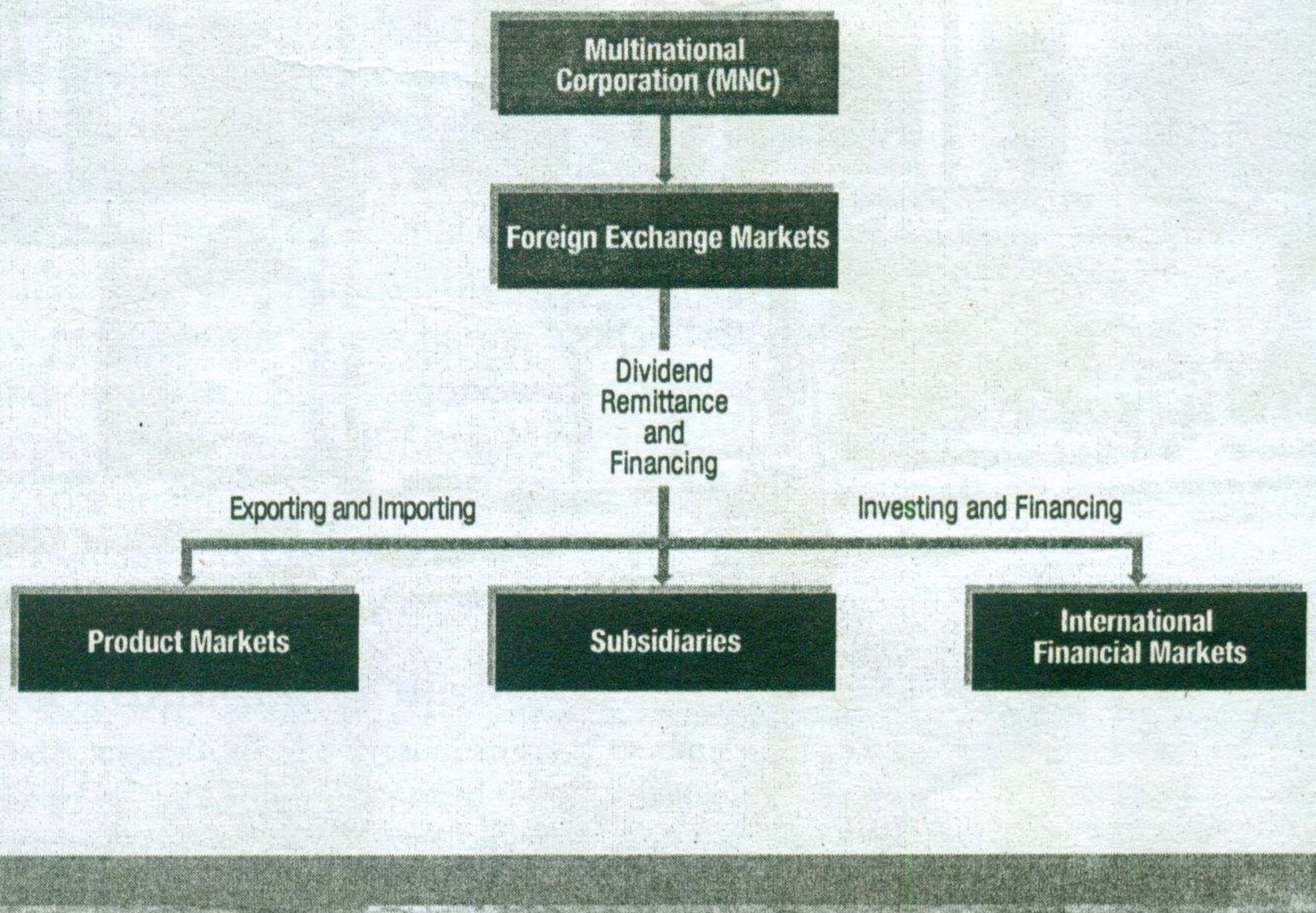
PART 1

The International Financial Environment

Part 1 (Chapters 1 through 5) provides an overview of the multinational corporation (MNC) and the environment in which it operates. Chapter 1 explains the goals of the MNC, along with the motives and risks of international business. Chapter 2 describes the international flow of funds between countries. Chapter 3 describes the international financial markets and how these markets facilitate ongoing operations. Chapter 4 explains how exchange rates are determined, and Chapter 5 provides background on the currency futures and options markets. Managers of MNCs must understand the international environment described in these chapters in order to make proper decisions.



1

Multinational Financial Management: An Overview

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- identify the management goal and organizational structure of the MNC,
- describe the key theories that justify international business,
- explain the common methods used to conduct international business, and
- provide a model for valuing the MNC.

Multinational corporations (MNCs) are defined as firms that engage in some form of international business. Their managers conduct international financial management, which involves international investing and financing decisions that are intended to maximize the value of the MNC. The goal of these managers is to maximize their firm's value, which is the same goal pursued by managers employed by strictly domestic companies.

Initially, firms may merely attempt to export products to a certain country or import supplies from a foreign manufacturer. Over time, however, many of these firms recognize additional foreign opportunities and eventually establish subsidiaries in foreign countries. Dow Chemical, IBM, Nike, and many other firms have more than half of their assets in foreign countries. Some businesses, such as ExxonMobil, Fortune Brands, and Colgate-Palmolive, commonly generate more than half of their sales in foreign countries. It is typical also for smaller U.S. firms to generate more than 20 percent of their sales in foreign markets; examples include Ferro (Ohio) and Medtronic (Minnesota). Seventy-five percent of U.S. firms that export have fewer than 100 employees.

International financial management is important even to companies that have no international business. The reason is that these companies must recognize how their foreign competitors will be influenced by movements in exchange rates, foreign interest rates, labor costs, and inflation. Such economic characteristics can affect the foreign competitors' costs of production and pricing policies.

This chapter provides background on the goals, motives, and valuation of a multinational corporation.

1-1 MANAGING THE MNC

The commonly accepted goal of an MNC is to maximize shareholder wealth. Managers employed by the MNC are expected to make decisions that will maximize the stock price and thereby serve the shareholders' interests. Some publicly traded MNCs based outside the United States may have additional goals, such as satisfying their respective governments,

creditors, or employees. However, these MNCs now place greater emphasis on satisfying shareholders; that way, the firm can more easily obtain funds from them to support its operations. Even in developing countries (e.g., Bulgaria and Vietnam) that have just recently encouraged the development of business enterprise, managers of firms must serve shareholder interests in order to secure their funding. There would be little demand for the stock of a firm that announced the proceeds would be used to overpay managers or invest in unprofitable projects.

The focus of this text is on MNCs whose parents wholly own any foreign subsidiaries, which means that the U.S. parent is the sole owner of the subsidiaries. This is the most common form of ownership of U.S.-based MNCs, and it gives financial managers throughout the firm the single goal of maximizing the entire MNC's value (rather than the value of any particular subsidiary). The concepts in this text apply generally also to MNCs based in countries other than the United States.

1-1a How Business Disciplines Are Used to Manage the MNC

Various business disciplines are integrated to manage the MNC in a manner that maximizes shareholder wealth. Management is used to develop strategies that will motivate and guide employees who work in an MNC and to organize resources so that they can efficiently produce products or services. Marketing is used to increase consumer awareness about the products and to monitor changes in consumer preferences. Accounting and information systems are used to record financial information about revenue and expenses of the MNC, which can be used to report financial information to investors and to evaluate the outcomes of various strategies implemented by the MNC. Finance is used to make investment and financing decisions for the MNC. Common finance decisions include:

- whether to discontinue operations in a particular country,
- whether to pursue new business in a particular country,
- whether to expand business in a particular country, and
- how to finance expansion in a particular country.

These finance decisions for each MNC are partially influenced by the other business discipline functions. The decision to pursue new business in a particular country is based on comparing the costs and potential benefits of expansion. The potential benefits of such new business depend on expected consumer interest in the products to be sold (marketing function) and expected cost of the resources needed to pursue the new business (management function). Financial managers rely on financial data provided by the accounting and information systems functions.

1-1b Agency Problems

Managers of an MNC may make decisions that conflict with the firm's goal of maximizing shareholder wealth. For example, a decision to establish a subsidiary in one location versus another may be based on the location's appeal to a particular manager rather than on its potential benefits to shareholders. A decision to expand a subsidiary may be motivated by a manager's desire to receive more compensation rather than to enhance the value of the MNC. This conflict of goals between a firm's managers and shareholders is often referred to as the **agency problem**.

The costs of ensuring that managers maximize shareholder wealth (referred to as *agency costs*) are normally larger for MNCs than for purely domestic firms for several reasons. First, MNCs with subsidiaries scattered around the world may experience larger

agency problems because monitoring the managers of distant subsidiaries in foreign countries is more difficult. Second, foreign subsidiary managers who are raised in different cultures may not follow uniform goals. Third, the sheer size of the larger MNCs can also create significant agency problems. Fourth, some non-U.S. managers tend to downplay the short-term effects of decisions, which may result in decisions for foreign subsidiaries of the U.S.-based MNCs that maximize subsidiary values or pursue other goals. This can be a challenge, especially in countries where some people may perceive that the first priority of corporations should be to serve their respective employees.

EXAMPLE Two years ago, Seattle Co. (based in the United States) established a subsidiary in Singapore so that it could expand its business there. It hired a manager in Singapore to manage the subsidiary. During the last two years, the sales generated by the subsidiary have not grown. Even so, the manager hired several employees to do the work that he was assigned. The managers of the parent company in the United States have not closely monitored the subsidiary because it is so far away and because they trusted the manager there. Now they realize that there is an agency problem. The subsidiary is experiencing losses every quarter, so its management must be more closely monitored. ●

Parent Control of Agency Problems The parent corporation of an MNC may be able to prevent most agency problems with proper governance. The parent should clearly communicate the goals for each subsidiary to ensure that all of them focus on maximizing the value of the MNC and not of their respective subsidiaries. The parent can oversee subsidiary decisions to check whether each subsidiary's managers are satisfying the MNC's goals. The parent can also implement compensation plans that reward those managers who satisfy the MNC's goals. A common incentive is to provide managers with the MNC's stock (or options to buy that stock at a fixed price) as part of their compensation; thus the subsidiary managers benefit directly from a higher stock price when they make decisions that enhance the MNC's value.

EXAMPLE When Seattle Co. (from the previous example) recognized the agency problems with its Singapore subsidiary, it created incentives for the manager of the subsidiary that were aligned with the parent's goal of maximizing shareholder wealth. Specifically, it set up a compensation system whereby the manager's annual bonus is based on the subsidiary's earnings. ●

Corporate Control of Agency Problems In the example of Seattle Co., the agency problems occurred because the subsidiary's management goals were not focused on maximizing shareholder wealth. In some cases, agency problems can occur because the goals of the entire management of the MNC are not focused on maximizing shareholder wealth. Various forms of corporate control can help prevent these agency problems and thus induce managers to make decisions that satisfy the MNC's shareholders. If these managers make poor decisions that reduce the MNC's value, then another firm might acquire it at the lower price and hence would probably remove the weak managers. Moreover, institutional investors (e.g., mutual and pension funds) with large holdings of an MNC's stock have some influence over management because they will complain to the board of directors if managers are making poor decisions. Institutional investors may seek to enact changes, including removal of high-level managers or even board members, in a poorly performing MNC. Such investors may also band together to demand changes in an MNC, since they know that the firm would not want to lose all of its major shareholders.

How SOX Improved Corporate Governance of MNCs One limitation of the corporate control process is that investors rely on reports by the firm's own managers for information. If managers are serving themselves rather than the investors, they may

exaggerate their performance. There are many well-known examples (such as Enron and WorldCom) in which large MNCs were able to alter their financial reporting and hide problems from investors.

Enacted in 2002, the Sarbanes-Oxley Act (SOX) ensures a more transparent process for managers to report on the productivity and financial condition of their firm. It requires firms to implement an internal reporting process that can be easily monitored by executives and the board of directors. Some of the common methods used by MNCs to improve their internal control process are:

- establishing a centralized database of information,
- ensuring that all data are reported consistently among subsidiaries,
- implementing a system that automatically checks data for unusual discrepancies relative to norms,
- speeding the process by which all departments and subsidiaries access needed data, and
- making executives more accountable for financial statements by personally verifying their accuracy.

These systems made it easier for a firm's board members to monitor the financial reporting process. In this way, SOX reduced the likelihood that managers of a firm can manipulate the reporting process and therefore improved the accuracy of financial information for existing and prospective investors.

1-1c Management Structure of an MNC

The magnitude of agency costs can vary with the MNC's management style. A centralized management style, as illustrated in the top section of Exhibit 1.1, can reduce agency costs because it allows managers of the parent to control foreign subsidiaries and thus reduces the power of subsidiary managers. However, the parent's managers may make poor decisions for the subsidiary if they are less informed than the subsidiary's managers about its setting and financial characteristics.

Alternatively, an MNC can use a decentralized management style, as illustrated in the bottom section of Exhibit 1.1. This style is more likely to result in higher agency costs because subsidiary managers may make decisions that fail to maximize the value of the entire MNC. Yet this management style gives more control to those managers who are closer to the subsidiary's operations and environment. To the extent that subsidiary managers recognize the goal of maximizing the value of the overall MNC and are compensated in accordance with that goal, the decentralized management style may be more effective.

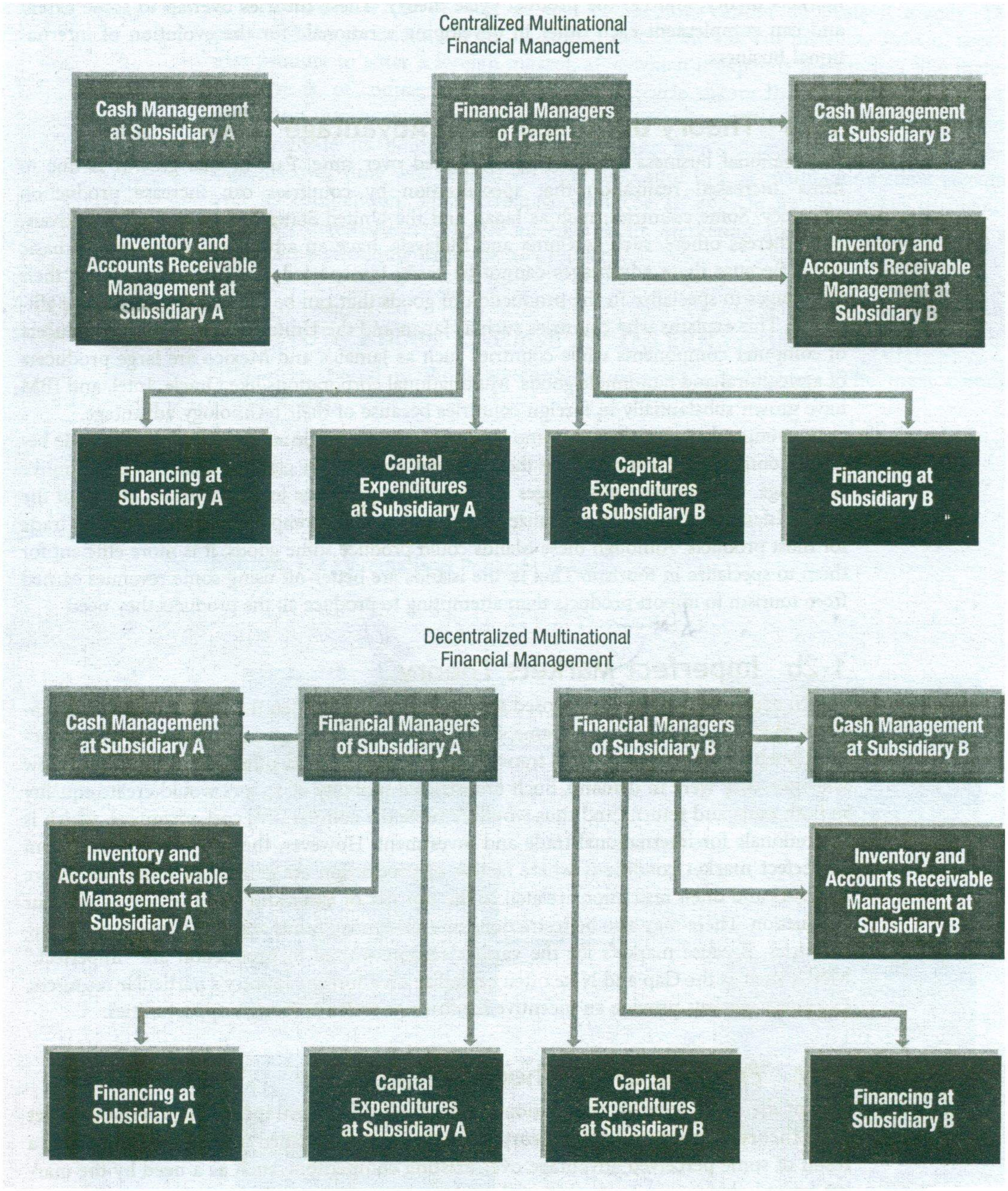
Given the clear trade-offs between centralized and decentralized management styles, some MNCs attempt to achieve the advantages of both. That is, they allow subsidiary managers to make the key decisions about their respective operations while the parent's management monitors those decisions to ensure they are in the MNC's best interests.

How the Internet Facilitates Management Control The Internet is making it easier for the parent to monitor the actions and performance of its foreign subsidiaries.

EXAMPLE

Recall the example of Seattle Co., which has a subsidiary in Singapore. The Internet allows the foreign subsidiary to e-mail updated information in a standardized format that reduces language problems and also to send images of financial reports and product designs. The parent can then easily track the inventory, sales, expenses, and earnings of each subsidiary on a weekly or monthly basis. Thus, using the Internet can reduce agency costs due to international aspects of an MNC's business. ●

Exhibit 1.1 Management Styles of MNCs



1-2 Why Firms Pursue International Business

Three commonly held theories to explain why firms become motivated to expand their business internationally are (1) the theory of comparative advantage, (2) the imperfect markets theory, and (3) the product cycle theory. These theories overlap to some extent and can complement each other in developing a rationale for the evolution of international business.

1-2a Theory of Comparative Advantage

Multinational business has generally increased over time. Part of this growth is due to firms' increased realization that specialization by countries can increase production efficiency. Some countries, such as Japan and the United States, have a technology advantage whereas others, such as China and Malaysia, have an advantage in the cost of basic labor. Because these advantages cannot be easily transported, countries tend to use their advantages to specialize in the production of goods that can be produced with relative efficiency. This explains why countries such as Japan and the United States are large producers of computer components while countries such as Jamaica and Mexico are large producers of agricultural and handmade goods. Multinational corporations like Oracle, Intel, and IBM have grown substantially in foreign countries because of their technology advantage.

A country that specializes in some products may not produce other products, so trade between countries is essential. This is the argument made by the classical theory of comparative advantage. **Comparative advantages** allow firms to penetrate foreign markets. Many of the Virgin Islands, for example, specialize in tourism and rely completely on international trade for most products. Although these islands could produce some goods, it is more efficient for them to specialize in tourism. That is, the islands are better-off using some revenues earned from tourism to import products than attempting to produce all the products they need.

1-2b Imperfect Markets Theory

If each country's markets were closed to all other countries, then there would be no international business. At the other extreme, if markets were perfect and so the factors of production (such as labor) were easily transferable, then labor and other resources would flow wherever they were in demand. Such unrestricted mobility of factors would create equality in both costs and returns and thus would remove the comparative cost advantage, which is the rationale for international trade and investment. However, the real world suffers from **imperfect market** conditions where factors of production are somewhat immobile. There are costs and often restrictions related to the transfer of labor and other resources used for production. There may also be restrictions on transferring funds and other resources among countries. Because markets for the various resources used in production are "imperfect," MNCs such as the Gap and Nike often capitalize on a foreign country's particular resources. Imperfect markets provide an incentive for firms to seek out foreign opportunities.

1-2c Product Cycle Theory

One of the more popular explanations as to why firms evolve into MNCs is the **product cycle theory**. According to this theory, firms become established in the home market as a result of some perceived advantage over existing competitors, such as a need by the market for at least one more supplier of the product. Because information about markets and competition is more readily available at home, a firm is likely to establish itself first in its home country. Foreign demand for the firm's product will initially be accommodated by exporting. As time passes, the firm may feel the only way to retain its advantage over

competition in foreign countries is to produce the product in foreign markets, thereby reducing its transportation costs. The competition in those foreign markets may increase as other producers become more familiar with the firm's product. The firm may develop strategies to prolong the foreign demand for its product. One frequently used approach is to differentiate the product so that competitors cannot duplicate it exactly. These phases of the product cycle are illustrated in Exhibit 1.2. For instance, 3M Co. uses one new product to enter a foreign market, after which it expands the product line there.

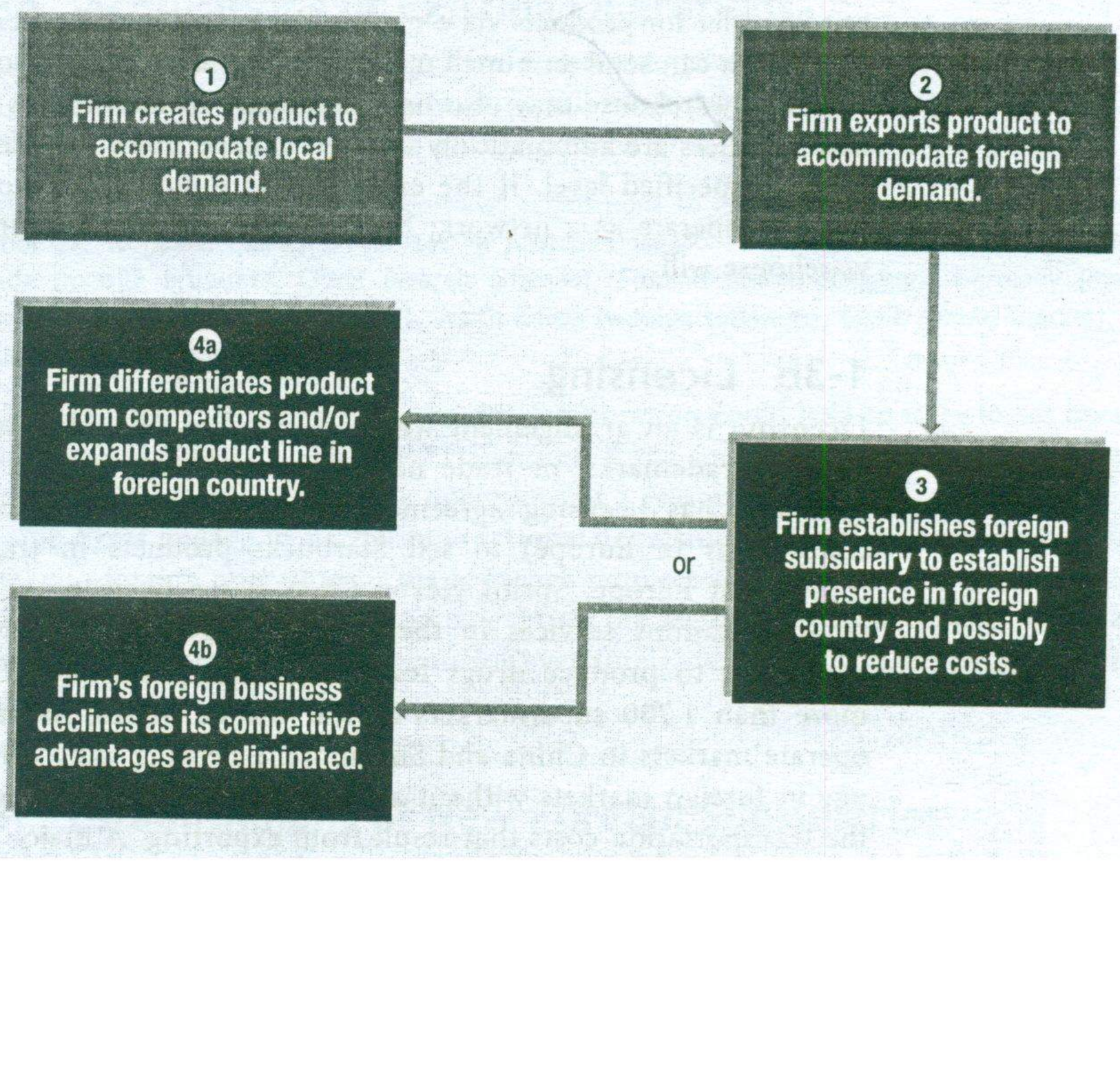
There is, of course, more to the product cycle theory than summarized here. This discussion merely suggests that, as a firm matures, it may recognize additional opportunities outside its home country. Whether the firm's foreign business diminishes or expands over time will depend on how successful it is at maintaining some advantage over its competition. That advantage could be an edge in its production or financing approach that reduces costs or an edge in its marketing approach that generates and maintains a strong demand for its product.

1-3 How Firms Engage in International Business

Firms use several methods to conduct international business. The most common methods are:

- international trade,
- licensing,
- franchising,

Exhibit 1.2 International Product Life Cycle



- joint ventures,
- acquisitions of existing operations, and
- establishment of new foreign subsidiaries.

Each method will be discussed in turn, with particular attention paid to the respective risk and return characteristics.

1-3a International Trade

WEB

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

International trade is a relatively conservative approach that can be used by firms to penetrate markets (by exporting) or to obtain supplies at a low cost (by importing). This approach entails minimal risk because the firm does not place any of its capital at risk. If the firm experiences a decline in its exporting or importing, it can normally reduce or discontinue that part of its business at a low cost.

Many large U.S.-based MNCs, including Boeing, DuPont, General Electric, and IBM, generate more than $4 billion in annual sales from exporting. Nonetheless, small businesses account for more than 20 percent of the value of all U.S. exports.

How the Internet Facilitates International Trade Many firms use their websites to list the products they sell along with the price for each product. This makes it easy for them to advertise their products to potential importers anywhere in the world without mailing brochures to various countries. Furthermore, a firm can add to its product line or change prices simply by revising its website. Thus, importers need only check an exporter's website periodically in order to keep abreast of its product information.

Firms can also use their websites to accept orders online. Some products, such as software, can be delivered directly to the importer over the Internet in the form of a file on the importer's computer. Other products must be shipped, but even in that case the Internet makes it easier to track the shipping process. An importer can transmit its order for products via e-mail to the exporter, and when the warehouse ships the products it can send an e-mail message to the importer and to the exporter's headquarters. The warehouse may also use technology to monitor its inventory of products so that suppliers are automatically notified to send more supplies once the inventory falls below a specified level. If the exporter has multiple warehouses, the Internet allows them to operate as a network; hence if one warehouse cannot fill an order, another warehouse will.

1-3b Licensing

Licensing is an arrangement whereby one firm provides its technology (copyrights, patents, trademarks, or trade names) in exchange for fees or other considerations. Starbucks has licensing agreements with SSP (an operator of food and beverage concessions in Europe) to sell Starbucks products in train stations and airports throughout Europe. Sprint Nextel Corp. has a licensing agreement to develop telecommunications services in the United Kingdom. Eli Lilly & Co. has a licensing agreement to produce drugs for foreign countries, and IGA, Inc., which operates more than 1,700 supermarkets in the United States, has a licensing agreement to operate markets in China and Singapore. Licensing allows firms to use their technology in foreign markets without a major investment in foreign countries and without the transportation costs that result from exporting. A major disadvantage of licensing is that it is difficult for the firm providing the technology to ensure quality control in the foreign production process.

1-3c Franchising

Under a **franchising** arrangement, one firm provides a specialized sales or service strategy, support assistance, and possibly an initial investment in the franchise in exchange for periodic fees. For example, McDonald's, Pizza Hut, Subway Sandwiches, Blockbuster, and Dairy Queen have franchises that are owned and managed by local residents in many foreign countries. As in the case of licensing, franchising allows firms to penetrate foreign markets without a major investment in foreign countries. The recent relaxation of barriers in countries throughout Eastern Europe and South America has resulted in numerous franchising arrangements.

1-3d Joint Ventures

A **joint venture** is a venture that is jointly owned and operated by two or more firms. Many firms enter foreign markets by engaging in a joint venture with firms that already reside in those markets. Most joint ventures allow two firms to apply their respective comparative advantages in a given project. For instance, General Mills, Inc., joined in a venture with Nestlé SA so that the cereals produced by General Mills could be sold through the overseas sales distribution network established by Nestlé.

Xerox Corp. and Fuji Co. (of Japan) engaged in a joint venture that allowed Xerox to penetrate the Japanese market while allowing Fuji to enter the photocopying business. Sara Lee Corp. and AT&T have engaged in joint ventures with Mexican firms to gain entry to Mexico's markets. Joint ventures between automobile manufacturers are numerous, since each manufacturer can offer its own technological advantages. General Motors has ongoing joint ventures with automobile manufacturers in several different countries, including the former Soviet states.

1-3e Acquisitions of Existing Operations

Firms frequently acquire other firms in foreign countries as a means of penetrating foreign markets. Such acquisitions give firms full control over their foreign businesses and enable the MNC to quickly obtain a large portion of foreign market share.

EXAMPLE Google, Inc., has made major international acquisitions to expand its business and improve its technology. It has acquired businesses in Australia (search engines), Brazil (search engines), Canada (mobile browser), China (search engines), Finland (micro-blogging), Germany (mobile software), Russia (online advertising), South Korea (weblog software), Spain (photo sharing), and Sweden (videoconferencing). ●

However, the acquisition of an existing corporation could lead to large losses because of the large investment required. In addition, if the foreign operations perform poorly then it may be difficult to sell the operations at a reasonable price.

Some firms engage in partial international acquisitions in order to obtain a toehold or stake in foreign operations. This approach requires a smaller investment than that of a full international acquisition and so exposes the firm to less risk. On the other hand, the firm will not have complete control over foreign operations that are only partially acquired.

1-3f Establishment of New Foreign Subsidiaries

Firms can also penetrate foreign markets by establishing new operations in foreign countries to produce and sell their products. Like a foreign acquisition, this method requires a large investment. Establishing new subsidiaries may be preferred to foreign acquisitions

because the operations can be tailored exactly to the firm's needs. In addition, a smaller investment may be required than would be needed to purchase existing operations. However, the firm will not reap any rewards from the investment until the subsidiary is built and a customer base established.

1-3g Summary of Methods

The methods of increasing international business extend from the relatively simple approach of international trade to the more complex approach of acquiring foreign firms or establishing new subsidiaries. Any method of increasing international business that requires a direct investment in foreign operations normally is referred to as a **direct foreign investment (DFI).** International trade and licensing are usually not viewed as examples of DFI because they do not involve direct investment in foreign operations. Franchising and joint ventures tend to require some investment in foreign operations but only to a limited degree. Foreign acquisitions and the establishment of new foreign subsidiaries require substantial investment in foreign operations and account for the largest portion of DFI.

Many MNCs use a combination of methods to increase international business. For example, IBM and PepsiCo engage in substantial direct foreign investment yet also derive some of their foreign revenue from various licensing agreements, which require less DFI to generate revenue.

EXAMPLE The evolution of Nike began in 1962 when Phil Knight, a student at Stanford's business school, wrote a paper on how a U.S. firm could use Japanese technology to break the German dominance of the athletic shoe industry in the United States. After graduation, Knight visited the Unitsuka Tiger shoe company in Japan. He made a licensing agreement with that company to produce a shoe that he sold in the United States under the name Blue Ribbon Sports (BRS). In 1972, Knight exported his shoes to Canada. In 1974, he expanded his operations into Australia. In 1977, the firm licensed factories in Taiwan and Korea to produce athletic shoes and then sold the shoes in Asian countries. In 1978, BRS became Nike, Inc., and began to export shoes to Europe and South America. As a result of its exporting and its direct foreign investment, Nike's international sales reached $1 billion by 1992 and now exceed $8 billion per year. ●

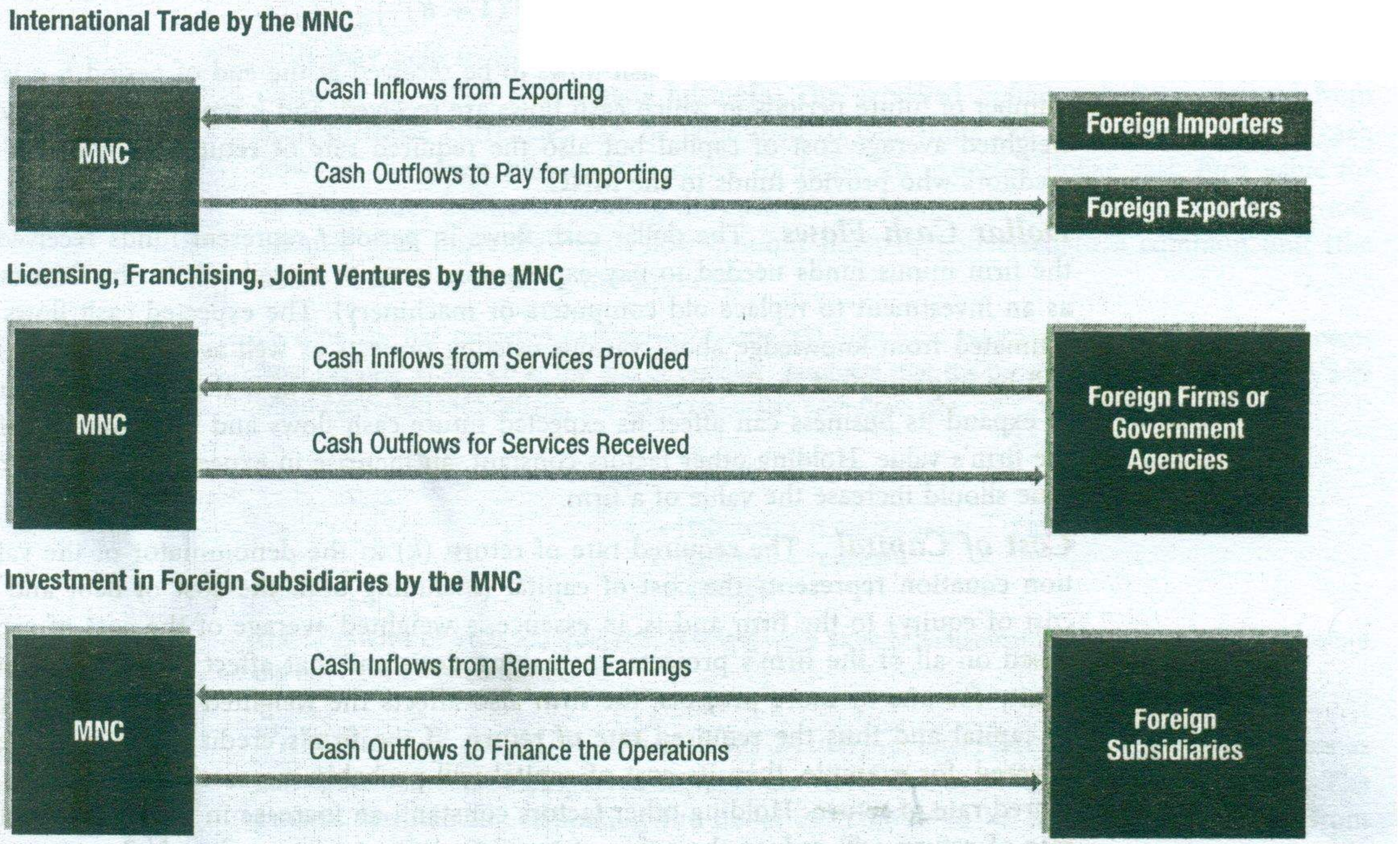
The effects of international business on an MNC's cash flows is illustrated in Exhibit 1.3. In general, the cash outflows associated with international business by the U.S. parent are used to pay for imports, to comply with its international arrangements, and/or to support the creation or expansion of foreign subsidiaries. At the same time, an MNC receives cash flows in the form of payment for its exports, fees for the services it provides within international arrangements, and remitted funds from the foreign subsidiaries. The first diagram in this exhibit illustrates the case of an MNC that engages in international trade; its international cash flows therefore result either from paying for imported supplies or from receiving payment in exchange for products that it exports.

The second diagram illustrates an MNC that engages in some international arrangements (which could include international licensing, franchising, or joint ventures). Any such arrangement may require cash outflows of the MNC in foreign countries to cover, for example, the expenses associated with transferring technology or funding partial investment in a franchise or joint venture. These arrangements generate cash flows for the MNC in the form of fees for services (e.g., technology, support assistance) that it provides.

The third diagram in Exhibit 1.3 illustrates the case of an MNC that engages in direct foreign investment. This type of MNC has one or more foreign subsidiaries. There can be cash outflows from the U.S. parent to its foreign subsidiaries in the form of invested

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Exhibit 1.3 Cash Flow Diagrams for MNCs



funds to help finance the operations of the foreign subsidiaries. There are also cash flows from the foreign subsidiaries to the U.S. parent in the form of remitted earnings and fees for services provided by the parent; all of these flows can be classified as remitted funds from the foreign subsidiaries.

1-4 Valuation Model for an MNC

The value of an MNC is relevant to its shareholders and its debt holders. When managers make decisions that maximize the firm's value, they also maximize shareholder wealth (assuming that the decisions are not intended to maximize the wealth of debt holders at the expense of shareholders). Given that international financial management should be conducted with the goal of increasing the MNC's value, it is useful to review some basics of valuation. There are numerous methods of valuing an MNC, some of which lead to the same valuation. The method described in this section reflects the key factors affecting an MNC's value in a general sense.

1-4a Domestic Model

Before modeling an MNC's value, consider the valuation of a purely domestic firm that does not engage in any foreign transactions. The value (V) of a purely domestic

firm in the United States is commonly specified as the present value of its expected cash flows:

$$V = \sum_{t=1}^{n} \left\{ \frac{E(CF_{\$,t})}{(1+k)^t} \right\}$$

Here $E(CF_{\$,t})$ denotes expected cash flows to be received at the end of period t; n is the number of future periods in which cash flows are received; and k represents not only the weighted average cost of capital but also the required rate of return by investors and creditors who provide funds to the MNC.

Dollar Cash Flows The dollar cash flows in period t represent funds received by the firm minus funds needed to pay expenses or taxes or to reinvest in the firm (such as an investment to replace old computers or machinery). The expected cash flows are estimated from knowledge about various existing projects as well as other projects that will be implemented in the future. A firm's decisions about how it should invest funds to expand its business can affect its expected future cash flows and therefore can affect the firm's value. Holding other factors constant, an increase in expected cash flows over time should increase the value of a firm.

Cost of Capital The required rate of return (k) in the denominator of the valuation equation represents the cost of capital (including both the cost of debt and the cost of equity) to the firm and is, in essence, a weighted average of the cost of capital based on all of the firm's projects. In making decisions that affect its cost of debt or equity for one or more projects, the firm also affects the weighted average of its cost of capital and thus the required rate of return. If the firm's credit rating is suddenly lowered, for example, then its cost of capital will probably increase and so will its required rate of return. Holding other factors constant, an increase in the firm's required rate of return will reduce the value of the firm because expected cash flows must be discounted at a higher interest rate. Conversely, a decrease in the firm's required rate of return will increase the value of the firm because expected cash flows are discounted at a lower required rate of return.

1-4b Multinational Model

An MNC's value can be specified in the same manner as a purely domestic firm's value. However, consider that the expected cash flows generated by a U.S.-based MNC's parent in period t may be coming from various countries and so may be denominated in different foreign currencies.

The foreign currency cash flows will be converted into dollars. Thus, the expected dollar cash flows to be received at the end of period t are equal to the sum of the products of cash flows denominated in each currency j multiplied by the expected exchange rate at which currency j could be converted into dollars by the MNC at the end of period t:

$$E(CF_{\$,t}) = \sum_{j=1}^{m} [E(CF_{j,t}) \times E(S_{j,t})]$$

Here $CF_{j,t}$ represents the amount of cash flow denominated in a particular foreign currency j at the end of period t, and $S_{j,t}$ denotes the exchange rate at which the foreign currency (measured in dollars per unit of the foreign currency) can be converted to dollars at the end of period t.

Valuation of an MNC That Uses Two Currencies An MNC that does business in two currencies could measure its expected dollar cash flows in any period by multiplying the expected cash flow in each currency by the expected exchange rate at which that currency could be converted to dollars and then summing those two products.

It may help to think of an MNC as a portfolio of currency cash flows, one for each currency in which it conducts business. The expected dollar cash flows derived from each of those currencies can be combined to determine the total expected dollar cash flows in the given period. It is easier to derive an expected dollar cash flow value for each currency before combining the cash flows among currencies within a given period, because each currency's cash flow amount must be converted to a common unit (the dollar) before combining the amounts.

EXAMPLE

Carolina Co. has expected cash flows of $100,000 from local business and 1 million Mexican pesos from business in Mexico at the end of period t. Assuming that the peso's value is expected to be $.09 when converted into dollars, the expected dollar cash flows are:

$$\begin{aligned} E(CF_{\$,t}) &= \sum_{j=1}^{m} [E(CF_{j,t}) \times E(S_{j,t})] \\ &= (\$100{,}000) + [1{,}000{,}000 \text{ pesos} \times (\$.09)] \\ &= (\$100{,}000) + (\$90{,}000) \\ &= \$190{,}000. \end{aligned}$$

The cash flows of $100,000 from U.S. business were already denominated in U.S. dollars and therefore did not have to be converted. ●

Valuation of an MNC That Uses Multiple Currencies The same process as just described can be employed to value an MNC that uses many foreign currencies. The general formula for estimating the dollar cash flows to be received by an MNC from multiple currencies in one period can be written as follows:

$$E(CF_{\$,t}) = \sum_{j=1}^{m} [E(CF_{j,t}) \times E(S_{j,t})]$$

EXAMPLE

Assume that Yale Co. will receive cash in 15 different countries at the end of the next period. To estimate the value of Yale Co., the first step is to estimate the amount of cash flows that it will receive at the end of the period in each currency (such as 2 million euros, 8 million Mexican pesos, etc.). Second, obtain a forecast of the currency's exchange rate for cash flows that will arrive at the end of the period for each of the 15 currencies (such as euro forecast = $1.40, peso forecast = $.12, etc.). The existing exchange rate can be used as a forecast for the future exchange rate, but there are many alternative methods (as explained in Chapter 9). Third, multiply the amount of each foreign currency to be received by the forecasted exchange rate of that currency in order to estimate the dollar cash flows to be received due to each currency. Fourth, add the estimated dollar cash flows for all 15 currencies in order to determine the total expected dollar cash flows in the period. The previous equation captures the four steps just described. When applying that equation to this example, $m = 15$ because there are 15 different currencies. ●

Valuation of an MNC's Cash Flows over Multiple Periods The entire process described in the example for a single period is not adequate for valuation because most MNCs have multiperiod cash flows. However, the process can be easily adapted to estimate the total dollar cash flows for all future periods. First, apply the same process described for a single period to all future periods in which the MNC will receive cash flows; this will generate an estimate of total dollar cash flows to be received in every period in the future. Second, discount the estimated total dollar cash flow for each period at the weighted cost of capital (k) and then sum these discounted cash flows to estimate the value of this MNC.

The process for valuing an MNC receiving multiple currencies over multiple periods can be expressed formally as:

$$V = \sum_{t=1}^{n} \left\{ \frac{\sum_{j=1}^{m} [E(CF_{j,t}) \times E(S_{j,t})]}{(1+k)^t} \right\}$$

Here $CF_{j,t}$ is the cash flow denominated in a particular currency (which may be dollars) and $S_{j,t}$ denotes represents the exchange rate at which the MNC can convert the foreign to the domestic currency at the end of period t. Whereas the previous equation is applied to single-period cash flows, this equation considers cash flows over multiple periods and then discounts those flows to obtain a present value.

Since the management of an MNC should be focused on maximizing its value, the equation for valuing an MNC is extremely important. According to this equation, the value (V) will increase in response to managerial decisions that increase the amount of its cash flows in a particular currency (CF_j) or to conditions that increase the exchange rate at which that currency is converted into dollars (S_j).

To avoid double counting, cash flows of the MNC's subsidiaries are considered in the valuation model only when they reflect transactions with the U.S. parent. Therefore, any expected cash flows received by foreign subsidiaries should not be counted in the valuation equation unless they are expected to be remitted to the parent.

The denominator of the valuation model for the MNC remains unchanged from the original valuation model for the purely domestic firm. However, note that the weighted average cost of capital for the MNC is based on funding some projects involving business in different countries. Hence any decision by the MNC's parent that affects the cost of its capital supporting projects in a specific country will also affect its weighted average cost of capital (and required rate of return) and thereby its value.

EXAMPLE

Austin Co. is a U.S.-based MNC that sells electronic games to U.S. consumers; it also has European subsidiaries that produce and sell the games in Europe. The firm's European earnings are denominated in euros (the currency of most European countries), and these earnings are typically remitted to the U.S. parent. Last year, Austin received $40 million in cash flows from its U.S. operations and 20 million euros from its European operations. The euro was valued at $1.30 when remitted to the U.S parent, so Austin's cash flows last year are calculated as follows.

Austin's total

$$\begin{aligned}
\text{\$ cash flowslast year} &= \text{\$ cash flows from U.S. operations} + \text{\$ cash flows from foreign operations} \\
&= \text{\$ cash flows from U.S. operations} + [(\text{euro cash flows}) \times (\text{euro exchange rate})] \\
&= \$40{,}000{,}000 + [(20{,}000{,}000 \text{ euros}) \times (\$1.30)] \\
&= \$40{,}000{,}000 + \$26{,}000{,}000 \\
&= \$66{,}000{,}000
\end{aligned}$$

Assume that Austin Co. plans to continue its business in the United States and Europe for the next three years. As a basic valuation model, the firm could use last year's cash flows to estimate each future year's cash flows; then its expected cash flows would be $66 million for each of the next three years. Its valuation could be estimated by discounting these cash flows at its cost of capital. ●

1-4c Uncertainty Surrounding an MNC's Cash Flows

The MNC's future cash flows (and therefore its valuation) are subject to uncertainty because of its exposure not only to domestic economic conditions but also to international economic conditions, political conditions, and exchange rate risk. These factors are explained next, and Exhibit 1.4 complements the discussion.

Exhibit 1.4 How an MNC's Valuation Is Exposed to Uncertainty (Risk)

Uncertain foreign currency cash flows due to uncertain foreign economic and political conditions

Uncertainty surrounding future exchange rates

$$V = \sum_{t=1}^{n} \left\{ \frac{\sum_{j=1}^{m} [E(CF_{j,t}) \times E(S_{j,t})]}{(1+k)^t} \right\}$$

Uncertainty Surrounding an MNC's Valuation:

Exposure to Foreign Economies: If $[CF_{j,t} < E(CF_{j,t})] \rightarrow V\downarrow$

Exposure to Political Risk: If $[CF_{j,t} < E(CF_{j,t})] \rightarrow V\downarrow$

Exposure to Exchange Rate Risk: If $[S_{j,t} < E(S_{j,t})] \rightarrow V\downarrow$

Exposure to International Economic Conditions To the extent that a foreign country's economic conditions affect an MNC's cash flows, they affect the MNC's valuation. The cash inflows that an MNC receives from sales in a foreign country during a given period depends on the demand by that country's consumers for the MNC's products, which in turn is affected by that country's national income in that period. If economic conditions improve in that country, consumers there may enjoy an increase in their income and the employment rate may rise. In that case, those consumers will have more money to spend and their demand for the MNC's products will increase. This illustrates how the MNC's cash flows increasing because of its exposure to international economic conditions.

However, an MNC can also be adversely affected by its exposure to international economic conditions. If conditions weaken in the foreign country where the MNC does business, that country's consumers suffer a decrease in their income and the employment rate may decline. Then those consumers have less money to spend, and their demand for the MNC's products will decrease. In this case, the MNC's cash flows are reduced because of its exposure to international economic conditions.

When Facebook went public in 2012, the registration statement acknowledged its exposure to international economic conditions: "We plan to continue expanding our operations abroad where we have limited operating experience and may be subject to increasing business and economic risks that could affect our financial results."

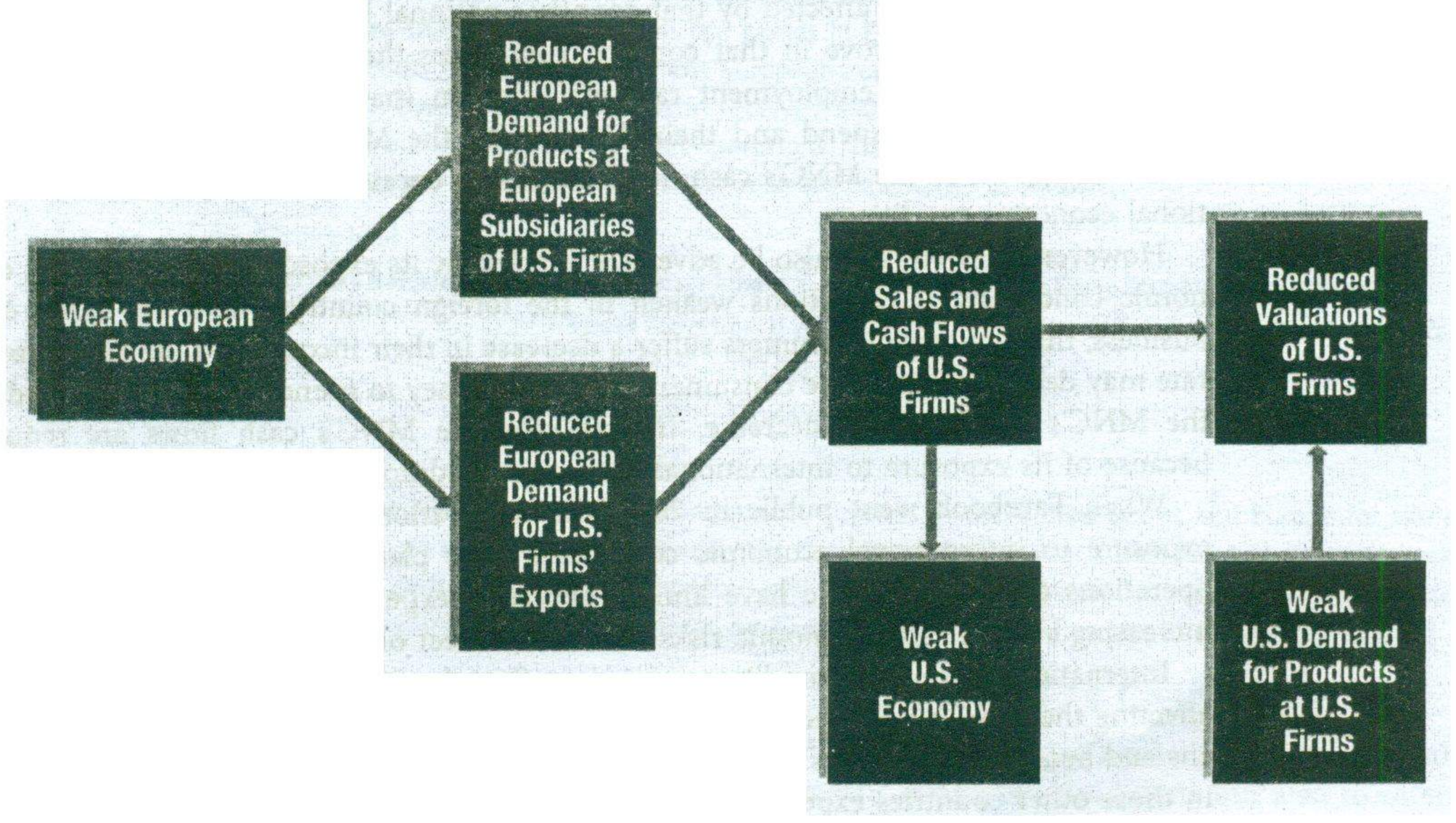
International economic conditions can also affect the MNC's cash flows indirectly by affecting the MNC's home economy. Consider that when a country's economy strengthens and hence its consumers buy more products from firms in other countries, the firms in those other countries experience stronger sales and cash flows. Therefore, the owners and employees of these firms have more income. When they spend a portion of that higher income locally, they stimulate their local economy.

Conversely, if the foreign country's economy weakens and hence its consumers buy fewer products from firms in other countries, then the firms in those countries experience weaker sales and cash flows. The owners and employees of these firms therefore have less income, and if they reduce spending locally their local economy weakens.

There is much international trade between the United States and Europe. European countries under weak economic conditions tend to reduce their demand for U.S.-made products. The result may be weaker economic conditions in the United States, which may lead to lower national income and higher unemployment there. Then U.S. consumers would have less money to spend and so would reduce their demand for the products offered by U.S.-based MNCs. In recent years, the financial press has featured extensive coverage on how bad economic conditions in European countries adversely affect the U.S economy. Similarly, research has documented that U.S. stock market performance is highly sensitive to economic conditions in Europe.

The effects on international economic conditions are illustrated in Exhibit 1.5, which shows how weak European conditions can affect the valuations of U.S.-based MNCs. The top string of effects (from left to right) in this exhibit indicate how weak European economic conditions cause a decline in the demand for the products made by U.S. firms. The result is weaker cash flows of the U.S.-based MNCs that sell products either as exports or through their European subsidiaries to European customers. However, there is an additional adverse effect of the weak European economy on U.S.-based MNCs and even on domestic U.S. firms. As the U.S.-based MNCs experience weaker cash flows, they may reduce their workforce or the number of hours that employees work. Furthermore, the profits earned by their owners are reduced. Thus not only the employees but also the owners of U.S.-based MNCs have less money to

Exhibit 1.5 Potential Effects of International Economic Conditions



spend, so all U.S. firms will likewise experience reduced sales and cash flows. This means that a weak European economy, in addition to reducing European demand for the products of U.S.-based MNCs, also weakens the U.S. economy and thus reduces U.S. demand for those products.

EXAMPLE Recall from the original example for Austin Co. that it has expected annual cash flows of $40 million from its U.S. operations. If Europe experiences a recession, however, then Austin expects reduced European demand for many U.S. products, and this will adversely affect the U.S. economy. Under these conditions, the U.S. demand for Austin's computer games would decline, reducing its expected annual cash flows due to U.S. operations from $40 million to $38 million. A European recession would naturally result also in reduced European demand for Austin's computer games, so the company reduces its expected euro cash flows due to European operations from 20 million euros to 16 million euros. ●

Exposure to International Political Risk Political risk in any country can affect the level of an MNC's sales. A foreign government may increase taxes or impose barriers on the MNC's subsidiary. Alternatively, consumers in a foreign country may boycott the MNC if there is friction between the government of their country and the MNC's home country. Political actions like these can reduce the cash flows of an MNC. The term "country risk" is commonly used to reflect an MNC's exposure to a variety of country conditions, including political actions such as friction within the government, government policies (such as tax rules), and financial conditions within that country.

Exposure to Exchange Rate Risk If the foreign currencies to be received by a U.S.-based MNC suddenly weaken against the dollar, then the MNC will receive a lower amount of dollar cash flows than expected. Therefore, the MNC's cash flows will be reduced.

EXAMPLE Recall from the previous example that Austin Co. now anticipates a European recession and so has revised its expected annual cash flows to be 16 million euros from its European operations. The dollar cash flows that Austin will receive from these euro cash flows depend on the exchange rate at the time those euros are converted to dollars. If the exchange rate is expected to be $1.30, then Austin's cash flows are predicted as follows.

$$\begin{aligned}\text{Austin's \$ cash flows resulting from European operations} &= \text{Austin's cash flows in euros} \times \text{euro exchange rate}\\ &= 16{,}000{,}000 \text{ euros} \times \$1.30\\ &= \$20{,}800{,}000\end{aligned}$$

However, if Austin believes that the anticipated European recession will cause the euro's value to weaken and be worth only $1.20 when the euros are converted into dollars, then its estimate of the dollar cash flows from European operations would be revised as follows.

$$\begin{aligned}\text{Austin's \$ cash flows resulting from European operations} &= \text{Austin's cash flows in euros} \times \text{euro exchange rate}\\ &= 16{,}000{,}000 \text{ euros} \times \$1.20\\ &= \$19{,}200{,}000\end{aligned}$$

Thus, Austin's expected dollar cash flows are reduced as a result of reducing the expected value of the euro at the time of conversion into dollars.

This conceptual framework can be used to understand how MNCs such as Facebook or Google are affected by exchange rate movements. Google now receives more than half of its total revenue from outside the United States as it provides advertising for non-U.S. companies targeted at non-U.S. users. Consequently, Google's dollar cash flows are favorably affected when the currencies it receives appreciate against the dollar over time.

As Facebook attracts more users in Europe, it will attract more demand for advertising by European firms and therefore will receive more cash flows in euros. As it sells more ads to firms in other countries, it will receive more cash flows in their respective currencies. Its international revenue as a percentage of total revenue has consistently increased over the last four years and it is now

approaching 50 percent. As Facebook's international business continues to grow, its estimated dollar cash flows in any period will necessarily become more sensitive to the exchange rates of these currencies relative to the dollar. If the revenue it receives is denominated in currencies that appreciate against the dollar over time, then its dollar cash flows and valuation will increase. Conversely, if the revenue it receives is denominated in currencies that depreciate against the dollar over time, its dollar cash flows and valuation will decrease. ●

Many MNCs have cash outflows in one or more foreign currencies because they import supplies or materials from companies in other countries. When an MNC anticipates future cash outflows in foreign currencies, it is exposed to exchange rate movements but in the opposite direction. If those foreign currencies strengthen, then the MNC will require more dollars to obtain the foreign currencies needed to make its payments. This dynamic reduces the MNC's dollar cash flows (on a net basis) overall and so diminishes its value.

1-4d Summary of International Effects

Exhibit 1.4 summarized how an MNC's expected cash flows and valuation are subject to uncertainty through exposure to international conditions. Up to this point, the possible impact of each international condition on an MNC's cash flows has been treated in isolation. In reality, however, an MNC must consider the impact of all international conditions so that it can determine the resulting effect on its cash flows.

EXAMPLE

Recall the original example of Austin Co., a U.S.-based MNC that expects to generate $40 million annually in cash flows from its operations in the United States and 20 million euros annually in cash flows from its operations in Europe over the next three years. Assume that Austin anticipates a possible European recession during this period and therefore revises its expectations as follows to reflect that possibility.

1. The company expects that a European recession will adversely affect the U.S. economy and result in reduced U.S. demand for its computer games; it therefore reduces its estimated dollar cash flows from U.S. operations to $38 million annually over the next three years.
2. Austin expects that a European recession will result in a reduced European demand for its computer games, so it lowers its estimated euro cash flows from European operations to 16 million euros annually over the next three years.
3. The firm expects that a European recession will weaken the euro and hence lowers its estimate of the euro's value to $1.20 over the next three years. Altogether, then, Austin's expected annual cash flows for each of the next three years are now calculated as follows.

$$\begin{aligned}\text{Austin's total expected \$ cash flows each year} &= \text{\$ cash flows from U.S. operations} + \text{\$ cash flows from foreign operations}\\ &= \text{\$ cash flows from U.S. operations} + [(\text{euro cash flows}) \times (\text{euro exchange rate})]\\ &= \$38{,}000{,}000 + [(16{,}000{,}000 \text{ euros}) \times (\$1.20)]\\ &= \$38{,}000{,}000 + \$19{,}200{,}000\\ &= \$57{,}200{,}000 \bullet\end{aligned}$$

Comparing these estimates to those in the original example reveals how each of the three revisions in expectations affects expected cash flows. The expected dollar cash flows from U.S. operations are reduced. The expected euro cash flows are reduced and the expected exchange rate is lower; both of these factors reduce the estimate of dollar cash flows from foreign operations. The expected annual dollar cash flows for Austin in the original example were $66 million, whereas the revised expectation is only $57.2 million. This example clearly illustrates just how adversely an MNC's cash flows can be affected by exposure to international conditions.

1-4e How Uncertainty Affects the MNC's Cost of Capital

If there is suddenly more uncertainty about an MNC's future cash flows, then investors will expect to receive a higher rate of return. Thus more uncertainty increases the return on investment required by investors (and thus the MNC's cost of obtaining capital), which lowers the firm's valuation.

EXAMPLE

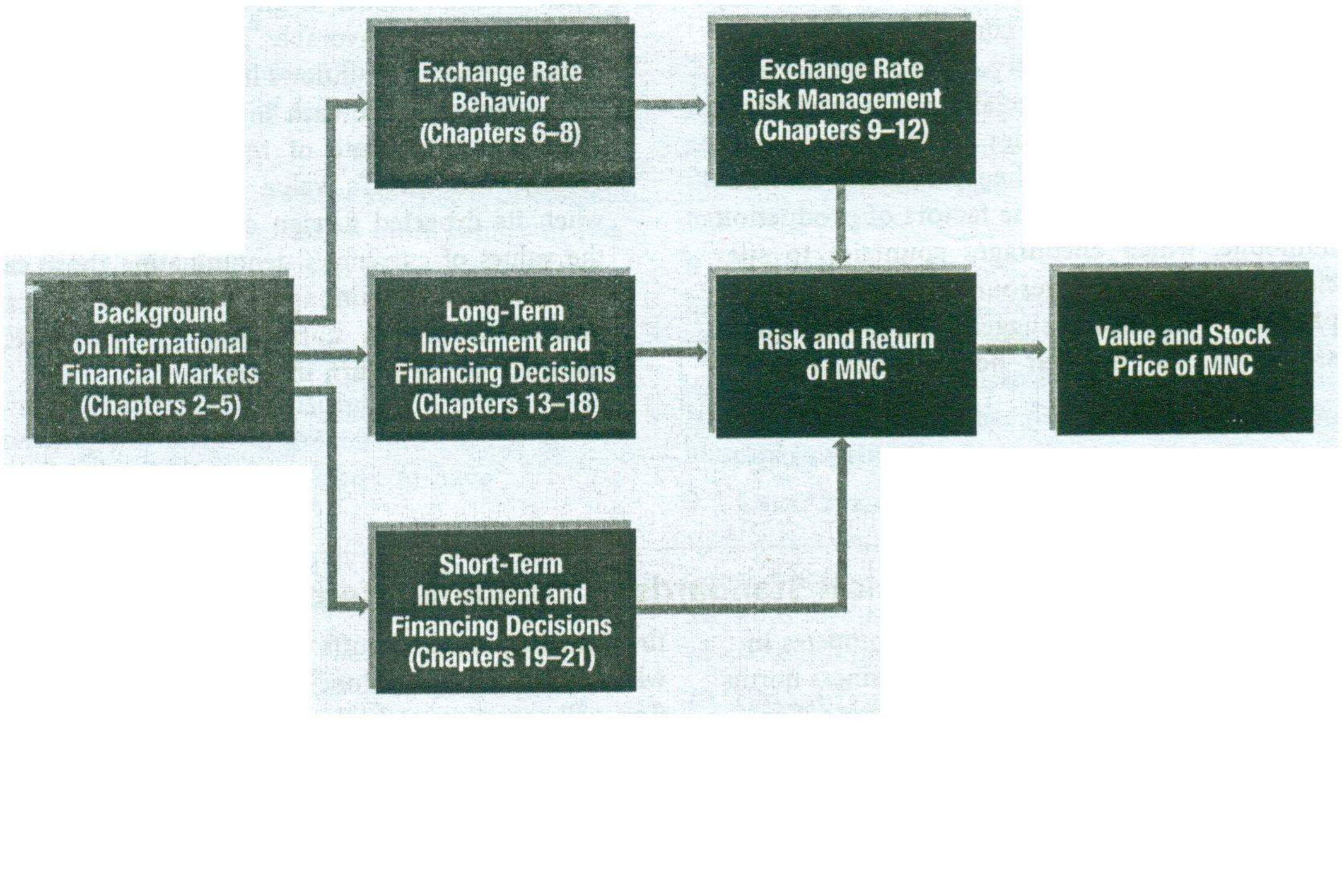
Since Austin Co. does substantial business in Europe, its value is strongly influenced by how much revenue it expects to earn from that business. As a result of some events that occurred in Europe today, economic conditions in Europe are subject to considerable uncertainty. Although Austin does not change its forecasts of expected cash flows, it is concerned that the actual flows could deviate substantially from those forecasts. The increased uncertainty surrounding these cash flows has increased the firm's cost of capital, because its investors now require a higher rate of return. In other words, the numerator (estimated cash flows) of the valuation equation has not changed but the denominator has increased owing to the increased uncertainty surrounding the cash flows. Thus, the valuation of Austin Co. has decreased. ●

In some periods, the uncertainty surrounding conditions that influence cash flows of MNCs could decline. In that case, the uncertainty surrounding cash flows also declines and results in a lower required rate of return and cost of capital for MNCs. Consequently, the valuations of MNCs increase.

1-5 Organization of the Text

The chapters in this textbook are organized as shown in Exhibit 1.6. Chapters 2 through 8 discuss international markets and conditions from a macroeconomic perspective, focusing

Exhibit 1.6 Organization of Chapters



on external forces that can affect the value of an MNC. Although financial managers cannot control such forces, they can control the extent of their firm's exposure to them. These macroeconomically oriented chapters provide the background necessary to make financial decisions.

Chapters 9 through 21 take a microeconomic perspective and focus on how the financial management of an MNC can affect its value. Financial decisions by MNCs are commonly classified as either investing decisions or financing decisions. In general, investing decisions by an MNC tend to affect the numerator of the valuation model because such decisions affect expected cash flows. In addition, investing decisions by the MNC that alter the firm's weighted average cost of capital may also affect the denominator of the valuation model. Long-term financing decisions by an MNC tend to affect the denominator of the valuation model because they affect its cost of capital.

SUMMARY

- The main goal of an MNC is to maximize shareholder wealth. When managers are tempted to serve their own interests instead of those of shareholders, an agency problem exists. Multinational corporations tend to experience greater agency problems than do domestic firms because managers of foreign subsidiaries might be tempted to make decisions that serve their subsidiaries instead of the overall MNC. Proper incentives and communication from the parent may help to ensure that subsidiary managers focus on serving the overall MNC.
- International business is justified by three key theories. The theory of comparative advantage suggests that each country should use its comparative advantage to specialize in its production and rely on other countries to meet other needs. The imperfect markets theory suggests that imperfect markets render the factors of production immobile, which encourages countries to specialize based on the resources they have. The product cycle theory suggests that, after firms are established in their home countries, they commonly expand their product specialization in foreign countries.
- The most common methods by which firms conduct international business are international trade, licensing, franchising, joint ventures, acquisitions of foreign firms, and formation of foreign subsidiaries. Methods such as licensing and franchising involve little capital investment but distribute some of the profits to other parties. The acquisition of foreign firms or formation of foreign subsidiaries requires substantial capital investments but offers the potential for large returns.
- The valuation model of an MNC shows that the MNC's value is favorably affected when its expected foreign cash inflows increase, the currencies denominating those cash inflows increase, or the MNC's required rate of return decreases. Conversely, the MNC's value is adversely affected when its expected foreign cash inflows decrease, the values of currencies denominating those cash flows decrease (assuming that they have net cash inflows in foreign currencies), or the MNC's required rate of return increases.

POINT COUNTER-POINT

Should an MNC Reduce Its Ethical Standards to Compete Internationally?

Point Yes. When a U.S.-based MNC competes in some countries, it may encounter some business norms there that are not allowed in the United States. For example, when competing for a government contract, firms might provide payoffs to the government officials who will make the decision. Yet, in the United States, a firm will sometimes take a client on an expensive golf outing or provide skybox tickets to events. This is no

different than a payoff. If the payoffs are bigger in some foreign countries, the MNC can compete only by matching the payoffs provided by its competitors.

Counter-Point No. A U.S.-based MNC should maintain a standard code of ethics that applies to any country, even if it is at a disadvantage in a foreign country that allows activities that might be viewed as unethical. In this way, the MNC establishes more credibility worldwide.

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. What are typical reasons why MNCs expand internationally?
2. Explain why unfavorable economic or political conditions affect the MNC's cash flows, required rate of return, and valuation.
3. Identify the more obvious risks faced by MNCs that expand internationally.

Questions and Applications

1. Agency Problems of MNCs

a. Explain the agency problem of MNCs.

b. Why might agency costs be larger for an MNC than for a purely domestic firm?

2. Comparative Advantage

a. Explain how the theory of comparative advantage relates to the need for international business.

b. Explain how the product cycle theory relates to the growth of an MNC.

3. Imperfect Markets

a. Explain how the existence of imperfect markets has led to the establishment of subsidiaries in foreign markets.

b. If perfect markets existed, would wages, prices, and interest rates among countries be more similar or less similar than under conditions of imperfect markets? Why?

4. International Opportunities

a. Do you think the acquisition of a foreign firm or licensing will result in greater growth for an MNC? Which alternative is likely to have more risk?

b. Describe a scenario in which the size of a corporation is not affected by access to international opportunities.

c. Explain why MNCs such as Coca-Cola and PepsiCo, Inc., still have numerous opportunities for international expansion.

5. International Opportunities Due to the Internet

a. What factors cause some firms to become more internationalized than others?

b. Offer your opinion on why the Internet may result in more international business.

6. Impact of Exchange Rate Movements Plak Co. of Chicago has several European subsidiaries that remit earnings to it each year. Explain how appreciation of the euro (the currency used in many European countries) would affect Plak's valuation.

7. Benefits and Risks of International Business As an overall review of this chapter, identify possible reasons for growth in international business. Then, list the various disadvantages that may discourage international business.

8. Valuation of an MNC Hudson Co., a U.S. firm, has a subsidiary in Mexico, where political risk has recently increased. Hudson's best guess of its future peso cash flows to be received has not changed. However, its valuation has declined as a result of the increase in political risk. Explain.

9. Centralization and Agency Costs Would the agency problem be more pronounced for Berkely Corp., whose parent company makes most major decisions for its foreign subsidiaries, or Oakland Corp., which uses a decentralized approach?

10. Global Competition Explain why more standardized product specifications across countries can increase global competition.

11. Exposure to Exchange Rates McCanna Corp., a U.S. firm, has a French subsidiary that produces wine and exports to various European countries. All of the countries where it sells its wine use the euro as their currency, which is the same currency used in France. Is McCanna Corp. exposed to exchange rate risk?

12. Macro versus Micro Topics Review the Table of Contents and indicate whether each of the chapters from Chapter 2 through Chapter 21 has a macro or micro perspective.

13. Methods Used to Conduct International Business Duve, Inc., desires to penetrate a foreign market with either a licensing agreement with a foreign firm or by acquiring a foreign firm. Explain the differences in potential risk and return between a licensing agreement with a foreign firm and the acquisition of a foreign firm.

14. International Business Methods Snyder Golf Co., a U.S. firm that sells high-quality golf clubs in the United States, wants to expand internationally by selling the same golf clubs in Brazil.

a. Describe the tradeoffs that are involved for each method (such as exporting, direct foreign investment, etc.) that Snyder could use to achieve its goal.

b. Which method would you recommend for this firm? Justify your recommendation.

15. Impact of Political Risk Explain why political risk may discourage international business.

16. Impact of September 11 Following the terrorist attack on the United States, the valuations of many MNCs declined by more than 10 percent. Explain why the expected cash flows of MNCs were reduced, even if they were not directly hit by the terrorist attacks.

Advanced Questions

17. International Joint Venture Anheuser-Busch (which is now part of AB InBev due to a merger), the producer of Budweiser and other beers, has engaged in a joint venture with Kirin Brewery, the largest brewery in Japan. The joint venture enabled Anheuser-Busch to have its beer distributed through Kirin's distribution channels in Japan. In addition, it could utilize Kirin's facilities to produce beer that would be sold locally. In return, Anheuser-Busch provided information about the American beer market to Kirin.

a. Explain how the joint venture enabled Anheuser-Busch to achieve its objective of maximizing shareholder wealth.

b. Explain how the joint venture limited the risk of the international business.

c. Many international joint ventures are intended to circumvent barriers that normally prevent foreign competition. What barrier in Japan did Anheuser-Busch circumvent as a result of the joint venture? What barrier in the United States did Kirin circumvent as a result of the joint venture?

d. Explain how Anheuser-Busch could have lost some of its market share in countries outside Japan as a result of this particular joint venture.

18. Impact of Eastern European Growth The managers of Loyola Corp. recently had a meeting to discuss new opportunities in Europe as a result of the recent integration among Eastern European countries. They decided not to penetrate new markets because of their present focus on expanding market share in the United States. Loyola's financial managers have developed forecasts for earnings based on the 12 percent market share (defined here as its percentage of total European sales) that Loyola currently has in Eastern Europe. Is 12 percent an appropriate estimate for next year's Eastern European market share? If not, does it likely overestimate or underestimate the actual Eastern European market share next year?

19. Valuation of an MNC Birm Co., based in Alabama, is considering several international opportunities in Europe that could affect the value of its firm. The valuation of its firm is dependent on four factors: (1) expected cash flows in dollars, (2) expected cash flows in euros that are ultimately converted into dollars, (3) the rate at which it can convert euros to dollars, and (4) Birm's weighted average cost of capital. For each opportunity, identify the factors that would be affected.

a. Birm plans a licensing deal in which it will sell technology to a firm in Germany for $3 million; the payment is invoiced in dollars, and this project has the same risk level as its existing businesses.

b. Birm plans to acquire a large firm in Portugal that is riskier than its existing businesses.

c. Birm plans to discontinue its relationship with a U.S. supplier so that it can import a small amount of supplies (denominated in euros) at a lower cost from a Belgian supplier.

d. Birm plans to export a small amount of materials to Ireland that are denominated in euros.

20. Assessing Motives for International Business Fort Worth, Inc., specializes in manufacturing some

basic parts for sports utility vehicles (SUVs) that are produced and sold in the United States. Its main advantage in the United States is that its production is efficient and less costly than that of some other unionized manufacturers. It has a substantial market share in the United States. Its manufacturing process is labor intensive. It pays relatively low wages compared to U. S. competitors, but has guaranteed the local workers that their positions will not be eliminated for the next 30 years. It hired a consultant to determine whether it should set up a subsidiary in Mexico, where the parts would be produced. The consultant suggested that Fort Worth should expand for the following reasons. Offer your opinion on whether the consultant's reasons are logical.

a. Theory of Competitive Advantage: There are not many SUVs sold in Mexico, so Fort Worth, Inc., would not have to face much competition there.

b. Imperfect Markets Theory: Fort Worth cannot easily transfer workers to Mexico, but it can establish a subsidiary there in order to penetrate a new market.

c. Product Cycle Theory: Fort Worth has been successful in the United States. It has limited growth opportunities because it already controls much of the U.S. market for the parts it produces. Thus, the natural next step is to conduct the same business in a foreign country.

d. Exchange Rate Risk: The exchange rate of the peso has weakened recently, so this would allow Fort Worth to build a plant at a very low cost (by exchanging dollars for the cheap pesos to build the plant).

e. Political Risk: The political conditions in Mexico have stabilized in the last few months, so Fort Worth should attempt to penetrate the Mexican market now.

21. Valuation of Walmart's International Business In addition to all of its stores in the United States, Walmart Stores, Inc. has 13 stores in Argentina, 302 stores in Brazil, 289 stores in Canada, 73 stores in China, 889 stores in Mexico, and 335 stores in the United Kingdom. Overall, it has 2,750 stores in foreign countries. Consider that the value of Walmart is composed of two parts, a U.S. part (due to business in the United States) and a non-U.S. part (due to business in other countries). Explain how to determine the present value (in dollars) of the non-U.S. part assuming that you had access to all the details of Walmart businesses outside the United States.

22. Impact of International Business on Cash Flows and Risk Nantucket Travel Agency specializes in tours for American tourists. Until recently, all of its business was in the United States. It just established a subsidiary in Athens, Greece, which provides tour services in the Greek islands for American tourists. It rented a shop near the port of Athens. It also hired residents of Athens who could speak English and provide tours of the Greek islands. The subsidiary's main costs are rent and salaries for its employees and the lease of a few large boats in Athens that it uses for tours. American tourists pay for the entire tour in dollars at Nantucket's main U.S. office before they depart for Greece.

a. Explain why Nantucket may be able to effectively capitalize on international opportunities such as the Greek island tours.

b. Nantucket is privately owned by owners who reside in the United States and work in the main office. Explain possible agency problems associated with the creation of a subsidiary in Athens, Greece. How can Nantucket attempt to reduce these agency costs?

c. Greece's cost of labor and rent are relatively low. Explain why this information is relevant to Nantucket's decision to establish a tour business in Greece.

d. Explain how the cash flow situation of the Greek tour business exposes Nantucket to exchange rate risk. Is Nantucket favorably or unfavorably affected when the euro (Greece's currency) appreciates against the dollar? Explain.

e. Nantucket plans to finance its Greek tour business. Its subsidiary could obtain loans in euros from a bank in Greece to cover its rent, and its main office could pay off the loans over time. Alternatively, its main office could borrow dollars and would periodically convert dollars to euros to pay the expenses in Greece. Does either type of loan reduce the exposure of Nantucket to exchange rate risk? Explain.

f. Explain how the Greek island tour business could expose Nantucket to political country risk.

23. Valuation of an MNC Yahoo! has expanded its business by establishing portals in numerous countries, including Argentina, Australia, China, Germany, Ireland, Japan, and the United Kingdom. It has cash outflows associated with the creation and administration of each portal. It also generates cash inflows from selling advertising space on its website. Each portal results in cash flows in a different currency. Thus, the valuation of Yahoo! is based on its expected future net cash flows in Argentine pesos after converting them

into U.S. dollars, its expected net cash flows in Australian dollars after converting them into U.S. dollars, and so on. Explain how and why the valuation of Yahoo! would change if most investors suddenly expected that the dollar would weaken against most currencies over time.

24. Uncertainty Surrounding an MNC's Valuation Carlisle Co. is a U.S. firm that is about to purchase a large company in Switzerland at a purchase price of $20 million. This company produces furniture and sells it locally (in Switzerland), and it is expected to earn large profits every year. The company will become a subsidiary of Carlisle and will periodically remit its excess cash flows due to its profits to Carlisle Co. Assume that Carlisle Co. has no other international business. Carlisle has $10 million that it will use to pay for part of the Swiss company and will finance the rest of its purchase with borrowed dollars. Carlisle Co. can obtain supplies from either a U.S. supplier or a Swiss supplier (in which case the payment would be made in Swiss francs). Both suppliers are very reputable and there would be no exposure to country risk when using either supplier. Is the valuation of the total cash flows of Carlisle Co. more uncertain if it obtains its supplies from a U.S. firm or a Swiss firm? Explain briefly.

25. Impact of Exchange Rates on MNC Value Olmsted Co. has small computer chips assembled in Poland and transports the final assembled products to the parent, where they are sold by the parent in the United States. The assembled products are invoiced in dollars. Olmsted Co. uses Polish currency (the zloty) to produce these chips and assemble them in Poland. The Polish subsidiary pays the employees in the local currency (zloty), and Olmsted Co. finances its subsidiary operations with loans from a Polish bank (in zloty). The parent of Olmsted will send sufficient monthly payments (in dollars) to the subsidiary in order to repay the loan and other expenses incurred by the subsidiary. If the Polish zloty depreciates against the dollar over time, will that have a favorable, unfavorable, or neutral effect on the value of Olmsted Co.? Briefly explain.

26. Impact of Uncertainty on MNC Value Minneapolis Co. is a major exporter of products to Canada. Today, an event occurred that has increased the uncertainty surrounding the Canadian dollar's future value over the long term. Explain how this event can affect the valuation of Minneapolis Co.

27. Exposure of MNCs to Exchange Rate Movements Arlington Co. expects to receive 10 million euros in each of the next 10 years. It will need to obtain 2 million Mexican pesos in each of the next 10 years. The euro exchange rate is presently valued at $1.38 and is expected to depreciate by 2 percent each year over time. The peso is valued at $.13 and is expected to depreciate by 2 percent each year over time. Review the valuation equation for an MNC. Do you think that the exchange rate movements will have a favorable or unfavorable effect on the MNC?

28. Impact of the Credit Crisis on MNC Value Much of the attention to the credit crisis was focused on its adverse effects on financial institutions. Yet, many other types of firms were affected as well. Explain why the numerator of the MNC valuation equation was affected during the October 6–10, 2008, period. Explain how the denominator of the MNC valuation equation was affected during this period.

29. Exposure of MNCs to Exchange Rate Movements Because of the low labor costs in Thailand, Melnick Co. (based in the United States) recently established a major research and development subsidiary there that it owns. The subsidiary was created to improve new products that the parent of Melnick can sell in the United States (denominated in dollars) to U.S. customers. The subsidiary pays its local employees in baht (the Thai currency). The subsidiary has a small amount of sales denominated in baht, but its expenses are much larger than its revenue. It has just obtained a large loan denominated in baht that will be used to expand its subsidiary. The business that the parent of Melnick Co. conducts in the United States is not exposed to exchange rate risk. If the Thai baht weakens over the next 3 years, will the value of Melnick Co. be favorably affected, unfavorably affected, or not affected? Briefly explain.

30. Shareholder Rights of Investors in MNCs MNCs tend to expand more when they can more easily access funds by issuing stock. In some countries, shareholder rights are very limited, and the MNCs have limited ability to raise funds by issuing stock. Explain why access to funding is more severe for MNCs based in countries where shareholder rights are limited.

31. MNC Cash Flows and Exchange Rate Risk Tuscaloosa Co. is a U.S. firm that assembles phones in Argentina and transports the final assembled products to the parent, where they are sold by the parent in the United States. The assembled products are invoiced in dollars. The Argentine subsidiary obtains some material from China, and the Chinese exporter is willing to

accept Argentine pesos as payment for these materials that it exports. The Argentine subsidiary pays its employees in the local currency (pesos), and finances its operations with loans from an Argentine bank (in pesos). Tuscaloosa Co. has no other international business. If the Argentine peso depreciates against the dollar over time, will that have a favorable, unfavorable, or neutral effect on Tuscaloosa Co.? Briefly explain.

32. MNC Cash Flows and Exchange Rate Risk Asheville Co. has a subsidiary in Mexico that develops software for its parent. It rents a large facility in Mexico and hires many people in Mexico to work in the facility. Asheville Co. has no other international business. All operations are presently funded by Asheville's parent. All the software is sold to U.S. firms by Asheville's parent and invoiced in U.S. dollars.

a. If the Mexican peso appreciates against the dollar, does this have a favorable effect, unfavorable effect, or no effect on Asheville's value?

b. Asheville Co. plans to borrow funds to support its expansion in the United States. The Mexican interest rates are presently lower than U.S. interest rates, so Asheville obtains a loan denominated in Mexican pesos in order to support its expansion in the United States. Will the borrowing of pesos increase, decrease, or have no effect on its exposure to exchange rate risk? Briefly explain.

33. Estimating an MNC's Cash Flows Biloxi Co. is a U.S. firm that has a subsidiary in China. The subsidiary reinvests half of its net cash flows into operations and remits half to the parent. Biloxi Co. has expected cash flows from domestic business equal to $10,000,000 and the Chinese subsidiary is expected to generate 100 million Chinese yuan at the end of the year. The expected value of yuan at the end of the year is $.13. What are the expected dollar cash flows of the parent of Biloxi Co. in one year?

34. Uncertainty Surrounding an MNC's Cash Flows

a. Assume that Bangor Co. (a U.S. firm) knows that it will have cash inflows of $900,000 from domestic operations, cash inflows of 200,000 Swiss francs due to exports to Swiss operations, and cash outflows of 500,000 Swiss francs at the end of the year. While the future value of the Swiss franc is uncertain because it fluctuates, your best guess is that the Swiss franc's value will be $1.10 at the end this year. What are the expected dollar cash flows of Bangor Co?

b. Assume that Concord Co. (a U.S. firm) is in the same industry as Bangor Co. There is no political risk that could have any impact on the cash flows of either firm. Concord Co. knows that it will have cash inflows of $900,000 from domestic operations, cash inflows of 700,000 Swiss francs due to exports to Swiss operations, and cash outflows of 800,000 Swiss francs at the end of the year. Is the valuation of the total cash flows of Concord Co. more uncertain or less uncertain than the total cash flows of Bangor Co.? Explain briefly.

35. Valuation of an MNC Odessa Co., Midland Co., and Roswell Co. are U.S. firms in the same industry and have the same valuation as of yesterday, based on the present value of future cash flows of each company. Odessa Co. obtains a large amount of its supplies invoiced in euros from European countries, and all of its sales are invoiced in dollars. Midland has a large subsidiary in Europe that does all of its business in euros and remits profits to the U.S. parent every year. Roswell Co. has no international business. Assume that as of this morning an event occurred that you believe will cause a substantial depreciation of the euro against the dollar over time. Assume that this event will not change the business operations of the firms mentioned in this question. Which firm will have the highest valuation based on your expectations? Briefly explain.

36. Impact of Uncertainty on an MNC's Valuation Assume that Alpine Co. is a U.S. firm that has direct foreign investment in Brazil as a result establishing a subsidiary there. Political conditions have changed in Brazil, but the best guess by investors of the future cash flows per year for Alpine Co. has not changed. Yet, there is more uncertainty surrounding the best guess of Alpine's cash flows. In other words, the distribution of possible outcomes above and below the best guess has expanded. Would the change in uncertainty cause the prevailing value of Alpine Co. to increase, decrease, or remain unchanged? Briefly explain.

37. Exposure of MNC Cash Flows

a. Rochester Co. is a U.S. firm that has a language institute in France. This institute attracts Americans who want to learn the French language. Rochester Co. charges tuition to the American students in dollars. It expects that its dollar revenue from charging tuition will be stable over each of the next several years. Its total expenses for this project are as follows. It rents a facility in Paris, and makes a large rent payment each month in euros. It also hires several French citizens as

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full-time instructors, and pays their salary in euros. It expects that its expenses denominated in euros will be stable over each of the next several years. If the euro appreciates against the dollar over time, should this have a favorable effect, unfavorable effect, or no effect on the value of Rochester Co.? Briefly explain.

b. Rochester considers a new project in which it would also attract people from Spain, and the institute in France would teach them the French language. It would charge them tuition in euros. The expenses for this project would be about the same as the expenses of the project described above for the American students. Assume that euros to be generated by this project would be stable over the next several years. Assume that this project is about the same size as the project for American students. For either project, the expected annual revenue is just slightly larger than the expected annual expenses. Is the valuation of net cash flows subject to a higher degree of exchange rate risk for this project or for the project for American students? Briefly explain.

Discussion in the Boardroom

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

Running Your Own MNC

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

Blades, Inc. Case

Decision to Expand Internationally

Blades, Inc., is a U.S.-based company that has been incorporated in the United States for 3 years. Blades is a relatively small company, with total assets of only $200 million. The company produces a single type of product, roller blades. Due to the booming roller blade market in the United States at the time of the company's establishment, Blades has been quite successful. For example, in its first year of operation, it reported a net income of $3.5 million. Recently, however, the demand for Blades' "Speedos," the company's primary product in the United States, has been slowly tapering off, and Blades has not been performing well. Last year, it reported a return on assets of only 7 percent. In response to the company's annual report for its most recent year of operations, Blades' shareholders have been pressuring the company to improve its performance; its stock price has fallen from a high of $20 per share 3 years ago to $12 last year. Blades produces high-quality roller blades and employs a unique production process, but the prices it charges are among the top 5 percent in the industry.

In light of these circumstances, Ben Holt, the company's chief financial officer (CFO), is contemplating his alternatives for Blades' future. There are no other cost-cutting measures that Blades can implement in the United States without affecting the quality of its product. Also, production of alternative products would require major modifications to the existing plant setup. Furthermore, and because of these limitations, expansion within the United States at this time seems pointless.

Holt is considering the following: If Blades cannot penetrate the U.S. market further or reduce costs here, why not import some parts from overseas and/or expand the company's sales to foreign countries? Similar strategies have proved successful for numerous companies that expanded into Asia in recent years to increase their profit margins. The CFO's initial focus is on Thailand. Thailand has recently experienced weak economic conditions, and Blades could purchase components there at a low cost. Holt is aware that many of Blades' competitors have begun importing production components from Thailand.

Not only would Blades be able to reduce costs by importing rubber and/or plastic from Thailand due to the low costs of these inputs, but it might also be able to augment weak U.S. sales by exporting to Thailand, an economy still in its infancy and just beginning to appreciate leisure products such as roller blades. While several of Blades' competitors import components from Thailand, few are exporting to the country. Long-term decisions would also eventually have to be made; maybe Blades, Inc., could establish a subsidiary in Thailand and gradually shift its focus away from the United States if its U.S. sales do not rebound. Establishing a subsidiary in Thailand would also make sense for

Blades due to its superior production process. Holt is reasonably sure that Thai firms could not duplicate the high-quality production process employed by Blades. Furthermore, if the company's initial approach of exporting works well, establishing a subsidiary in Thailand would preserve Blades' sales before Thai competitors are able to penetrate the Thai market.

As a financial analyst for Blades, Inc., you are assigned to analyze international opportunities and risk resulting from international business. Your initial assessment should focus on the barriers and opportunities that international trade may offer. Holt has never been involved in international business in any form and is unfamiliar with any constraints that may inhibit his plan to export to and import from a foreign country. Holt has presented you with a list of initial questions you should answer.

1. What are the advantages Blades could gain from importing from and/ or exporting to a foreign country such as Thailand?
2. What are some of the disadvantages Blades could face as a result of foreign trade in the short run? In the long run?
3. Which theories of international business described in this chapter apply to Blades, Inc., in the short run? In the long run?
4. What long-range plans other than establishment of a subsidiary in Thailand are an option for Blades and may be more suitable for the company?

Small Business Dilemma

Developing a Multinational Sporting Goods Corporation

In every chapter of this text, some of the key concepts are illustrated with an application to a small sporting goods firm that conducts international business. These "Small Business Dilemma" features allow students to recognize the dilemmas and possible decisions that firms (such as this sporting goods firm) may face in a global environment. For this chapter, the application is on the development of the sporting goods firm that would conduct international business.

Last month, Jim Logan completed his undergraduate degree in finance and decided to pursue his dream of managing his own sporting goods business. Logan had worked in a sporting goods shop while going to college, and he had noticed that many customers wanted to purchase a low-priced football. However, the sporting goods store where he worked, like many others, sold only top-of-the-line footballs. From his experience, Logan was aware that top-of-the-line footballs had a high markup and that a low-cost football could possibly penetrate the U.S. market. He also knew how to produce footballs. His goal was to create a firm that would produce low-priced footballs and sell them on a wholesale basis to various sporting goods stores in the United States. Unfortunately, many sporting goods stores began to sell low-priced footballs just before Logan was about to start his business. The firm that began to produce the low-cost footballs already provided many other products to sporting goods stores in the United States and therefore had already established a business relationship with these stores. Logan did not believe that he could compete with this firm in the U.S. market.

Rather than pursue a different business, Logan decided to implement his idea on a global basis. While football (as it is played in the United States) has not been a traditional sport in foreign countries, it has become more popular in some foreign countries in recent years. Furthermore, the expansion of cable networks in foreign countries would allow for much more exposure to U.S. football games in those countries in the future. To the extent that this would increase the popularity of football (U.S. style) as a hobby in the foreign countries, it would result in a demand for footballs in foreign countries. Logan asked many of his foreign friends from college days if they recalled seeing footballs sold in their home countries. Most of them said they rarely noticed footballs being sold in sporting goods stores but that they expected the demand for footballs to increase in their home countries. Consequently, Logan decided to start a business of producing low-priced footballs and exporting them to sporting goods distributors in foreign countries. Those distributors would then sell the footballs at the retail level. Logan planned to expand his product line over time once he identified other sports products that he might sell to foreign sporting goods stores. He decided to call his business "Sports Exports Company." To avoid any rent and labor expenses, Logan planned to produce the footballs in his garage and to perform the work himself. Thus, his main business expenses were the cost of the materials used to produce

footballs and expenses associated with finding distributors in foreign countries who would attempt to sell the footballs to sporting goods stores.

1. Is Sports Exports Company a multinational corporation?
2. Why are the agency costs lower for Sports Exports Company than for most MNCs?
3. Does Sports Exports Company have any comparative advantage over potential competitors in foreign countries that could produce and sell footballs there?
4. How would Jim Logan decide which foreign markets he would attempt to enter? Should he initially focus on one or many foreign markets?
5. The Sports Exports Company has no immediate plans to conduct direct foreign investment. However, it might consider other less costly methods of establishing its business in foreign markets. What methods might the Sports Exports Company use to increase its presence in foreign markets by working with one or more foreign companies?

Internet/Excel Exercises

The website address of the Bureau of Economic Analysis is www.bea.gov.

1. Use this website to assess recent trends in direct foreign investment (DFI) abroad by U.S. firms. Compare the DFI in the United Kingdom with the DFI in France. Offer a possible reason for the large difference.
2. Based on the recent trends in DFI, are U.S.-based MNCs pursuing opportunities in Asia? In Eastern Europe? In Latin America?

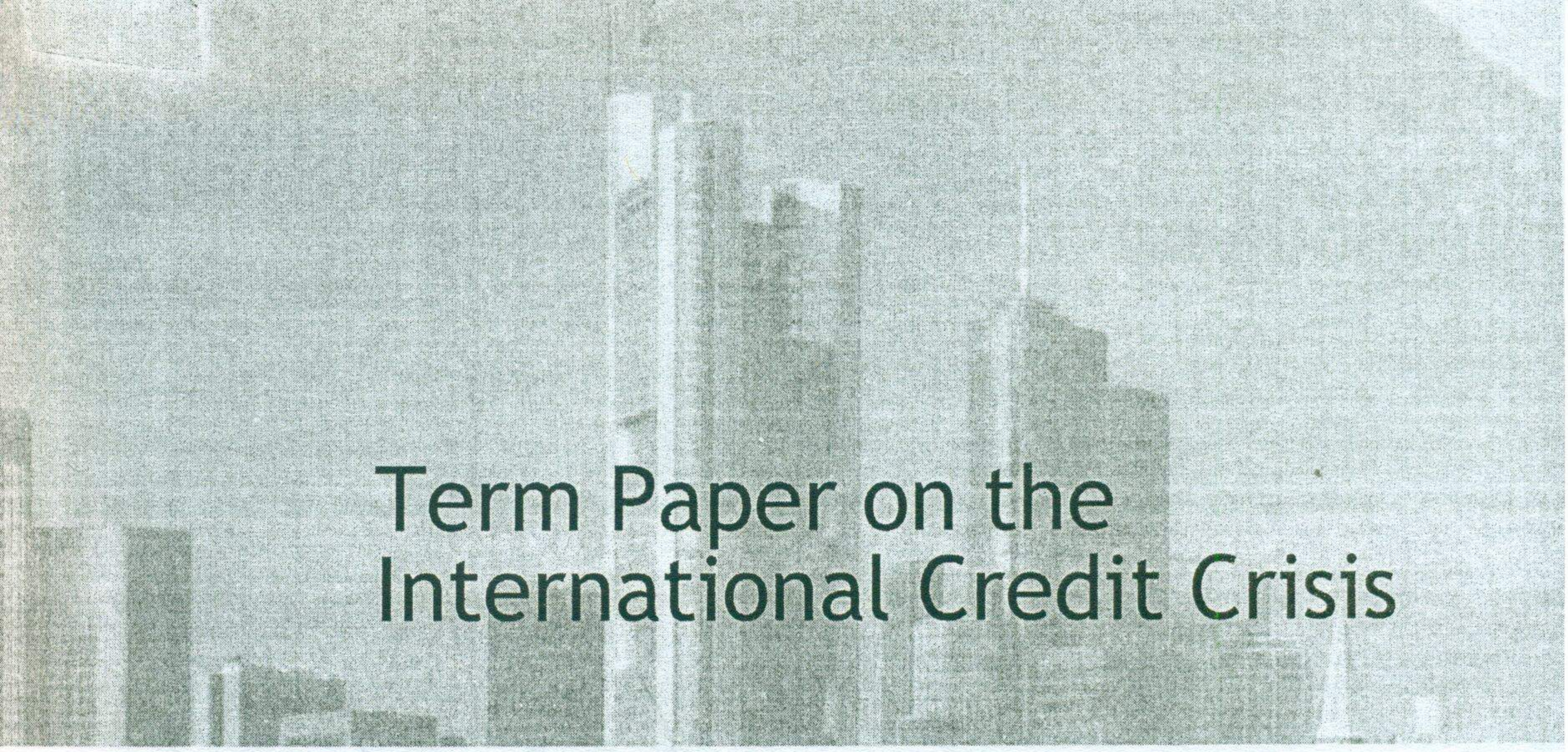
Online Articles with Real-World Examples

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

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

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

1. company AND repatriated foreign earnings
2. Inc. AND repatriated foreign earnings
3. company AND currency effects
4. Inc. AND currency effects
5. company AND country risk
6. Inc. AND country risk
7. direct foreign investment
8. joint venture AND international
9. licensing AND international
10. multinational corporation AND risk



Term Paper on the International Credit Crisis

Write a term paper on one of the topics below or one that is assigned by your professor. Details such as deadline date and length of the paper will be provided by your professor.

Each of the ideas listed below can be easily researched because much media attention has been given to the topics. While this text offers a brief summary of each topic, much more information is available on the Internet by inserting a few key terms or phrases into a search engine.

1. Impact on a Selected Country. Select one country (except the United States) and describe why that country was affected by the international credit crisis. For example, did its financial institutions invest heavily in mortgage-related securities? Did its MNCs suffer from limited liquidity because they relied on credit from other countries during the international credit crunch? Did the country's economy suffer because it relies heavily on exports? Was the country adversely affected because of how the international credit crisis affected its currency's value?

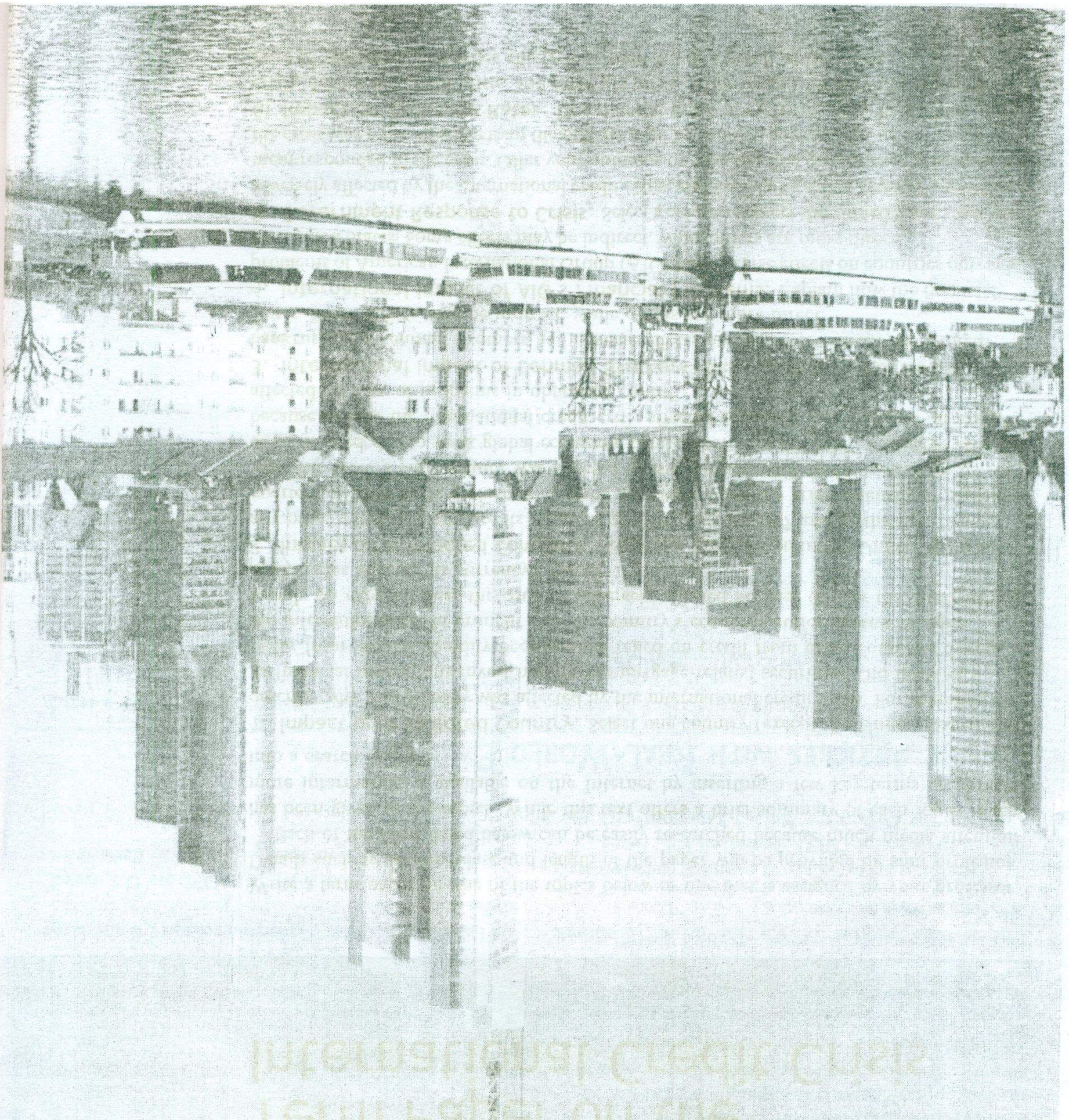
2. Impact on a Selected Company. Select one MNC based in the United States or in any other country. Compare its financial performance in 2007 and in the first two quarters of 2008 to its performance since July 2008 when the crisis intensified. Explain why this MNC's performance was affected by the international credit crisis. Was its revenue reduced due to weak global economic conditions? Was the MNC adversely affected because of how the international credit crisis affected exchange rates? Was it adversely affected because of problems in obtaining credit?

3. International Impact of Lehman Brothers' Bankruptcy. Explain how the bankruptcy of Lehman Brothers had adverse effects on countries outside the United States. Some effects may be indirect, while others are more direct.

4. International Impact of AIG's Financial Problems. Explain how the financial problems of American International Group (AIG) had adverse effects on countries out- side the United States. Some effects may be indirect, while others are more direct.

5. Government Response to Crisis. Select a country (except the United States) that was adversely affected by the international credit crisis, and explain how that country's government responded to the crisis. Offer your opinions on whether that government's response to the crisis was more effective than the policies used by the U.S. government.

6. Impact on Exchange Rates. Describe the trend of exchange rates before the credit crisis, during the credit crisis, and after the crisis. Offer insight on why the exchange rates of particular currencies changed as they did as a result of the crisis.



2 International Flow of Funds

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- explain the key components of the balance of payments,
- explain the growth in international trade activity over time,
- explain how international trade flows are influenced by economic and other factors,
- explain how international capital flows are influenced by country characteristics, and
- introduce the agencies that facilitate the international flow of funds.

Many MNCs are heavily engaged in international business, such as exporting, importing, or direct foreign investment in foreign countries. The transactions arising from international business cause money flows from one country to another. The balance of payments is a measure of international money flows and is discussed in this chapter.

Financial managers of MNCs monitor the balance of payments so that they can determine how the flow of international transactions is changing over time. The balance of payments can indicate the volume of transactions between specific countries and may even signal potential shifts in specific exchange rates. Thus, it can have a major influence on the long-term planning and management by MNCs.

2-1 Balance of Payments

The **balance of payments** is a summary of transactions between domestic and foreign residents for a specific country over a specified period of time. It represents an accounting of a country's international transactions for a period, usually a quarter or a year. It accounts for transactions by businesses, individuals, and the government.

A balance-of-payments statement can be broken down into various components. Those that receive the most attention are the current account, the capital account, and the financial account. The **current account** represents a summary of the flow of funds between one specified country and all other countries due to purchases of goods and services or to the cash flows generated by income-producing financial assets. The **capital account** represents a summary of the flow of funds resulting from the sale of assets between one specified country and all other countries over a specified period of time; thus, it compares the new foreign investments made by a country with the foreign investments within a country over a given time period. The **financial account** refers to special types of investment, including DFI and portfolio investment. For all three accounts, transactions that reflect inflows of funds generate positive numbers (credits) for the country's balance whereas transactions that reflect outflows of funds generate negative numbers (debits) for its balance.

2-1a Current Account

The main components of the current account are payments for (1) merchandise (goods) and services, (2) factor income, and (3) transfers.

Payments for Goods and Services Merchandise exports and imports represent tangible products, such as computers and clothing, that are transported between countries. Service exports and imports represent tourism and other services (such as legal, insurance, and consulting services) provided for customers based in other countries. Service exports by the United States result in an inflow of funds to the United States, while service imports by the United States result in an outflow of funds.

The difference between total exports and imports is referred to as the **balance of trade**. A deficit in the U.S. balance of trade means that the value of merchandise and services exported by the United States is less than the value of merchandise and services that it imports. Before 1993, the balance of trade was based solely on merchandise exports and imports. In 1993, it was redefined to include also service exports and imports. The value of U.S. service exports usually exceeds the value of U.S. service imports. However, the value of U.S. merchandise exports is typically much smaller than the value of U.S. merchandise imports. Overall, the United States normally has a negative balance of trade.

Factor Income Payments A second component of the current account is **factor income**, which represents income (interest and dividend payments) received by investors on foreign investments in financial assets (securities). Thus, factor income received by U.S. investors reflects an inflow of funds into the United States. Factor income paid by U.S. securities reflects an outflow of funds from the United States.

Transfer Payments The third main component of the current account is transfer payments, which represent aid, grants, and gifts from one country to another.

Examples of Payment Entries Exhibit 2.1 shows several examples of transactions that would be reflected in the current account. Every transaction generating a U.S. cash inflow (exports and income receipts by the United States) represents a credit to the current account and that every transaction generating a U.S. cash outflow (imports and income payments from the United States) represents a debit to the current account. Therefore, a large current account deficit indicates that the United States is sending more cash abroad to buy goods and services or to pay income than it is receiving for its sales of goods and services.

Actual Current Account Balance The U.S. current account balance in the year 2011 is summarized in Exhibit 2.2. Notice that the exports of merchandise were valued at $1,288 billion and imports of merchandise at $1,934 billion. Total U.S. exports and imports of merchandise and services and income receipts amounted to $2,500 billion and $2,404 billion, respectively. Line 9 shows that net transfers (which include grants and gifts provided to other countries) were −$136 billion; this negative number for net transfers represents a cash outflow from the United States. Overall, the current account balance was −$471 billion, which is primarily attributed to the difference between U.S. payments sent for imports and those received from exports.

As shown in Exhibit 2.2, the current account balance (line 10) can be derived as the difference between total U.S. exports and income receipts (line 4) and total U.S. imports and income payments (line 8) with an adjustment for net transfer payments (line 9). This is logical, since the total U.S. exports and income receipts represent U.S. cash inflows while the total U.S. imports and income payments (and, in this case, the net transfers) represent U.S. cash outflows. The negative current account balance means that the United States spent more on trade, income, and transfer payments in 2011 than it received during that year.

Exhibit 2.1 Examples of Current Account Transactions

INTERNATIONAL *TRADE* TRANSACTION	U.S. CASH FLOW POSITION	ENTRY ON U.S. BALANCE-OF-PAYMENTS ACCOUNT
J.C. Penney purchases stereos produced in Indonesia that it will sell in its U.S. retail stores.	U.S. cash outflow	Debit
Individuals in the United States purchase CDs over the Internet from a firm based in China.	U.S. cash outflow	Debit
The Mexican government pays a U.S. consulting firm for consulting services provided by the firm.	U.S. cash inflow	Credit
IBM headquarters in the United States purchases computer chips from Singapore that it uses in assembling computers.	U.S. cash outflow	Debit
A university bookstore in Ireland purchases textbooks produced by a U.S. publishing company.	U.S. cash inflow	Credit
INTERNATIONAL *INCOME* TRANSACTION	**U.S. CASH FLOW POSITION**	**ENTRY ON U.S. BALANCE-OF-PAYMENTS ACCOUNT**
A U.S. investor receives a dividend payment from a French firm in which she purchased stock.	U.S. cash inflow	Credit
The U.S. Treasury sends an interest payment to a German insurance company that purchased U.S. Treasury bonds one year ago.	U.S. cash outflow	Debit
A Mexican company that borrowed dollars from a bank based in the United States sends an interest payment to that bank.	U.S. cash inflow	Credit
INTERNATIONAL *TRANSFER* TRANSACTION	**U.S. CASH FLOW POSITION**	**ENTRY ON U.S. BALANCE-OF-PAYMENTS ACCOUNT**
The United States provides aid to Costa Rica in response to a flood in Costa Rica.	U.S. cash outflow	Debit
Switzerland provides a grant to U.S. scientists to work on cancer research.	U.S. cash inflow	Credit

2-1b Capital Account

The capital account category originally included the financial account, which is now treated separately (and described in the next section). The capital account includes the value of financial assets transferred across country borders by people who move to a

Exhibit 2.2 Summary of Current Account in the Year 2011 (billions of $)

(1)	U.S. exports of merchandise	+ $1,288
+ (2)	U.S. exports of services	+ 549
+ (3)	U.S. income receipts	+ 663
= (4)	Total U.S. exports and income receipts	= $2,500
(5)	U.S. imports of merchandise	$1,934
+ (6)	U.S. imports of services	403
+ (7)	U.S. income payments	498
= (8)	Total U.S. imports and income payments	= $2,835
(9)	Net transfers by the United States	− $136
(10)	Current account balance = (4) − (8) − (9)	− $471

Source: *U.S. Census Bureau, 2010.*

different country. It also includes the value of l patents and trademarks that are transferred across country borders. The sale of patent rights by a U.S. firm to a Canadian firm reflects a credit to the U.S. balance-of-payments account, and a U.S. purchase of patent rights from a Canadian firm reflects a debit to the U.S. balance-of-payments account. The capital account items are relatively minor (in terms of dollar amounts) when compared with the financial account items.

2-1c Financial Account

The key components of the financial account are payments for (1) direct foreign investment, (2) portfolio investment, and (3) other capital investment.

Direct Foreign Investment Direct foreign investment represents the investment in fixed assets in foreign countries that can be used to conduct business operations. Examples of direct foreign investment include a firm's acquisition of a foreign company, its construction of a new manufacturing plant, or its expansion of an existing plant in a foreign country.

Portfolio Investment Portfolio investment refers to transactions between countries involving long-term financial assets (such as stocks and bonds) that do not affect the transfer of control. Thus, a purchase of Heineken (Netherlands) stock by a U.S. investor is classified as portfolio investment because it represents a purchase of foreign financial assets without changing control of the company. If a U.S. firm purchased all of Heineken's stock in an acquisition, this transaction would result in a transfer of control and therefore would be classified as direct foreign investment instead of portfolio investment.

Other Capital Investment A third component of the financial account consists of other capital investment, which represents transactions involving short-term financial assets (such as money market securities) between countries. In general, direct foreign investment measures the expansion of firms' foreign operations whereas portfolio investment and other capital investment measure the net flow of funds due to financial asset transactions between individual or institutional investors.

Errors and Omissions and Reserves If a country has a negative current account balance then it should have a positive capital and financial account balance. This implies that, although it sends more money out of the country than it receives from other countries for trade and factor income, it receives more money from other countries than it spends for capital and financial account components such as investments. In fact, the negative balance on the current account should be offset by a positive balance on the capital and financial account. However, the offsetting effect is seldom perfect because measurement errors can occur when attempting to measure the value of funds transferred into or out of a country. For this reason, the balance-of-payments account includes a category of errors and omissions.

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www.bea.gov
Update of the current account balance and international trade balance.

2-2 Growth in International Trade

The United States has benefitted from international trade. First, such trade has created some U.S. jobs, especially in industries where domestic firms have a technology advantage. International trade has caused a shift of production to countries that can produce products more efficiently. In addition, it ensures more competition among the firms that produce products, which forces the firms to keep their prices low. Hence U.S. consumers have more product choices, and at lower prices, as a result of international trade.

2-2a Events That Increased Trade Volume

International trade has increased substantially over time, which has strongly affected multinational corporations. First, it has enabled some MNCs to obtain materials at lower prices. Second, it has allowed many MNCs to increase their sales and expand their operations.

The development of international trade is the result of numerous efforts by governments to remove cross-border restrictions. Some of the more important historical events that increased trade activity are discussed next.

WEB

www.census.gov/foreign-trade
Click on U.S. International Trade in Goods and Services. There are several links here to additional details about the U.S. balance of trade.

Fall of the Berlin Wall In 1989, the Berlin Wall separating East Germany from West Germany was torn down. This symbolic event led to improved relations between Eastern Europe and Western Europe and also encouraged free enterprise in all Eastern European countries and the privatization of businesses that were owned by the government. Finally, the Berlin Wall's removal led to major reductions in trade barriers in Eastern Europe. Many MNCs began to export products there, and others capitalized on the cheap labor costs by importing supplies from that region.

Single European Act In the late 1980s, industrialized countries in Europe agreed to make regulations more uniform and to remove many taxes on goods traded among themselves. This agreement, which was formalized by the Single European Act of 1987, was followed by a series of negotiations among the countries to achieve uniform policies by 1992. The act allows firms in a given European country greater access to supplies from firms in other European countries.

Many firms, including European subsidiaries of U.S.-based MNCs, have capitalized on this agreement by attempting to penetrate markets in border countries. By producing more of the same product and distributing it across European countries, firms are now better able to achieve economies of scale. Best Foods (now part of Unilever) was one of many MNCs that increased efficiency by streamlining manufacturing operations in response to reduced trade barriers.

NAFTA As a result of the North American Free Trade Agreement (NAFTA) of 1993, trade barriers between the United States and Mexico were eliminated. Some U.S. firms attempted to capitalize on this by exporting goods that had previously been restricted by barriers to Mexico. Other firms established subsidiaries in Mexico to produce their goods at a lower cost than was possible in the United States before selling them in the United States. The removal of trade barriers essentially allowed U.S. firms to penetrate product and labor markets that were previously inaccessible.

The removal of trade barriers between the United States and Mexico allows Mexican firms to export some products to the United States that were previously restricted. Thus, U.S. firms that produce these goods are now subject to competition from Mexican exporters. Given the low cost of labor in Mexico, some U.S. firms have lost some of their market share. These effects are most pronounced in labor-intensive industries, such as clothing.

WEB

www.ecb.int/euro/coins/html/index.en.html
Information about the euro.

GATT Within a month of the NAFTA accord, the momentum for free trade continued with a General Agreement on Tariffs and Trade (GATT) accord. This particular agreement was the conclusion of the so-called Uruguay round of trade negotiations that had begun seven years earlier. It called for the reduction or elimination of trade restrictions on specified imported goods over a ten-year period across 117 countries. This accord has generated more international business for firms that had been unable to penetrate foreign markets because of trade restrictions.

Inception of the Euro In 1999, several European countries adopted the euro as their currency for business transactions among these countries. The euro was phased in as a currency for other transactions during 2001 and completely replaced the currencies

of participating countries on January 1, 2002. Hence only the euro is used for transactions in these countries, and firms (including European subsidiaries of U.S.-based MNCs) no longer face the costs and risks associated with converting one currency to another. This single-currency system, which applies in most of Western Europe, has led to more trade among European countries.

Expansion of the European Union In 2004, the European Union (EU) was expanded to include Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia; these countries were followed by Bulgaria and Romania in 2007. Slovenia adopted the euro as its currency in 2007, Cyprus and Malta adopted it as their currency in 2008, and Estonia adopted it in 2011. The other new members of the European Union continue to use their own currencies, yet they could adopt the euro in the future after meeting specified guidelines (with regard to budget deficits) and other financial conditions. Nevertheless, their admission into the EU is relevant because restrictions on their trade with Western Europe are thus reduced. Because wages in these countries are substantially lower than in Western European countries, many MNCs have established manufacturing plants there to produce goods for export to Western Europe.

Other Trade Agreements In June 2003, the United States and Chile signed a free trade agreement to remove tariffs on products traded between the two countries. In 2006, the Central American Trade Agreement (CAFTA) was implemented; this pact allowed for lower tariffs and regulations among the United States, the Dominican Republic, and four Central American countries. In addition, there is an pending initiative for Caribbean nations to create a single market featuring free flow of trade, capital, and workers across countries. The United States has also established trade agreements with many other countries, including Singapore (2004), Morocco (2006), Oman (2006), Peru (2007), and Bahrain (2010). Yet because of the weak global economy in the period 2008–2011, momentum for trade agreements subsided as some governments became more concerned about protecting their own country's companies and local jobs.

2-2b Impact of Outsourcing on Trade

The term **outsourcing** refers to the process of subcontracting to a third party. In the context of multinational financial management, outsourcing consists of subcontracting to a third party in another country to provide supplies or services that were previously produced internally. Under this definition, outsourcing increases international trade activity because it means that MNCs now purchase products or services from another country. For example, technical support for computer systems used in the United States is commonly outsourced to India or other countries.

Outsourcing allows MNCs to conduct operations at a lower cost. The reason is that the expenses incurred from paying a third party are less than those incurred if the MNC itself produces the product or service. Many MNCs argue that they cannot compete globally without outsourcing some of their production or services. Outsourcing by MNCs has created many jobs in countries where wages are low. However, outsourcing by U.S.-based MNCs is sometimes criticized because it may reduce jobs in the United States. These MNCs might counter that, if they had not outsourced, they would have shut down some labor-intensive operations because labor expenses are too high in the United States to compete on a global basis.

There are many opinions about outsourcing but no simple solutions. Often people have opinions about outsourcing that are inconsistent with their own behavior.

EXAMPLE

As a U.S. citizen, Rick says he is embarrassed by U.S. firms that outsource their labor services to other countries as a means of increasing their value because this practice eliminates jobs in the United States. Rick is president of Atlantic Co. and says the company will never outsource its services. Atlantic Co. imports most of its materials from a foreign company. It also owns a factory in Mexico, and the materials produced there are exported to the United States.

Rick recognizes that outsourcing may replace jobs in the United States, but he does not realize that importing materials or operating a factory in Mexico may also replace U.S. jobs. When questioned about his use of foreign labor markets for materials and production, he explains that the high manufacturing wages in the United States force him to rely on lower-cost labor in foreign countries. However, the same argument could be used by other U.S. firms that outsource services.

Rick owns a Toyota, a Nokia cell phone, a Toshiba computer, and Adidas clothing. He argues that these non-U.S. products are a better value for the money than their U.S. counterparts. His friend Nicole suggests that Rick's consumption choices are inconsistent with his "create U.S. jobs" philosophy. She explains that she only purchases U.S. products. She owns a Ford automobile (produced in Mexico), an Apple iPod and iPhone (produced in China), a Compaq computer (produced in China), and Nike clothing (produced in Indonesia). ●

Managerial Decisions about Outsourcing Managers of a U.S.-based MNC may argue that they produce their products in the United States to create jobs for U.S. workers. However, when the same products can be easily duplicated in foreign markets for one-fifth of the cost, shareholders may pressure the managers to establish a foreign subsidiary or to engage in outsourcing. Shareholders could argue that the managers are failing to maximize the MNC's value as a result of their commitment to creating U.S. jobs. The MNC's board of directors, which governs all major managerial decisions, could pressure the managers to move some of the production outside the United States. The board should consider the potential savings that could occur from this strategy, but it must also consider the possible adverse effects due to bad publicity or to bad morale among its remaining U.S. workers. If production cost could be substantially reduced outside the United States without a loss in quality, then a possible compromise is to restrict foreign production to accommodating any growth in the firm's business. That way, the outsourcing strategy would not adversely affect the employees already involved in production.

2-2c Trade Volume among Countries

Some countries rely more heavily on international trade than do others. The annual international trade volume of the United States is typically between 10 and 20 percent of its annual gross domestic product (GDP). Based on this ratio, the United States is less reliant on trade than many other developed countries. Canada, France, Germany, and other European countries rely more heavily on trade than does the United States. For instance, Canada's volume of exports and imports per year is valued at more than 50 percent of its annual GDP. The annual international trade volume of European countries is typically between 30 and 40 percent of their respective GDPs. The annual trade volume of Japan is typically between 10 and 20 percent of its GDP, much as in the United States.

WEB

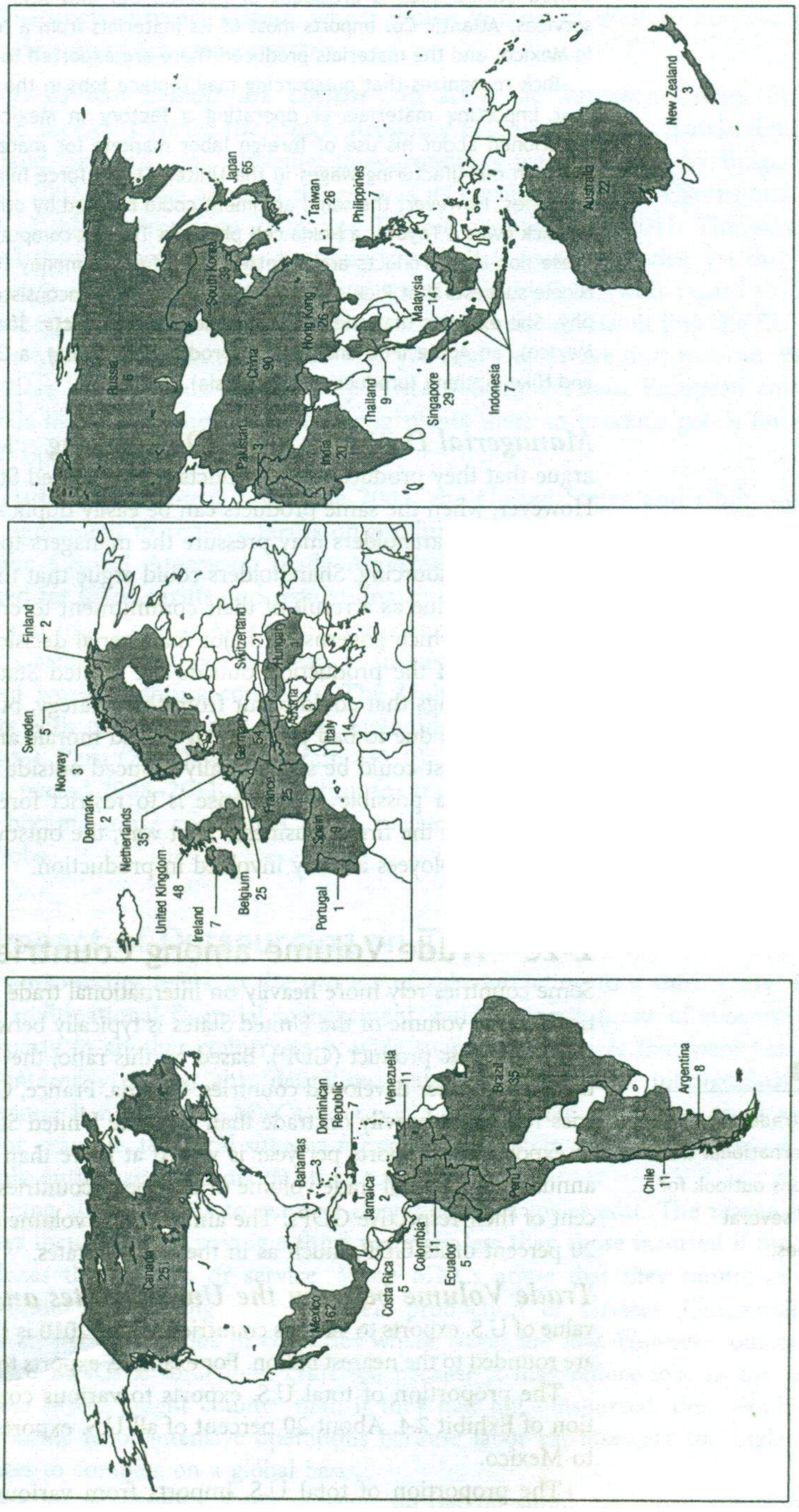
http://trade.gov
The international trade conditions outlook for each of several industries.

Trade Volume between the United States and Other Countries The dollar value of U.S. exports to various countries during 2010 is shown in Exhibit 2.3, where amounts are rounded to the nearest billion. For example, exports to Canada were valued at $251 billion.

The proportion of total U.S. exports to various countries is shown in the upper portion of Exhibit 2.4. About 20 percent of all U.S. exports are to Canada and 13 percent are to Mexico.

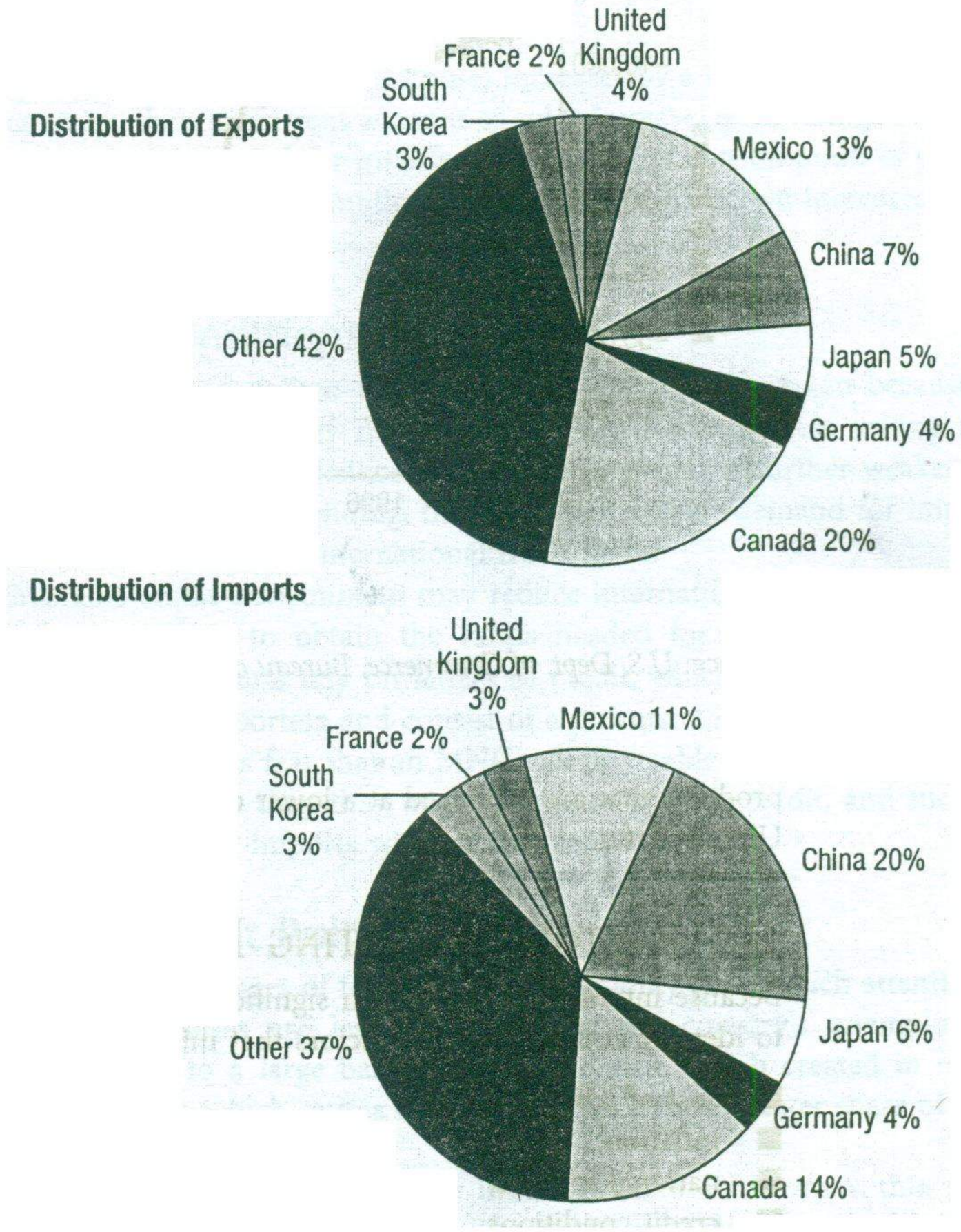
The proportion of total U.S. imports from various countries is shown in the lower part of Exhibit 2.4. Canada, China, Mexico, and Japan are the key exporters to the United States; together, they account for more than half of the value of all U.S. imports.

Exhibit 2.3 Distribution of U.S. Exports by Country (2010, billions of $)



Source: *U.S. Census Bureau, 2010.*

Exhibit 2.4 Distribution of U.S. Exports and Imports by Country (2008)



Source: *Bureau of Economic Analysis, 2010.*

WEB

www.ita.doc.gov
Access to a variety of trade-related country and sector statistics.

WEB

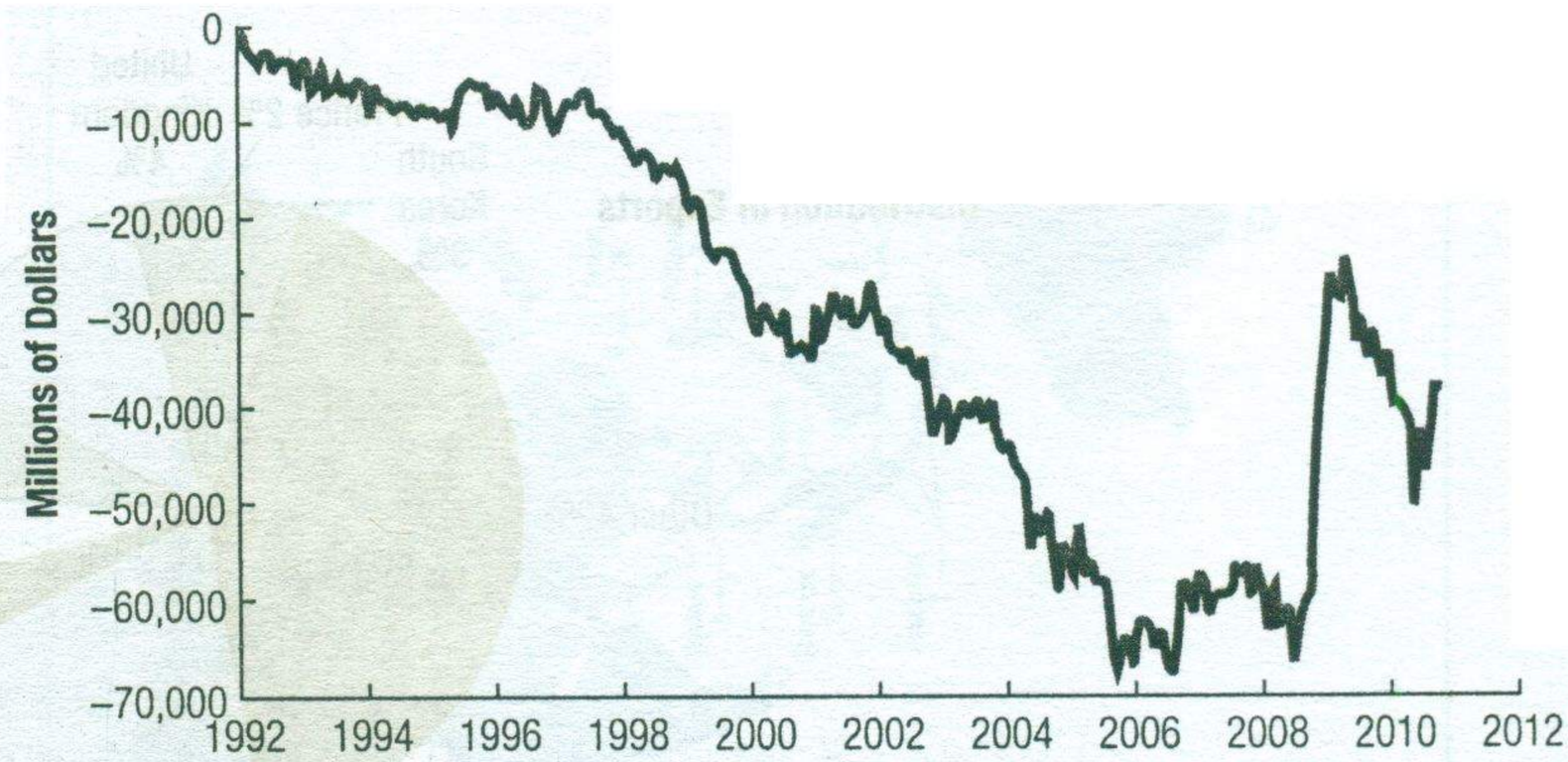
www.census.gov
Latest economic, financial, socioeconomic, and political surveys and statistics.

2-2d Trend in U.S. Balance of Trade

The quarterly trend in the U.S. balance of trade is shown in Exhibit 2.5. The U.S. balance-of-trade deficit increased substantially from 1997 until 2008. During 2008–2009, U.S. economic conditions worsened considerably and so the U.S. demand for foreign products and services decreased. As a result, the balance-of-trade deficit also decreased. Much of the U.S. trade deficit is due to a trade imbalance with just two countries: China and Japan. In recent years, the U.S. annual balance-of-trade deficit with China has exceeded $200 billion.

Any country's balance of trade can change substantially over time. Shortly after World War II, the United States experienced a large balance-of-trade surplus because Europe relied on U.S. exports as it was rebuilt. During the last decade, the United States has experienced balance-of-trade deficits owing to strong U.S. demand for imported

Exhibit 2.5 U.S. Balance of Trade over Time (Quarterly)



Source: *U.S. Dept. of Commerce, Bureau of Economic Analysis, Census Bureau, Federal Reserve.*

products that are produced at a lower cost than similar products can be produced in the United States.

2-3 Factors Affecting International Trade Flows

Because international trade can significantly affect a country's economy, it is important to identify and monitor the factors that influence it. The most influential factors are:

- cost of labor,
- inflation,
- national income,
- credit conditions,
- government policies, and
- exchange rates.

WEB

http://research.stlouisfed.org/fred2 Information about international trade, international transactions, and the balance of trade.

2-3a Cost of Labor

The cost of labor varies substantially among countries. Many of China's workers earn wages of less than $300 per month, so it is not surprising that China's firms commonly make products that require manual labor—at a much lower cost than most countries in Europe and North America. Within Europe, wages of Eastern European countries tend to be much lower than wages of Western European countries. Firms in countries where labor costs are low typically have an advantage when competing globally, especially in labor-intensive industries.

2-3b Inflation

If a country's inflation rate increases relative to the countries with which it trades, then its current account should decrease, other things being equal. Consumers and corporations in that country will most likely purchase more goods overseas (in response to high

local inflation), and the country's exports to other countries will decline. However, inflation may have a limited effect on the balance of trade between some countries, as when the typical wage rate in one country is more than 10 times the typical wage rate in the other country.

2-3c National Income

If a country's income level (national income) increases by a higher percentage than those of other countries, then its current account should decrease, other things being equal. As the real income level (adjusted for inflation) rises, so does consumption of goods. A percentage of that increase in consumption will most likely reflect an increased demand for foreign goods.

WEB

http://export.gov/logistics/
Information about tariffs on imported products. Click on any country listed, and then click on Trade Regulations. Review the import controls set by that country's government.

2-3d Credit Conditions

Credit conditions tend to tighten when economic conditions weaken because corporations are then less able to repay debt. In that case, banks are less willing to provide financing to MNCs, which can reduce corporate spending and further weaken the economy. As MNCs reduce their spending, they also reduce their demand for imported supplies. The result is a decline in international trade flows.

An unfavorable credit environment may reduce international trade also by making it difficult for some MNCs to obtain the funds needed for purchasing imports. Many MNCs that purchase imports rely on letters of credit, which are issued by commercial banks on behalf of the importers and consist of a promise to make payment upon delivery of the imports. If banks fear that an MNC will be unable to repay its debt because of weak economic conditions then they might refuse to provide credit, and such an MNC will be unable to purchase imports without that credit.

2-3e Government Policies

Theories about the advantages of free trade are commonly given much attention in classrooms, but these theories are less popular when the country's unemployment rate increases in response to a large balance-of-trade deficit. A job created in one country may be lost in another, which causes countries to battle for a greater share of the world's exports.

Government policies can have a major influence on which firms within an industry attain the most market share worldwide. These policies affect the legislating country's unemployment level, income level, and economic growth. Each country's government wants to increase its exports because more exports lead to more production and income and may also create jobs. Moreover, a country's government generally prefer that its citizens and firms purchase products and services locally (rather import them) because doing so creates local jobs.

WEB

www.commerce.gov
General information about import restrictions and other trade-related information.

An easy way to start an argument among students (or professors) is to ask what they think their country's international trade policy should be. People whose job prospects are significantly influenced by international trade tend to have strong opinions on this subject.

Governments of countries with a weak economy tend to become more creative and aggressive with policies that are intended to boost their exports or reduce imports. There are several types of policies often used to improve the balance of trade and thereby to create jobs within a country.

Restrictions on Imports Some governments prevent or discourage imports from other countries by imposing trade restrictions. Of these, the most commonly used are tariffs and quotas. When a country's government imposes a tax on imported goods,

WEB

www.treasury.gov/resource-center/sanctions
Information about sanctions imposed by the U.S. government on specific countries.

which is also known as a **tariff**, consumers must pay more to purchase foreign goods. Many governments impose tariffs on imported cars as a means of encouraging the exporter to establish local subsidiaries that will manufacture the cars (and create local jobs). Tariffs imposed by the U.S. government are, on average, lower than those imposed by other governments. Even so, some U.S. industries are more highly protected by tariffs than are others. American apparel products and farm products have historically received more protection against foreign competition through high tariffs on related imports.

In addition to tariffs, a government can reduce its country's imports by enforcing a **quota**, or a maximum limit that can be imported. Quotas have frequently been applied to a variety of goods imported by the United States and other countries. In fact, weakening economic conditions in 2008–2012 led many countries to implement barriers intended to protect some of their industries.

EXAMPLE

In 2011, Argentina's government imposed restrictions on its car importers by requiring any local company importing autos to export an equivalent value of products to other countries. Hence these importers began to export wine, olives, and other products just so that they could import more vehicles for sale in Argentina. A government policy of this type is questionable because the additional exporting could take business away from local firms whose principal business is exporting.

Argentina also imposed other trade restrictions on imports. Although the country's balance of trade improved thereafter, Argentina experienced shortages in many types of products, including some medical products. ●

As mentioned previously, international trade treaties have resulted in fewer explicit trade restrictions. However, there remain many other country characteristics that can give one nation's firms an advantage in international trade.

Subsidies for Exporters A government may offer subsidies to its domestic firms so that they can produce products at a lower cost than their global competitors. The demand for exports produced by those firms is higher as a result of these subsidies.

EXAMPLE

Many firms in China receive free loans or free land from the government. Thus they incur a lower cost of operations and can therefore price their products lower. Lower prices, in turn, enable these subsidized firms to capture a larger share of the global market. ●

Firms in some countries receive subsidies from the government provided that the manufactured products are then exported. The exporting of products that were produced with the help of government subsidies is commonly referred to as **dumping**. These firms may be able to sell their products at a lower price than any of their competitors in other countries. Some subsidies are more obvious than others, and it could be argued that every government provides subsidies in some form.

Restrictions on Piracy Government restrictions on piracy vary among countries. A government can affect international trade flows by its *lack* of restrictions on piracy. A government that does not act to minimize piracy may indirectly reduce imports and may even discourage MNCs from exporting to that market.

EXAMPLE

In China, piracy is very common. Individuals (called pirates) manufacture CDs and DVDs that look almost exactly like the original product produced in the United States and other countries. They sell the CDs and DVDs on the street at a price that is lower than the original product; in fact, they even sell the CDs and DVDs to retail stores. Consequently, local consumers obtain copies of imports rather than actual imports. According to the U.S. film industry, as many as 90 percent of the DVDs (which are the intellectual property of U.S. firms) purchased in China may be pirated. It has been estimated that U.S. producers of video, music, and software lose $2 billion in sales each year to piracy in China. The Chinese government periodically promises to crack down, but piracy remains prevalent there. ●

As a result of piracy, China's demand for imports is lower. Piracy is one reason why the United States has a large balance-of-trade deficit with China. However, this deficit would still be large even if piracy were eliminated.

Environmental Restrictions When a government imposes environmental restrictions, local firms experience higher costs of production. Those costs could put local firms at a disadvantage compared with firms (in other countries) that are not subject to the same restrictions. Some governments have considered loosening or entirely eliminating environmental restrictions as a means to ensure that local firms can compete globally. Of course, such a policy will be in clear conflict with the objectives of that country's environmental groups. A person's opinion about the appropriate policy is often based in large part on whether local jobs or a clean environment is considered to be the most important criterion.

Labor Laws Labor laws vary among countries, which might allow for pronounced differences in the labor expenses incurred by firms among countries. Some countries have more restrictive laws that protect the rights of workers. In addition, some countries have more restrictive child labor laws. Firms based in countries with more restrictive laws will incur higher expenses for labor, other factors being equal. For this reason, their firms may be at a disadvantage when competing against firms based in other countries.

Business Laws Some countries have more restrictive laws on bribery than others. Firms based in these countries may not be able to compete globally in some situations, such as when government officials of an agency soliciting specific services from MNCs expect to receive bribes from the MNCs attempting to secure that business.

Tax Breaks The government in some countries may allow tax breaks to firms that operate in specific industries. Although it need not be a subsidy, this practice is still a form of government financial support that could benefit firms that export products. For example, U.S.-based MNCs can benefit from tax breaks when investing in research and development and also when investing in equipment and machinery.

Country Trade Requirements A government may require that MNCs complete various forms or obtain licenses before they can export products to its country. Such requirements often result in delays simply because the government is inefficient in validating the forms or licenses. The process might even be *purposely* inefficient in order to discourage exporters and thereby, indirectly, protect jobs within a country.

Bureaucracy (whether international or not) is a strong trade barrier. Furthermore, it is difficult to prove that a country's government is purposely trying to prevent trade and is therefore in violation of free trade agreements. Even with the available advances in technology (such as the possibility of online forms), many governments still respond slowly to requests by other country's exporters to export products to their country. Given that some governments are slow, it is possible also that other governments are purposely slow as a form of retaliation that could hinder trade and so protect local jobs. Bureaucratic delays discourage some MNCs from pursuing business in other countries.

Government Ownership or Subsidies Some governments maintain ownership in firms that are major exporters. The Chinese government has granted billions of dollars of subsidies over the years to its auto manufacturers and auto parts suppliers. The U.S. government bailed out General Motors in 2009 by investing billions of dollars to purchase a large amount of its stock.

Country Security Laws Some U.S. politicians have argued that international trade and foreign ownership should be restricted when U.S. security is threatened. Despite the general support for this opinion, there is disagreement regarding which specific U.S.

business and transactions deserve protection from foreign competition. Consider, for example, the following questions.

1. Should the United States purchase military planes only from a U.S. producer even when Brazil could produce the same planes for half the price? The trade-off is a larger budget deficit against increased security. Is the United States truly safer with planes produced in the United States? Are technology secrets safer when production occurs in the United States by a domestic firm?
2. If military planes are manufactured only by a U.S. firm, should there be any restrictions on foreign ownership of that firm? Note that foreign investors own a portion of most large publicly traded companies in the United States.
3. Should foreign ownership restrictions be imposed on investors based in some countries but not on those based in other countries, or should owners based in *any* foreign country be banned from business transactions that might threaten U.S. security? Is the threat that the producing firm's owners could sell technology secrets to enemies? Is a firm with only U.S. owners immune to that threat? If some foreign owners are acceptable, then which countries are considered to be acceptable?
4. What products should be viewed as a threat to U.S. security? Suppose, for instance, that military planes are produced by strictly U.S. firms; what about all the components that are used in the planes' production? Some of the components used in U.S. military plane production are produced in China and imported by the plane manufacturers.

To appreciate the extent of disagreement on such issues, try to obtain a consensus answer on any of these questions from your fellow students. If students without hidden agendas cannot agree on an answer, imagine the level of disagreement among owners or employees of U.S. and foreign firms that have much to gain (or lose) from whatever international trade and investment policy is implemented. It is difficult to distinguish between a trade or investment restriction that enhances national security versus one that unfairly protects a U.S. firm from foreign competition. This same dilemma is faced not only by the United States, of course, but also by most other countries.

Policies to Punish Country Governments International trade policy issues have become even more contentious over time as people have come to expect that trade policies will be used to punish country governments for various actions. Many expect countries to restrict imports from countries that fail to enforce environmental laws or child labor laws, initiate war against another country, or are unwilling to participate in a war against an unlawful dictator of another country. Every international trade convention now attracts a large number of protesters, all of whom have their own agendas. International trade may not even be the focus of each protest, but some protesters view its elimination (or reduction) as a desirable outcome. Although most protesters are clearly dissatisfied with existing trade policies, there is no consensus on what trade policies should become. These different views are similar to the disagreements that occur between government representatives when they try to negotiate international trade policy.

The managers of each MNC cannot be responsible for resolving these international trade policy conflicts. However, they should at least recognize how a particular international trade policy affects their competitive position in the industry and how policy changes could affect their future position.

Summary of Government Policies Every government implements some policies that may give its local firms an advantage in the battle for global market share, so the playing field is probably not level across all countries. However, no formula can ensure a completely fair contest for market share. Notwithstanding the progress of international trade treaties, most governments will be pressured by their constituents and companies

to implement policies that give their local firms an exporting advantage. Such actions are typically initiated without considering the ultimate consequences when other countries are adversely affected and then implement their own trade policy in retaliation. The following example describes a common sequence of events that illustrates the formation **and effects of international trade policies.**

EXAMPLE

Assume that a large group of local agriculture firms in the United States have lost business recently because local consumers have begun buying vegetables imported from the country of Vegambia at much lower prices. Having laid off many employees as a result, these firms decide to lobby their political representatives. The agriculture firms argue that:

- vegetables from Vegambia are unfairly priced because Vegambia's government gives some tax breaks on land to the firms that grow the vegetables,
- there is speculation that the vegetables imported from Vegambia have caused illness among some consumers, and
- Vegambia has failed to intervene in a bordering country's war in which that country's government is mistreating its local citizens.

In response to this lobbying, the U.S. government decides to impose restrictions on imports. Vegambia's vegetable exports to the United States consequently decline, and its unemployment rate rises. Vegambia's government decides that it can correct its unemployment rate by improving its balance-of-trade deficit. Some of its firms specialize in manufacturing toys, but sales have been weak recently because many local citizens purchase toys imported from the United States. The government of Vegambia determines that:

- the U.S. toy manufacturers have an unfair advantage because they pay low taxes (as a proportion of their income) to the U.S. government,
- the toys produced in the United States present a health risk to local children because they are reports that a few children hurt themselves while playing with these toys, and
- the U.S. government has failed to intervene in some foreign countries to prevent the production of illegal drugs that flow into Vegambia, so Vegambia should reduce U.S. imports as a form of protest.

Therefore, the government of Vegambia prohibits the importing of toys from the United States. ●

One conclusion from the preceding example is that any government can find an argument for restricting imports if it wants to increase domestic employment. Some arguments might be justified; others, less so. Naturally, countries that are adversely affected by a trade policy may retaliate in order to offset any adverse effects on employment. This means that the plan to create jobs by restricting imports may not be successful. It is noteworthy that, even when the overall employment situation for both countries is unchanged, employment within particular industries may be changed by government actions on trade. In this example, the agriculture firms benefit from the U.S. government policy at the expense of the toy manufacturers.

Another easy way to start an argument among students (or professors) is to ask what they think the proper government policies should be in order to ensure that MNCs of all countries have an equal chance to compete globally. Given the disagreement on this topic among citizens of the same country, consider how difficult it is to achieve agreement among countries.

2-3f Exchange Rates

Each country's currency is valued in terms of other currencies through the use of exchange rates. Currencies can then be exchanged to facilitate international transactions. The values of most currencies fluctuate over time because of market and government forces

(as discussed in detail in Chapter 4). If a country's currency begins to rise in value against other currencies then its current account balance should decrease, other things being equal. As the currency strengthens, goods exported by that country will become more expensive to the importing countries and so the demand for such goods will decrease.

EXAMPLE

Accel Co. produces a standard tennis racket in the Netherlands and sells it online to consumers in the United States. This racket competes with a tennis racket produced by Malibu Co. in the United States, which is of similar quality and is priced at about $140. Accel has set the price of its tennis racket at 100 euros. Assuming that the euro's exchange rate (during the sales month in question) was $1.60, then the price of Accel's racket to U.S. consumers is $160 (i.e., 100 euros × $1.60 per euro). Because U.S. consumers could by a Malibu racket for only $140, Accel only sold about 1,000 rackets to U.S. consumers in that month.

Since then, however, the euro's value has weakened; this month, the euro's exchange rate is only $1.20. Hence U.S. consumers can purchase the Accel tennis racket for $120 (100 euros × $1.20 per euro), which is now a lower price than that charged for the U.S. Malibu racket. In this month, Accel sold 5,000 rackets. The U.S. demand for this tennis racket is price-elastic (sensitive to price changes) because there are substitute products available: the increase in demand for Accel rackets led to reduced demand for tennis rackets produced by Malibu Co. ●

The two exchange rates used in the preceding example are very real. The euro was valued at about $1.60 in July 2009 and was valued at about $1.20 (a reduction of 25 percent) in June 2010, just 11 months later. By April 2011 the euro had reached a high of $1.48, which amounted to a 23 percent increase over 9 months. But then, in July 2012, the euro reached a low of $1.24; this represented a 16 percent decrease over a period of 15 months.

This example illustrates, first of all, how much the price of a product can change in a short time in response to movements in the exchange rate. Second, it illustrates how the demand for an exported product can shift as a result of a change in the exchange rate. Third, the example shows how the demand for products of *competitors* to an exported product can change as a function of the exchange rate.

This example considered only a single product. The economic effects are much greater when one considers how the U.S. demand for *all* products imported from eurozone countries could change in response to such a large change in the euro's value. The following example helps explain the exchange rate's effect on U.S. exports.

EXAMPLE

Malibu Co. produces tennis rackets in the United States and sells some of them to European countries. Its standard racket is priced at $140, and it competes with the Accel racket in both the U.S. and the eurozone market. When the euro was valued at $1.60, eurozone consumers paid about 87 euros for Malibu's racket (computed as $140/$1.60 = 87.50 euros). Since this price to eurozone consumers was lower than the Accel's price of 100 euros per racket, Malibu sold 7,000 rackets in the eurozone at that time.

When the euro's value falls to $1.20, however, eurozone consumers will have to pay about 117 euros for Malibu's standard tennis racket (i.e., $140/$1.20), which is more than the 100 euros for an Accel racket. Hence Malibu only sold 2,000 rackets to eurozone consumers in this month. As those consumers reduced their demand for Malibu rackets, they increased their demand for tennis rackets produced by Accel. ●

This example was based on only one product; the cumulative effect of all exports would again be much greater. In general, the examples here suggest that, when currencies are strong against the U.S. dollar (i.e., when the dollar is weak), U.S. exports should be relatively high and U.S. imports should be relatively low. Conversely, when currencies are weak against the U.S. dollar (i.e., when the dollar is strong), U.S. exports should be relatively low and U.S. imports should be relatively high, which would enlarge the U.S. balance-of-trade deficit.

How Exchange Rates May Correct a Balance-of-Trade Deficit A floating exchange rate could correct any international trade imbalances between two countries in the following way. A balance-of-trade deficit suggests that the country is spending more **funds on foreign products than it is receiving from exports to foreign countries. This** exchange of its currency (to buy foreign goods) in greater volume than the foreign demand for its currency could place downward pressure on the value of that currency. Once the country's home currency's value declines in response to these forces, the result should be more foreign demand for its products.

Why Exchange Rates May Not Correct a Balance-of-Trade Deficit A floating exchange rate will not correct any international trade imbalances when there are other forces that offset the effects of international trade flows on the exchange rate.

EXAMPLE Since the United States normally experiences a large balance-of-trade deficit, international trade flows should place downward pressure on the dollar's value. Yet in many periods there are more financial flows into the United States (e.g., to purchase securities) than there are financial outflows. These forces offset the downward pressure on the dollar's value caused by the trade imbalance. If the value of the dollar does not weaken in such circumstances, a floating exchange rate will not correct the U.S. balance-of-trade deficit. ●

Limitations of a Weak-Home Currency Solution Even if a country's home currency weakens, there are several reasons why its balance-of-trade deficit will not necessarily be corrected. First, when a country's currency weakens, its prices become more attractive to foreign customers; hence many foreign companies lower their prices to remain competitive. Second, a country's currency need not weaken against all currencies at the same time. Therefore, a country that has a balance-of-trade deficit with many countries is unlikely to reduce all deficits simultaneously.

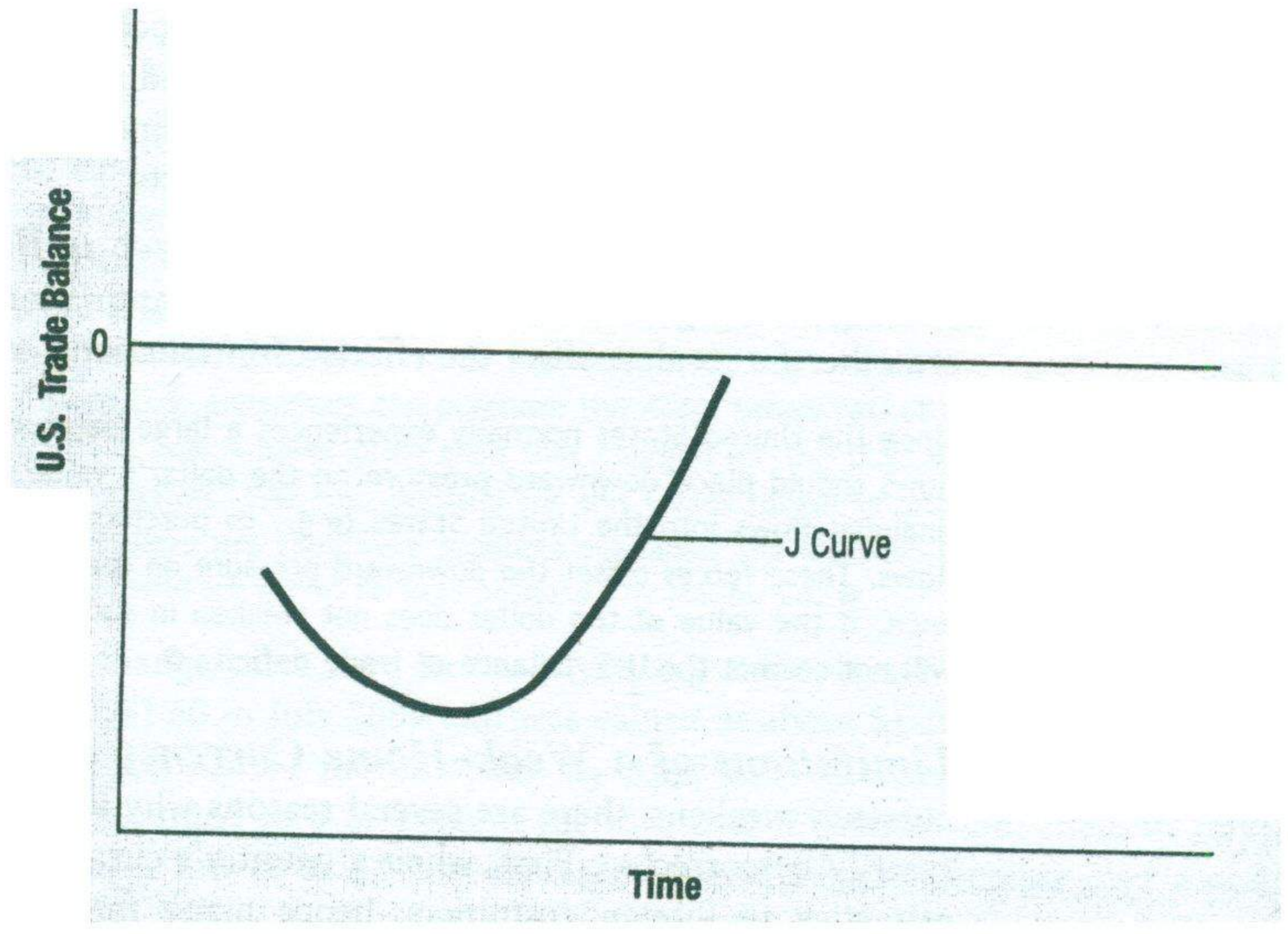
EXAMPLE Despite weakening against European currencies, the dollar might strengthen against Asian currencies. Under such conditions, U.S. consumers may reduce their demand for products in European countries but increase their demand for products in Asian countries. Hence the U.S. balance-of-trade deficit with European countries may decline but the U.S. balance-of-trade deficit with Asian countries may increase. Changes of this nature would not eliminate the overall U.S. balance-of-trade deficit. ●

A third reason why a weak currency will not always improve a country's balance of trade is that many international trade transactions are prearranged and cannot be immediately adjusted. Thus, exporters and importers are committed to following through on the international transactions that they agreed to complete. The lag time between weakness in the dollar and increased non-U.S. demand for U.S. products has been estimated to be 18 months or even longer. The U.S. balance-of-trade deficit could deteriorate even further in the short run when the dollar is weak because U.S. importers then need more dollars to pay for the imports they have contracted to purchase. This pattern is referred to as the **J-curve effect** and is illustrated in Exhibit 2.6. The trade balance's further decline before a reversal is a trend whose plot resembles the letter J.

Finally, a weak currency is less likely to improve the country's balance of trade to that extent that its international trade involves importers and exporters under the same ownership. Many firms purchase products that are produced by their subsidiaries in what is known as **intracompany trade**. This type of trade amounts to more than 50 percent of all international trade. Such trading will normally continue even if the importer's currency weakens.

Exchange Rates and International Friction For the many reasons just cited, a weaker home currency is seldom the best way to reduce a balance-of-trade deficit.

Exhibit 2.6 J-Curve Effect



Even so, it is not unusual for government officials to recommend this approach as a possible solution. However, all country governments cannot simultaneously weaken their home currencies. For any pair of countries, the actions by one government to weaken its currency causes the other country's currency to strengthen. As consumers in the country with the stronger currency are enticed by the new exchange rate to purchase more imports, more jobs may be created in the country with the weak currency and jobs may be eliminated in the country with the strong currency. These outcomes can lead to friction between countries.

EXAMPLE At any given moment, a group of exporters may claim that it is being mistreated and lobby its government to weaken the local currency, thus rendering its exports less expensive for foreign purchasers. When the euro is strong against the dollar, some European exporters claim that they are disadvantaged because their euro-denominated products are priced high for U.S. consumers (who must convert dollars into euros). When the euro is weak against the dollar, some U.S. exporters claim that they are disadvantaged because their dollar-denominated products are priced high for European consumers (who must convert euros into dollars). ●

It is frequently claimed by U.S. exporters and government officials that the Chinese government maintains the value of the yuan at an artificially low level against the dollar. They argue that the Chinese government should revalue the yuan upward in order to correct the large U.S. balance-of-trade deficit with China. This issue received much attention during the 2008–2012 period, when the U.S. economy was extremely weak and government officials were searching for ways to stimulate it. Some believe that if the Chinese yuan is revalued upward then U.S. exports would increase and U.S. imports would decrease. Consequently, more U.S. jobs could be created.

However, there are counterarguments that should be considered. China's government might respond that the trade imbalance is highly influenced by the difference in the cost of labor between countries and that adjusting the exchange rate could not offset such a large labor cost difference between countries. Furthermore, even if China's government revalued the yuan upward in order to make its products much more expensive for U.S. importers, would that increase demand for U.S. products? Or would it simply replace U.S. purchases from China with purchases from other countries (e.g., Malaysia, Mexico, Vietnam) in which wage rates are very low? If U.S. consumers shifted their purchases to alternative low-wage countries, will U.S. government officials then argue that those countries should revalue *their* currencies so as to reduce the U.S. balance-of-trade deficit? These questions are left to be answered by today's students who will later serve as government officials, because the dispute will almost certainly still exist in the future.

2-4 International Capital Flows

One of the most important types of capital flows is direct foreign investment. Firms commonly attempt to engage in direct foreign investment so that they can reach additional consumers or utilize low-cost labor. Multinational corporations based in the United States engage in DFI more than MNCs from any other country. Europe as a whole attracts more than 50 percent of all DFI by U.S.-based MNCs. Another 30 percent of that DFI is in Latin America and Canada, with about 15 percent more in the Asia and Pacific region. The United Kingdom and Canada enjoy the most DFI by U.S.-based MNCs.

Multinational corporations in the United Kingdom, France, and Germany also frequently engage in DFI. The countries that are most heavily involved in pursuing DFI also attract considerable DFI. In particular, the United States attracts about one-sixth of all DFI, which is more than any other country. Much of the DFI in the United States comes from the United Kingdom, Japan, the Netherlands, Germany, and Canada. Many well-known firms that operate in the United States are owned by foreign companies, including Shell Oil (Netherlands), Citgo Petroleum (Venezuela), Canon (Japan), and Fireman's Fund (Germany). Many other firms operating in the United States are partially or wholly owned by foreign companies, including MCI Communications (United Kingdom) and Iberdrola (Spain). Even as U.S.-based MNCs consider expanding into other countries, they must compete with foreign firms in the United States.

WEB

http://reason.org/news/show/annual-privatization-report-2010

Information about privatizations around the world together with commentaries and related publications.

2-4a Factors Affecting Direct Foreign Investment

Capital flows resulting from DFI change whenever conditions in a country change the desire of firms to conduct business operations there. Some of the more common factors that could affect a country's appeal for DFI are identified here.

Changes in Restrictions Many countries lowered their restrictions on DFI during the 1990s, which resulted in more DFI in those countries. Many U.S.-based MNCs (including Bausch & Lomb, Colgate-Palmolive, and General Electric) have penetrated less developed countries such as Argentina, Chile, China, Hungary, India, and Mexico. New opportunities in these countries have arisen since government barriers were removed.

Privatization Several national governments have recently engaged in privatization, which is the selling of some of their operations to corporations and other investors. Privatization is popular in Brazil and Mexico, in Eastern European countries such as Poland and Hungary, and in such Caribbean territories as the Virgin Islands. It allows for greater international business because foreign firms can acquire operations sold by national governments.

Privatization was used in Chile to prevent a small group of investors from controlling all the shares of stock, and in France to prevent a more nationalized economy. In the United Kingdom, privatization was promoted as a way of spreading stock ownership across investors, which allowed more people to have a direct stake in the success of British industry.

The primary reason that the market value of a firm may increase in response to privatization is the anticipated improvement in managerial efficiency. Managers in a privately owned firm can focus on the goal of maximizing shareholder wealth; in contrast, a state-owned business must consider the economic and social ramifications of any decision. Also, managers of a privately owned enterprise are more motivated to ensure profitability because their careers may depend on it. For these reasons, privatized firms will search for local and global opportunities that could enhance their value. The trend toward privatization will undoubtedly create a more competitive global marketplace.

Potential Economic Growth Countries that have greater potential for economic growth are more likely to attract DFI because firms recognize the possibility of capitalizing on that growth by establishing more business there.

Tax Rates Countries that impose relatively low tax rates on corporate earnings are more likely to attract DFI. When assessing the feasibility of DFI, firms estimate the after-tax cash flows that they expect to earn.

Exchange Rates Firms typically prefer to pursue DFI in countries where the local currency is expected to strengthen against their own. Under these conditions, they can invest funds to establish their operations in a country at a time when that country's currency is relatively cheap (weak). Thereafter, earnings from the new operations will have to be converted into the firm's currency at a less favorable exchange rate.

2-4b Factors Affecting International Portfolio Investment

The desire by individual or institutional investors to direct international portfolio investment to a specific country is influenced by a number of factors as follows.

Tax Rates on Interest or Dividends Investors normally prefer to invest in a country where the taxes on interest or dividend income from investments are relatively low. Investors assess their potential after-tax earnings from investments in foreign securities.

Interest Rates Portfolio investment can also be affected by interest rates. Money tends to flow to countries with high interest rates as long as the local currencies are not expected to weaken.

Exchange Rates When investors invest in a security in a foreign country, their return is affected by (1) the change in the value of the security and (2) the change in the value of the currency in which the security is denominated. If a country's home currency is expected to strengthen, then foreign investors may be willing to invest in that country's securities in order to benefit from the currency movement. Conversely, if a country's home currency is expected to weaken then foreign investors may well prefer to purchase securities in other countries.

WEB

www.worldbank.org
Information on capital flows and international transactions.

2-4c Impact of International Capital Flows

The United States relies heavily on foreign capital in many ways. First, there is foreign investment in the United States to build manufacturing plants, offices, and other buildings. Second, foreign investors purchase U.S. debt securities issued by U.S. firms and

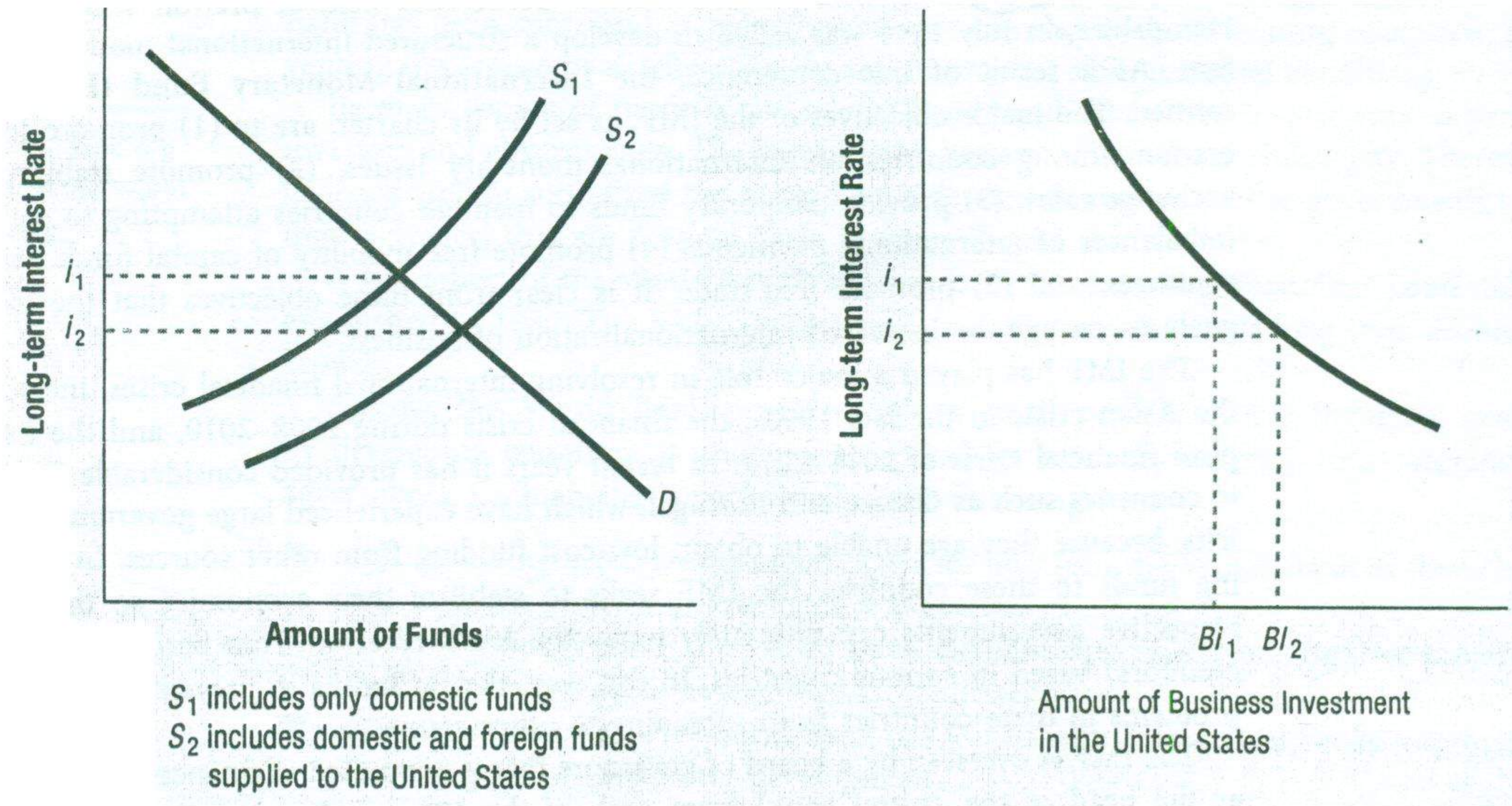
thereby serve as creditors to these firms. Third, foreign investors purchase Treasury debt securities and thus serve as creditors to the U.S. government.

Foreign investors are especially attracted to U.S. financial markets when the interest rate in their home country is substantially lower than that in the United States. For example, Japan's annual interest rate has been close to 1 percent for several years because the supply of funds in its credit market is quite large. At the same time, however, Japan's economy has been stagnant and so the demand for funds to support business growth there has been limited. Given the low interest rates in Japan, many Japanese investors invest their funds in the United States so as to earn a higher interest rate.

The impact of international capital flows on the U.S. economy is shown in Exhibit 2.7. At any time, the long-term interest rate in the United States is determined by the interaction between the supply of funds available in U.S. credit markets and the amount of funds demanded there. The supply curve S_1 in the left graph reflects the supply of funds from domestic sources. If the United States relied solely on domestic sources for its supply, then its equilibrium interest rate would be i_1 and the level of U.S. business investment (shown in the right graph) would be BI_1. But since the supply curve also includes the supply of funds from foreign sources (as shown in S_2), the equilibrium interest rate is i_2. Because of the large international capital flows to the U.S. credit markets, interest rates in the United States are lower than they would be otherwise. This allows for a lower cost of borrowing and thus a lower cost of using capital. As a result, the equilibrium level of business investment is BI_2. Because of the lower interest rate, there are more business opportunities that deserve to be funded.

Consider the long-term rate shown in the exhibit as the cost of borrowing for the most creditworthy firms; other firms would pay a premium above that rate. Without

Exhibit 2.7 Impact of the International Flow of Funds on U.S. Interest Rates and Business Investment



international capital flows, there would be less funding available in the United States across all risk levels and the cost of funding would be higher regardless of a firm's risk level. This would reduce the amount of feasible business opportunities in the United States.

U.S. Reliance on Foreign Funds If Japan and China stopped investing in U.S. debt securities then U.S. interest rates would probably rise, in which case investors from other countries would be attracted to the relatively high U.S. interest rate. Thus, the United States would still be able to obtain funding for its debt, but its interest rates (cost of borrowing) would rise.

In general, access to international funding has allowed more growth in the U.S. economy over time but has also made the United States more reliant on foreign investors for funding. Such reliance remains possible provided the U.S. government and U.S. firms are perceived to be creditworthy. If that trust were ever weakened, then U.S. entities would be able to obtain foreign funding only by paying a higher interest rate to compensate for the increased risk (i.e., a risk premium).

In recent years, the Federal Reserve (the U.S. central bank) has maintained the country's long-term interest rates at a very low level; this policy is intended to encourage more borrowing and stimulate the economy. Yet the low rates could also lead foreign investors to seek alternative investments offering a higher return. In that case, if the Fed wants low interest rates then it may need to supply more of the funding itself to replace those funds withdrawn by foreign investors.

WEB

www.imf.org
The latest international economic news, data, and surveys.

2-5 Agencies That Facilitate International Flows

A variety of agencies have been established to facilitate international trade and financial transactions. These agencies often represent a group of nations. A description of each of the more important agencies follows.

2-5a International Monetary Fund

The United Nations Monetary and Financial Conference held in Bretton Woods, New Hampshire, in July 1944 was called to develop a structured international monetary system. As a result of this conference, the **International Monetary Fund (IMF)** was formed. The major objectives of the IMF, as set by its charter, are to (1) promote cooperation among countries on international monetary issues, (2) promote stability in exchange rates, (3) provide temporary funds to member countries attempting to correct imbalances of international payments, (4) promote free mobility of capital funds across countries, and (5) promote free trade. It is clear from these objectives that the IMF's goals encourage the increased internationalization of business.

The IMF has played a major role in resolving international financial crises, including the Asian crisis in the late 1990s, the financial crisis during 2008–2010, and the European financial crisis of 2011–2012. In recent years it has provided considerable funding to countries such as Greece and Portugal, which have experienced large government deficits, because they are unable to obtain low-cost funding from other sources. In providing funds to these countries the IMF seeks to stabilize their economies so that their respective governments can ultimately repay the loans received from banks (and other creditors) based in various countries. In this way, the IMF aims to prevent the financial problems in these countries from spreading to other countries.

The IMF is overseen by a board of governors that is composed of finance officers (such as the head of the central bank) from each of the 188 member countries; it also has an executive board consisting of 24 executive directors. This executive board is based in Washington, DC, and meets at least three times a week to discuss ongoing issues.

The IMF uses a surveillance system that closely monitors national, regional, and global financial conditions. It attempts to anticipate financial problems in member countries and offers advice to these countries on how they can reduce their exposure to potential crises. The IMF also provides technical assistance to countries in order to help them implement effective tax policies, exchange rate policies, banking systems, and legal systems.

Each member country of the IMF is assigned a quota that is based on a variety of factors reflecting its economic status. Members are required to pay this assigned quota. The amount of funds that each member can borrow from the IMF depends on its particular quota.

The financing by the IMF is measured in **special drawing rights (SDRs)**, which are a unit of account allocated to member countries to supplement currency reserves. The SDR's value fluctuates in accordance with the value of major currencies.

One of the key duties of the IMF is its **compensatory financing facility (CFF)**, which aims to reduce the impact of export instability on the economies of member countries. Although this facility is available to all IMF members, it is used mainly by developing countries. A country experiencing financial problems resulting from reduced export earnings must demonstrate that the reduction is temporary and beyond its control. In addition, it must be willing to work with the IMF in resolving the problem.

Funding Dilemma of the IMF The IMF typically specifies economic reforms that a country must satisfy in order to receive IMF funding, which is meant to ensure that the country uses the funds properly. However, some countries want funding without adhering to the economic reforms required by the IMF. For example, the IMF may require that a government reduce its budget deficit as a condition for receiving funding. Some governments have failed to implement these required reforms.

2-5b World Bank

The **International Bank for Reconstruction and Development (IBRD)**, also referred to as the **World Bank**, was established in 1944. Its primary objective is to make loans to countries in order to reduce poverty and enhance economic development. The World Bank has been successful at reducing extreme poverty levels, increasing education, preventing the spread of deadly diseases, and improving environmental conditions.

WEB

www.worldbank.org website of the World Bank Group.

Its main source of funds is the sale of bonds and other debt instruments to private investors and governments. The World Bank has a profit-oriented philosophy. Therefore, its loans are not subsidized but instead are extended at market rates to governments (and their agencies) that are deemed likely to repay them.

A key aspect of the World Bank's mission is the **Structural Adjustment Loan (SAL)**, established in 1980. The SALs are intended to enhance a country's long-term economic growth.

Because the World Bank provides only a small portion of the financing needed by developing countries, it attempts to spread its funds by entering into **cofinancing agreements**. Cofinancing is performed in the following ways.

- *Official aid agencies.* Development agencies may join the World Bank in financing development projects in low-income countries.
- *Export credit agencies.* The World Bank cofinances some capital-intensive projects that are also financed through export credit agencies.
- *Commercial banks.* The World Bank has joined with commercial banks to provide financing for private-sector development.

The World Bank recently established the **Multilateral Investment Guarantee Agency (MIGA)**, which offers various forms of political risk insurance. This is an additional

means (along with its SALs) by which the World Bank can encourage the development of international trade and investment.

The World Bank is one of the largest borrowers in the world. Its loans are well diversified among numerous currencies and countries, and it has received the highest credit rating (AAA) possible.

2-5c World Trade Organization

The **World Trade Organization (WTO)** was created as a result of the Uruguay round of trade negotiations that led to the GATT accord in 1993. This organization was established to provide a forum for multilateral trade negotiations and to settle trade disputes related to the GATT. The WTO began operations in 1995 with 81 member countries, and more countries have joined since then. Member countries are given voting rights that are used to render verdicts on trade disputes and other issues. World trade agreements have been signed among countries, and these agreements provide the legal foundation for facilitating international trade. Such agreements articulate how international trade must be executed so as not to violate specific social and environmental standards. Although the agreements thus contain rules, they help to promote international trade because the rules are communicated to exporters and importers alike. In other words, MNCs are more willing to pursue international trade when the rules are more transparent.

2-5d International Financial Corporation

In 1956 the **International Financial Corporation (IFC)** was established to promote private enterprise within countries. Composed of a number of member nations, the IFC works to promote economic development through the private rather than the government sector. It not only provides loans to corporations but also purchases stock, thereby becoming part owner in some cases in addition to a creditor. The IFC typically provides 10 to 15 percent of the necessary funds to the private enterprise projects in which it invests, and the rest of the project must be financed through other sources. Thus the IFC serves as a catalyst, rather than a primary supporter, for private-enterprise development projects. It traditionally has obtained financing from the World Bank but can also borrow in the international financial markets.

WEB

www.bis.org
Information on the role of the BIS and the various activities in which it is involved.

2-5e International Development Association

The **International Development Association (IDA)** was created in 1960 with country development objectives similar to those of the World Bank. However, its loan policy is more appropriate for less prosperous nations. The IDA extends loans at low interest rates to poor nations that cannot qualify for loans from the World Bank.

2-5f Bank for International Settlements

The **Bank for International Settlements (BIS)** attempts to facilitate cooperation among countries with regard to international transactions. It serves central banks of countries in their pursuit of financial stability. The BIS is sometimes referred to as the "central banks' central bank" or the "lender of last resort." It played an important role in supporting some of the less developed countries during international debt crises. It commonly provides financing for central banks in Latin American and Eastern European countries.

WEB

www.oecd.org
Summarizes the role and activities of the OECD.

2-5g OECD

The Organisation for Economic Co-operation and Development (OECD) facilitates governance in governments and corporations of countries with market economics. It has 30 member countries as well as relationships with numerous other countries. The OECD promotes international country relationships that lead to globalization.

2-5h Regional Development Agencies

There are several other agencies whose objectives relating to economic development are more regional than global. These include, for example, the Inter-American Development Bank (focusing on the needs of Latin America), the Asian Development Bank (established to enhance social and economic development in Asia), and the African Development Bank (focusing on development in African countries). In 1990, the European Bank for Reconstruction and Development was created to help Eastern European countries adjust from communism to capitalism.

SUMMARY

- The key components of the balance of payments are the current account, the capital account, and the financial account. The current account is a broad measure of the country's international trade balance. The capital account measures the value of financial and nonfinancial assets transferred across country borders. The financial account consists mainly of payments for direct foreign investment and investment in securities (portfolio investment).
- International trade activity has grown over time in response to several government agreements to remove cross-border restrictions. In addition, MNCs have commonly used outsourcing in recent years, subcontracting with a third party in a foreign country for supplies or services they previously produced themselves. Thus outsourcing is another reason for the increase in international trade activity.
- A country's international trade flows are affected by inflation, national income, government restrictions, and exchange rates. High labor costs, high inflation, a high national income, low or no restrictions on imports, and a strong local currency tend to result in a strong demand for imports and a current account deficit. Although some countries attempt to correct current account deficits by reducing the value of their currencies, this strategy is not always successful.
- A country's international capital flows are affected by any factors that influence direct foreign investment or portfolio investment. Direct foreign investment tends to occur in those countries that have no restrictions and much potential for economic growth. Portfolio investment tends to occur in those countries where taxes are not excessive, where interest rates are high, and where the local currencies are not expected to weaken.
- Several agencies facilitate the international flow of funds by promoting international trade and finance, providing loans to enhance global economic development, settling trade disputes between countries, and promoting global business relationships between countries.

POINT COUNTER-POINT

Should Trade Restrictions Be Used to Influence Human Rights Issues?

Point Yes. Some countries do not protect human rights in the same manner as the United States. At times, the United States should threaten to restrict U.S. imports from or investment in a particular country if it does not correct human rights violations. The United States should use its large international trade and investment as leverage to ensure that human rights violations do not occur. Other

countries with a history of human rights violations are more likely to honor human rights if their economic conditions are threatened.

Counter-Point No. International trade and human rights are two separate issues. International trade should not be used as the weapon to enforce human rights. Firms engaged in international trade should not be penalized by the human rights violations of a government. If the United States imposes trade restrictions to enforce human rights, the country will retaliate. Thus, the U.S. firms that export to that foreign country will be **adversely affected. By imposing trade sanctions, the U. S.** government is indirectly penalizing the MNCs that are attempting to conduct business in specific foreign countries. Trade sanctions cannot solve every difference in beliefs or morals between the more developed countries and the developing countries. By restricting trade, the United States will slow down the economic progress of developing countries.

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

Self-Test

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

1. Briefly explain how changes in various economic factors affect the U.S. current account balance.
2. Explain why U.S. tariffs will not necessarily reduce a U.S. balance-of-trade deficit.
3. Explain why a global recession like that in 2008–2009 might encourage some governments to impose more trade restrictions.

Questions and Applications

1. **Balance of Payments**
   a. Of what is the current account generally composed?
   b. Of what is the capital account generally composed?
2. **Inflation Effect on Trade**
   a. How would a relatively high home inflation rate affect the home country's current account, other things being equal?
   b. Is a negative current account harmful to a country? Discuss.
3. **Government Restrictions** How can government restrictions affect international payments among countries?
4. **IMF**
   a. What are some of the major objectives of the IMF?
   b. How is the IMF involved in international trade?
5. **Exchange Rate Effect on Trade Balance** Would the U.S. balance-of-trade deficit be larger or smaller if the dollar depreciates against all currencies, versus depreciating against some currencies but appreciating against others? Explain.
6. **Demand for Exports** A relatively small U.S. balance-of-trade deficit is commonly attributed to a strong demand for U.S. exports. What do you think is the underlying reason for the strong demand for U.S. exports?
7. **Change in International Trade Volume** Why do you think international trade volume has increased over time? In general, how are inefficient firms affected by the reduction in trade restrictions among countries and the continuous increase in international trade?
8. **Effects of the Euro** Explain how the existence of the euro may affect U.S. international trade.
9. **Currency Effects** When South Korea's export growth stalled, some South Korean firms suggested that South Korea's primary export problem was the weakness in the Japanese yen. How would you interpret this statement?
10. **Effects of Tariffs** Assume a simple world in which the United States exports soft drinks and beer to France and imports wine from France. If the United States imposes large tariffs on the French wine, explain the likely impact on the values of the U.S. beverage firms, U.S. wine producers, the French beverage firms, and the French wine producers.

Advanced Questions

11. **Free Trade** There has been considerable momentum to reduce or remove trade barriers in an effort to achieve "free trade." Yet, one disgruntled executive of an exporting firm stated, "Free trade is not conceivable; we are always at the mercy of the exchange

rate. Any country can use this mechanism to impose trade barriers." What does this statement mean?

12. International Investments U.S.–based MNCs commonly invest in foreign securities.

a. Assume that the dollar is presently weak and is expected to strengthen over time. How will these expectations affect the tendency of U.S. investors to invest in foreign securities?

b. Explain how low U.S. interest rates can affect the tendency of U. S.–based MNCs to invest abroad.

c. In general terms, what is the attraction of foreign investments to U.S. investors?

13. Exchange Rate Effects on Trade

a. Explain why a stronger dollar could enlarge the U.S. balance-of-trade deficit. Explain why a weaker dollar could affect the U.S. balance-of-trade deficit.

b. It is sometimes suggested that a floating exchange rate will adjust to reduce or eliminate any current account deficit. Explain why this adjustment would occur.

c. Why does the exchange rate not always adjust to a current account deficit?

14. Impact of Government Policies on Trade Governments of many countries enact policies that can have a major impact on international trade flows.

a. Explain how governments might give their local firms a competitive advantage in the international trade arena.

b. Why might different tax laws on corporate income across countries allow firms from some countries to have an competitive advantage in the international trade arena?

c. If a country imposes lower corporate income tax rates, does that provide an unfair advantage?

15. China-U.S. Balance of Trade There is an ongoing debate between the United States and China regarding whether the Chinese yuan's value should be revalued upward. The cost of labor in China is substantially lower than that in the United States.

a. Would the U.S. balance-of-trade deficit in China be eliminated if the yuan was revalued upward by 20 percent? Or by 40 percent? Or by 80 percent?

b. If the yuan was revalued to the extent that it substantially reduced the U.S. demand for Chinese products, would this shift the U.S. demand toward the United States or toward other countries where wage rates are relatively low? In other words, would the correction of the U.S. balance-of-trade deficit have a major impact on U.S. productivity and jobs?

Discussion in the Boardroom

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

Running Your Own MNC

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

Blades, Inc. Case

Exposure to International Flow of Funds

Ben Holt, chief financial officer (CFO) of Blades, Inc., has decided to counteract the decreasing demand for Speedos roller blades by exporting this product to Thailand. Furthermore, due to the low cost of rubber and plastic in Southeast Asia, Holt has decided to import some of the components needed to manufacture Speedos from Thailand. Holt feels that importing rubber and plastic components from Thailand will provide Blades with a cost advantage (the components imported from Thailand are about 20 percent cheaper than similar components in the United States). Currently, approximately $20 million, or 10 percent, of Blades' sales are contributed by its sales in Thailand. Only about 4 percent of Blades' cost of goods sold is attributable to rubber and plastic imported from Thailand.

Blades faces little competition in Thailand from other U.S. roller blades manufacturers. Those competitors that export roller blades to Thailand invoice their exports in U.S. dollars. Currently, Blades follows a policy of invoicing in Thai baht (Thailand's currency). Holt felt that this strategy would give Blades a competitive advantage since Thai importers can plan more easily when they do not have to worry about paying differing amounts due to currency fluctuations. Furthermore, Blades' primary customer in Thailand (a retail store) has committed itself to purchasing a

certain amount of Speedos annually if Blades will invoice in baht for a period of 3 years. Blades' purchases of components from Thai exporters are currently invoiced in Thai baht.

Holt is rather content with current arrangements and believes the lack of competitors in Thailand, the quality of Blades' products, and its approach to pricing will ensure Blades' position in the Thai roller blade market in the future. Holt also feels that Thai importers will prefer Blades over its competitors because Blades invoices in Thai baht.

You, Blades' financial analyst, have doubts as to Blades' "guaranteed" future success. Although you believe Blades' strategy for its Thai sales and imports is sound, you are concerned about current expectations for the Thai economy. Current forecasts indicate a high level of anticipated inflation, a decreasing level of national income, and a continued depreciation of the Thai baht. In your opinion, all of these future developments could affect Blades financially given the company's current arrangements with its suppliers and with the Thai importers. Both Thai consumers and firms might adjust their spending habits should certain developments occur.

In the past, you have had difficulty convincing Holt that problems could arise in Thailand. Consequently, you have developed a list of questions for yourself, which you plan to present to the company's CFO after you have answered them. Your questions are listed here:

1. How could a higher level of inflation in Thailand affect Blades (assume U.S. inflation remains constant)?
2. How could competition from firms in Thailand and from U.S. firms conducting business in Thailand affect Blades?
3. How could a decreasing level of national income in Thailand affect Blades?
4. How could a continued depreciation of the Thai baht affect Blades? How would it affect Blades relative to U.S. exporters invoicing their roller blades in U.S. dollars?
5. If Blades increases its business in Thailand and experiences serious financial problems, are there any international agencies that the company could approach for loans or other financial assistance?

Small Business Dilemma

Identifying Factors That Will Affect the Foreign Demand at the Sports Exports Company

Recall from Chapter 1 that Jim Logan planned to pursue his dream of establishing his own business (called the Sports Exports Company) of exporting footballs to one or more foreign markets. He has decided to initially pursue the market in the United Kingdom because British citizens appear to have some interest in football as a possible hobby, and no other firm has capitalized on this idea in the United Kingdom. (The sporting goods shops in the United Kingdom do not sell footballs but might be willing to sell them.) Logan has contacted one sporting goods distributor that has agreed to purchase footballs on a monthly basis and distribute (sell) them to sporting goods stores throughout the United Kingdom. The distributor's demand for footballs is ultimately influenced by the demand for footballs by British citizens who shop in British sporting goods stores. The Sports Exports Company will receive British pounds when it sells the footballs to the distributor and will then convert the pounds into dollars. Logan recognizes that products (such as the footballs his firm will produce) exported from U.S. firms to foreign countries can be affected by various factors.

Identify the factors that affect the current account balance between the United States and the United Kingdom. Explain how each factor may possibly affect the British demand for the footballs that are produced by the Sports Exports Company.

Internet/Excel Exercises

The website address of the Bureau of Economic Analysis is www.bea.gov.

1. Use this website to assess recent trends in exporting and importing by U.S. firms. How has the balance of trade changed over the last 12 months?
2. Offer possible reasons for this change in the balance of trade.
3. Go to www.census.gov/foreign-trade/balance, and obtain monthly balance-of-trade data for the last 24 months between the United States and the United Kingdom or a country specified by your professor.

Create an electronic spreadsheet in which the first column is the month of concern, and the second column is the trade balance. (See Appendix C for help with conducting analyses with Excel.) Use a compute statement to derive the percentage change in the trade balance in the third column. Then go to www.oanda.com/currency/historical-rates/. Obtain the direct exchange rate (dollars per currency unit) of the British pound (or the local currency of the foreign country you select). Obtain the direct exchange rate of the currency at the beginning of each month and insert the data in column.

4. Use a compute statement to derive the percentage change in the currency value from one month to the next in column.

5. Then apply regression analysis in which the percentage change in the trade balance is the dependent variable and the percentage change in the exchange rate is the independent variable. Is there a significant relationship between the two variables? Is the direction of the relationship as expected? If you think that the exchange rate movements affect the trade balance with a lag (because the transactions of importers and exporters may be booked a few months in advance), you can reconfigure your data to assess that relationship (match each monthly percentage change in the balance of trade with the exchange rate movement that occurred a few months earlier).

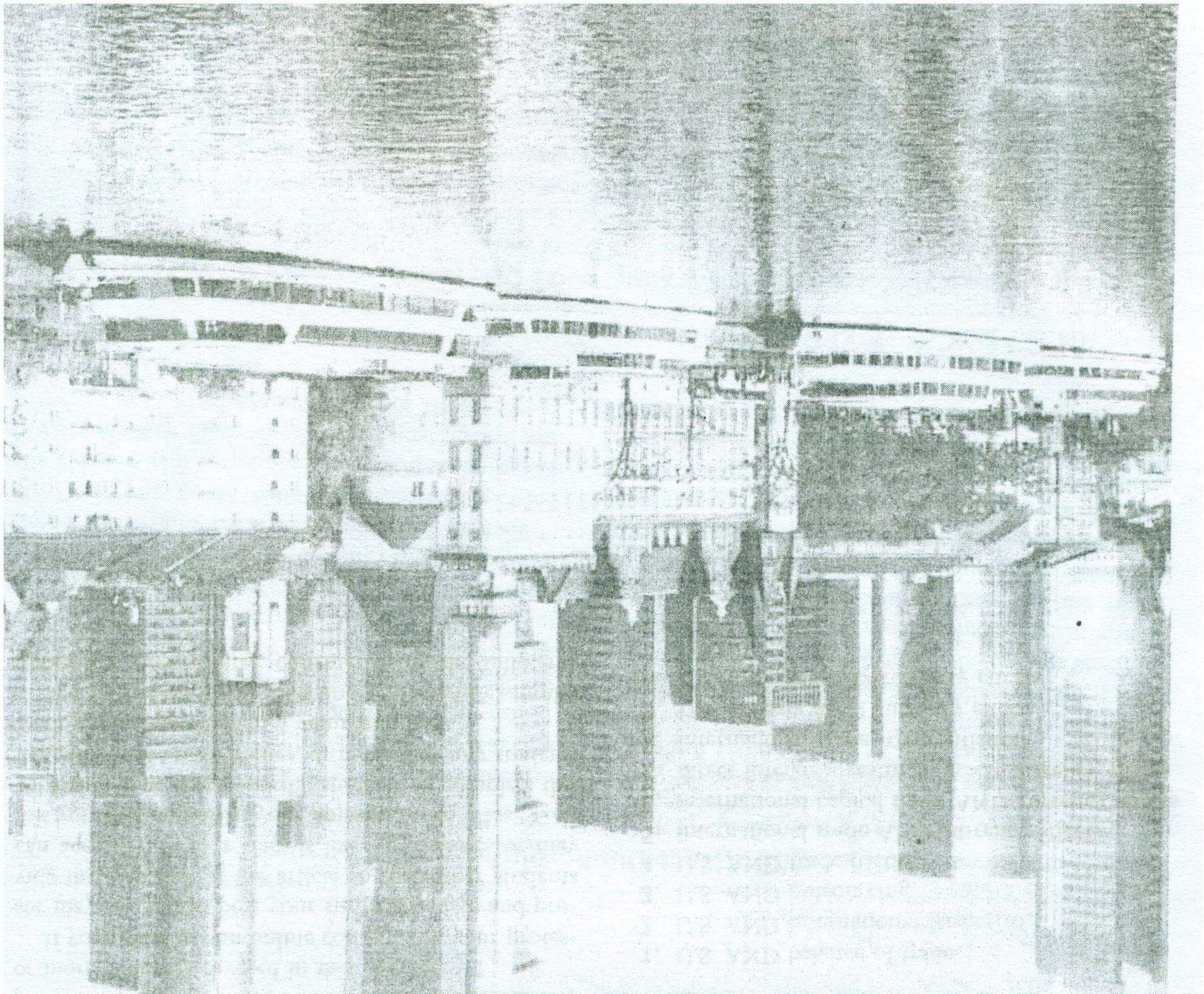
Online Articles with Real-World Examples

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

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

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

1. U.S. AND balance of trade
2. U.S. AND international trade
3. U.S. AND outsourcing
4. U.S. AND trade friction
5. international trade AND currency effects
6. international capital flows AND currency effects
7. direct foreign investment AND currency effects
8. international trade AND inflation
9. U.S. exports AND currency effects
10. U.S. imports AND currency effects



3 International Financial Markets

CHAPTER OBJECTIVES

The specific objectives of this chapter are to describe the background and corporate use of the following international financial markets:

- foreign exchange market,
- international money market,
- international credit market,
- international bond market, and
- international stock markets.

The growth in international business over the last 30 years has led to the development of various international financial markets. Financial managers of MNCs must understand the available international financial markets so they can be used to facilitate the firm's international business transactions.

3-1 Foreign Exchange Market

The **foreign exchange market** allows for the exchange of one currency for another. Large commercial banks serve this market by holding inventories of each currency so that they can accommodate requests by individuals or MNCs. Individuals rely on the foreign exchange market when they travel to foreign countries. People from the United States exchange dollars for Mexican pesos when they visit Mexico, or euros when they visit Italy, or Japanese yen when they visit Japan. Some MNCs based in the United States exchange dollars for Mexican pesos when they purchase supplies in Mexico that are denominated in pesos, or exchange them for euros when they purchase supplies from Italy that are denominated in euros. Other MNCs based in the United States receive Japanese yen when selling products to Japan and may wish to convert those yen to dollars.

For one currency to be exchanged for another currency, an *exchange rate* is needed that specifies the rate at which one currency can be exchanged for another. The exchange rate of the Mexican peso will determine how many dollars you need to stay in a hotel in Mexico City that charges 500 Mexican pesos per night. The exchange rate of the Mexican peso will also determine how many dollars an MNC will need to purchase supplies that are invoiced at 1 million pesos. The system for establishing exchange rates has changed over time, as described in the next section.

3-1a History of Foreign Exchange

The system used for exchanging foreign currencies has evolved from the gold standard to an agreement on fixed exchange rates to a floating rate system.

Gold Standard From 1876 to 1913, exchange rates were dictated by the gold standard. Each currency was convertible into gold at a specified rate. Thus, the exchange rate between two currencies was determined by their relative convertibility rates per ounce of gold. Each country used gold to back its currency.

When World War I began in 1914, the gold standard was suspended. Some countries reverted to the gold standard in the 1920s but abandoned it as a result of the U.S. and European banking panic during the Great Depression. In the 1930s, some countries

attempted to peg their currency to the dollar or the British pound, but there were frequent revisions. As a result of instability in the foreign exchange market and the severe restrictions on international transactions during this period, the volume of international trade declined.

Agreements on Fixed Exchange Rates In 1944, an international agreement (known as the **Bretton Woods Agreement**) called for fixed exchange rates between currencies. Exchange rates were established between currencies, and governments intervened to prevent exchange rates from moving more than 1 percent above or below their initially established levels. This agreement among countries lasted until 1971.

By 1971 the U.S. dollar had apparently become overvalued; the foreign demand for U.S. dollars was substantially less than the supply of dollars for sale (to be exchanged for other currencies). Representatives from the major nations met to discuss this dilemma. As a result of this conference, which led to the **Smithsonian Agreement**, the U.S. dollar was devalued relative to the other major currencies. The degree to which the dollar was devalued varied with each foreign currency. Not only was the dollar's value reset, but exchange rates were also allowed to fluctuate by 2.25 percent in either direction from the newly set rates. These boundaries of 2.25 percent were wider than the previous boundaries (of 1 percent) and thus enabled exchange rates to move more freely.

Floating Exchange Rate System Even with the wider bands allowed by the Smithsonian Agreement, governments still had difficulty maintaining exchange rates within the stated boundaries. By March 1973, the official boundaries imposed by the Smithsonian Agreement were eliminated. Since that time, the currencies of most countries have been allowed to fluctuate in accordance with market forces; however, their respective central banks periodically intervene to stabilize exchange rates.

3-1b Foreign Exchange Transactions

The foreign exchange market should not be thought of as a specific building or location where traders exchange currencies. Companies normally exchange one currency for another through a commercial bank over a telecommunications network; this is an over-the-counter market through which many transactions occur. The largest foreign exchange trading centers are in London, New York, and Tokyo, but foreign exchange transactions occur on a daily basis in cities around the world. London accounts for about 33 percent of the trading volume and New York City for about 20 percent. Thus, these two markets control more than half the currency trading in the world.

Foreign exchange dealers serve as intermediaries in the foreign exchange market by exchanging currencies desired by MNCs or individuals. Large foreign exchange dealers include CitiFX (a subsidiary of Citigroup), JPMorgan Chase & Co., and Deutsche Bank (Germany). Dealers such as these have branches in most major cities and also facilitate foreign exchange transactions with an online trading service. Dealers that rely exclusively on online trading to facilitate such transactions include FX Connect (a subsidiary of State Street Corporation), OANDA, and ACM. Customers establish an online account and can interact with the foreign exchange dealer's website to transmit their foreign exchange order.

WEB

www.oanda.com
Historical exchange rate movements. Data are available on a daily basis for most currencies.

In recent years, new trading platforms have been established that allow some MNCs to engage in foreign exchange transactions directly with other MNCs, thereby eliminating the need for a foreign exchange dealer. An MNC that subscribes to such a platform can indicate to the platform's other users whether it wants to buy or sell a particular currency as well as the volume desired. Some MNCs continue to use an foreign exchange dealer, often because they prefer personal attention or require more customized transactions than can be handled via trading platforms.

The average daily trading volume in the foreign exchange market is about $4 trillion. The U.S. dollar is involved in about 40 percent of those transactions, and currencies from emerging countries are involved in about 20 percent of them. Most currency transactions between two non-U.S. countries do not involve the U.S. dollar. For example, a Canadian MNC that purchases supplies from a Mexican MNC exchanges its Canadian dollars for Mexican pesos; likewise, a Japanese MNC that invests funds in a British bank exchanges its Japanese yen for British pounds.

Spot Market The most common type of foreign exchange transaction is for immediate exchange. The market where these transactions occur is known as the **spot market**. The exchange rate at which one currency is traded for another in the spot market is known as the **spot rate**.

Spot Market Structure Commercial transactions in the spot market are often completed electronically, and the exchange rate at the time determines the amount of funds necessary for the transaction.

EXAMPLE

Indiana Co. purchases supplies priced at 100,000 euros (€) from Belgo, a Belgian supplier, on the first day of every month. Indiana instructs its bank to transfer funds from its account to Belgo's account on the first day of each month. It only has dollars in its account, whereas Belgo's account balance is denominated in euros. When payment was made last month, the euro was worth $1.08; hence Indiana Co. needed $108,000 to pay for the supplies (€100,000 × $1.08 = $108,000). The bank reduced Indiana's account balance by $108,000, which was exchanged at the bank for €100,000. The bank then sent the €100,000 electronically to Belgo by increasing Belgo's account balance by €100,000. Today, a new payment needs to be made. The euro is currently valued at $1.12, so the bank will reduce Indiana's account balance by $112,000 (€100,000 × $1.12 = $112,000) and exchange it for €100,000, which will be sent electronically to Belgo.

In this way, the bank not only executes the transactions but also serves as the foreign exchange dealer. Each month the bank receives dollars from Indiana Co. in exchange for the euros it provides. In addition, the bank facilitates other transactions for MNCs in which it receives euros in exchange for dollars. The bank maintains an inventory of euros, dollars, and other currencies to facilitate these foreign exchange transactions. If the transactions cause it to buy as many euros as it sells to MNCs, then its inventory of euros will not change. However, if the bank sells more euros than it buys then its inventory of euros will be reduced. ●

If a bank begins to experience a shortage of a particular foreign currency, it can purchase that currency from other banks. This trading between banks occurs in what is often referred to as the **interbank market**.

Some other financial institutions, such as securities firms, can provide the same services described in the previous example. Most major airports around the world also have foreign exchange centers where individuals can exchange currencies. In many cities, there are retail foreign exchange offices where tourists and other individuals can exchange their currency.

Use of the Dollar in Spot Markets The U.S. dollar is accepted as a medium of exchange by merchants in many countries; this is especially true in countries (such as Bolivia, Indonesia, Russia, Vietnam) where the home currency is weak or subject to foreign exchange restrictions. Many merchants accept U.S. dollars because they can easily use them to purchase goods from other countries.

Spot Market Time Zones Although foreign exchange trading is conducted only during normal business hours at a given location, such hours vary among locations owing to different time zones. Thus, at any given weekday time, a bank is open and ready to accommodate foreign exchange requests.

When the foreign exchange market opens in the United States each morning, the opening exchange rate quotations are based on the prevailing rates quoted by banks in London (and other locations), where the markets have opened earlier. Suppose the quoted spot rate of the British pound was $1.80 at the previous close of the U.S. foreign exchange market but that, by the time the U.S. market opens the following day, the spot rate is $1.76. Events occurring before the U.S. market opened could have changed the supply and demand conditions for British pounds in the London foreign exchange market, reducing the quoted price for the pound.

Several U.S. banks have established so-called night trading desks. The largest banks initiated night trading to capitalize on overnight foreign exchange movements and to accommodate corporate requests for currency trades. Even some medium-sized banks now offer night trading as a way of accommodating their corporate clients.

Spot Market Liquidity The spot market for each currency is characterized by its liquidity, which reflects the level of trading activity. The more buyers and sellers there are, the more liquid a market is. The spot markets for heavily traded currencies such as the euro, the pound, and the yen are extremely liquid. In contrast, the spot markets for currencies of less developed countries are much less liquid. A currency's liquidity affects the ease with which it can be bought or sold by an MNC. If a currency is illiquid, then the number of willing buyers and sellers is limited and so an MNC may be unable to purchase or sell that currency in a timely fashion and at a reasonable exchange rate.

EXAMPLE Bennett Co. sold computer software to a firm in Peru and received payment of 10 million units of the nuevo sol (Peru's currency). Bennett Co. wanted to convert these units into dollars. The prevailing exchange rate of the nuevo sol at the time was $.36. However, the company's bank did not want to receive such a large amount of nuevo sol because it expected that none of its customers would need that currency. The bank was therefore willing to exchange dollars for the nuevo sol only at the lower exchange rate of $.35. ●

Attributes of Banks That Provide Foreign Exchange The following characteristics of banks are important to customers in need of foreign exchange.

1. *Competitiveness of quote.* A savings of 1¢ per unit on an order of 1 million units of currency is worth $10,000.
2. *Special relationship with the bank.* The bank may offer cash management services or be willing to make a special effort to obtain even hard-to-find foreign currencies for the corporation.
3. *Speed of execution.* Banks may vary in the efficiency with which they handle an order. A corporation needing the currency will prefer a bank that conducts the transaction promptly and also handles any paperwork properly.
4. *Advice about current market conditions.* Some banks may provide assessments of foreign economies and relevant activities in the international financial environment that relate to corporate customers.
5. *Forecasting advice.* Some banks may provide forecasts of the future state of foreign economies and the future value of exchange rates.

WEB

www.everbank.com
Individuals can open an FDIC-insured CD account in a foreign currency.

The preceding list suggests that a corporation in need of a foreign currency should not automatically choose the bank that sells that currency at the lowest price. Most corporations that frequently need foreign currencies develop a close relationship with at least one major bank in case they need various foreign exchange services from a bank.

3-1c Foreign Exchange Quotations

WEB

www.xe.com/fx
Allows individuals to buy and sell currencies.

At any moment in time, the exchange rate between two currencies should be similar across the various banks that provide foreign exchange services. If there is a large discrepancy, then customers (or other banks) will purchase a large amount of the currency from the low-quoting bank and immediately sell it to the high-quoting bank. Such actions cause adjustments in the exchange rate quotations that rapidly eliminate any discrepancy.

Bid/Ask Spread of Banks Commercial banks charge fees for conducting foreign exchange transactions; thus, they buy a currency from customers at a slightly lower price than the price at which they sell it. This means that a bank's **bid price** (buy quote) for a foreign currency will always be less than its **ask price** (sell quote). The difference between the bid and ask prices is known as the **bid/ask spread**, which is meant to cover the costs associated with fulfilling requests to exchange currencies. The bid/ask spread is normally expressed as a percentage of the ask quote.

EXAMPLE

To understand how a bid/ask spread could affect you, assume you have $1,000 and plan to travel from the United States to the United Kingdom. Assume further that the bank's bid rate for the British pound is $1.52 and its ask rate is $1.60. Before leaving on your trip, you go to this bank to exchange dollars for pounds. Your $1,000 will be converted to 625 pounds (£), as follows:

$$\frac{\text{Amount of U.S. dollars to be converted}}{\text{Price charged by bank per pound}} = \frac{\$1{,}000}{\$1.60} = £625$$

Now suppose that an emergency prevents you from taking the trip and so you now want to convert the £625 back into U.S. dollars; if the exchange rate has not changed, then you will receive only

$$£625 \times (\text{Bank's bid rate of } \$1.52 \text{ per pound}) = \$950$$

Because of the bid/ask spread, you have $50 (5 percent) less than when you started. Of course, the dollar amount of your loss would be greater if you had originally converted more than $1,000 into pounds. ●

Comparison of Bid/Ask Spread among Currencies The difference between a bid quote and an ask quote will look much smaller for currencies of lesser value. This differential can be standardized by measuring the spread as a percentage of the currency's spot rate.

EXAMPLE

Charlotte Bank quotes a bid price for yen (¥) of $.0070 and an ask price of $.0074; therefore, the nominal bid/ask spread in this case is $.0074 − $.0070, or just four-hundredths of a penny. Yet in percentage terms the bid/ask spread is actually slightly higher for the yen in this example than for the pound in the previous example. To prove this, consider a traveler who sells $1,000 for yen at the bank's ask price of $.0074. The traveler receives about ¥135,135 (computed as $1,000/$.0074). Suppose the traveler cancels the trip and immediately converts the yen back to dollars; then, assuming no changes in the bid/ask quotations, the bank will buy these yen back at the bank's bid price of $.007 for a total of about $946 (i.e., ¥135,135 × $.007), which is $54 (or 5.4 percent) less than what the traveler started with. This spread exceeds that of the British pound (5 percent in the previous example). ●

The bid/ask spread in percentage terms is typically computed as follows:

$$\text{Bid/ask spread} = \frac{\text{Ask rate} - \text{Bid rate}}{\text{Ask rate}}$$

This formula is used to compute the bid/ask spreads in Exhibit 3.1 for both the British pound and the Japanese yen.

Exhibit 3.1 Computation of the Bid/Ask Spread

CURRENCY	BID RATE	ASK RATE	$\frac{\text{ASK RATE} - \text{BID RATE}}{\text{ASK RATE}}$	=	BID/ASK PERCENTAGE SPREAD
British pound	$1.52	$1.60	$\frac{\$1.60 - \$1.52}{\$1.60}$	=	.05 *or* 5%
Japanese yen	$0.0070	$0.0074	$\frac{\$.0074 - \$.007}{\$.0074}$	=	.054 *or* 5.4%

Notice that these numbers coincide with those derived earlier. Such spreads are common for *retail* transactions (i.e., those serving consumers). For the larger *wholesale* transactions between banks or involving large corporations, the spread will be much smaller. The bid/ask spread for retail transactions is usually in the range of 3 to 7 percent; for wholesale transactions requested by MNCs, the spread is between .01 and .03 percent. The spread is normally larger for illiquid currencies that are less frequently traded. The bid/ask spread as defined here represents the discount in the bid rate as a percentage of the ask rate. An alternative bid/ask spread uses the bid rate (instead of the ask rate) as the denominator and thus measures the percentage markup of the ask rate above the bid rate. The spread is slightly higher when using this formula because the bid rate used in the denominator is always less than the ask rate.

In the following discussion, and in examples throughout much of the text, the bid/ask spread will be ignored. That is, only one price will be shown for a given currency so that you can concentrate on understanding other relevant concepts. These examples depart slightly from reality because the bid and ask prices are, in a sense, assumed to be equal. Although in reality the ask price will always exceed the bid price by a small amount, the implications of the examples presented here should hold nonetheless (i.e., even without accounting for the bid/ask spreads). On those occasions when the bid/ask spread contributes significantly to the concept under discussion, that spread will be accounted for.

To conserve space, some quotations show the entire bid price followed by a slash and then only the last two or three digits of the ask price.

EXAMPLE Assume that a commercial bank's prevailing quote for wholesale transactions involving the euro is $1.0876/78. This means that the commercial bank is willing to pay $1.0876 per euro; alternatively, it is willing to sell euros for $1.0878. The bid/ask spread in this example is therefore

$$\text{Bid/ask spread} = \frac{\$1.0878 - \$1.0876}{\$1.0878}$$
$$= \text{about } .000184 \text{ or } .0184\%$$

●

Factors That Affect the Spread The spread on currency quotations is influenced by the following factors:

$$\text{Spread} = f(\text{Order costs}, \text{Inventory costs}, \text{Competition}, \text{Volume}, \text{Currency risk})$$
$$\quad\quad\quad

- *Competition.* The more intense the competition, the smaller the spread quoted by intermediaries. Competition is more intense for the more widely traded currencies because there is more business in those currencies. The establishment of trading platforms that allow MNCs to trade directly with each other is a form of competition against foreign exchange dealers, and it has forced dealers to reduce their spread in order to remain competitive.
- *Volume.* Currencies that are more liquid are less likely to experience a sudden change in price. Currencies that have a large trading volume are more liquid because there are numerous buyers and sellers at any given time. This means that the market has enough depth that a few large transactions are unlikely to cause the currency's price to change abruptly.
- *Currency risk.* Some currencies exhibit more volatility than others because of economic or political conditions that cause the demand for and supply of the currency to change abruptly. For example, currencies in countries that have frequent political crises are subject to sudden price movements. Intermediaries that are willing to buy or sell these currencies could incur large losses due to such changes in their value.

EXAMPLE There are a limited number of banks or other financial institutions that serve as foreign exchange dealers for Russian rubles. The exchange volume of dollars for rubles is limited, which implies an illiquid market. Hence some dealers may not be able to accommodate requests of large exchange transactions for rubles, and the ruble's market value could change abruptly in response to some larger transactions. The ruble's value has been volatile in recent years, which means that dealers with an inventory of them meant to serve foreign exchange transactions are exposed to the possibility of a sharp depreciation in that currency. Given these conditions, dealers are likely to quote a relatively large bid/ask spread for the Russian ruble. ●

3-1d Interpreting Foreign Exchange Quotations

Exchange rate quotations for widely traded currencies are published daily in the *Wall Street Journal* and in business sections of many newspapers. With a few exceptions, each country has its own currency. In 1999, several European countries (including Germany, France, and Italy) adopted the euro as their currency, and more countries, primarily in Eastern Europe, have adopted the euro since then. The area containing the countries that have adopted the euro is referred to as the *eurozone*. Currently, the eurozone encompasses 17 European countries.

Direct versus Indirect Quotations at One Point in Time The quotations of exchange rates for currencies normally reflect the ask prices for large transactions. Because these rates change throughout the day, those quoted in a newspaper reflect only one specific time during the day. Quotations that report the value of a foreign currency in dollars (number of dollars per unit of other currency) are referred to as **direct quotations**, whereas quotations that report the number of units of a foreign currency per dollar are known as **indirect quotations**. Thus an indirect quotation is the reciprocal (inverse) of the corresponding direct quotation.

EXAMPLE The spot rate of the euro is quoted this morning at $1.031. This is a direct quotation because it represents the value of the foreign currency in dollars. The indirect quotation of the euro is the reciprocal of the direct quotation:

$$\begin{aligned}(\text{Indirect quotation}) &= 1/(\text{Direct quotation})\\ &= 1/\$1.031\\ &= .97, \text{ which means .97 euros} = \$1\end{aligned}$$

If you initially received the indirect quotation then you can take its inverse to obtain the direct quote. The indirect quotation for the euro is $.97, so the direct quotation is

$$\text{Direct quotation} = 1/\text{Indirect quotation} = 1/.97 = \$1.031$$ ●

Exhibit 3.2 compares the direct and indirect exchange rates at two different times. Columns 2 and 3 provide quotes at the beginning of the semester, while columns 4 and 5 provide quotes at the end of the semester. For each currency, the indirect quotes at the beginning and end of the semester (columns 3 and 5) are the reciprocals of their respective direct quotes at the beginning and end of the semester (columns 2 and 4).

Exhibit 3.2 demonstrates that, for any currency at any time, the indirect exchange rate is the inverse of the direct exchange rate. Exhibit 3.2 also shows the relationship, for each currency, between movements in the direct exchange rate and movements in the indirect exchange rate.

EXAMPLE According to Exhibit 3.2, the Canadian dollar's direct quotation rose from $.66 to $.70 during the semester. This change reflects an appreciation of the Canadian dollar: this currency increased in value over the semester. Note that the Canadian dollar's indirect quotation decreased from 1.51 to 1.43 over the same time period; therefore, fewer Canadian dollars are needed to obtain a U.S. dollar at the end than at the start of the semester. This change also confirms that the Canadian dollar's value has strengthened. The indirect quote's *decline* corresponds to the quoted currency's *appreciation.*

Note also that the Mexican peso's direct quotation changed from $.12 to $.11 during the semester, reflecting a depreciation of the peso. The indirect quotation increased over the semester, which means that more pesos are needed to obtain a U.S. dollar at the end than at the start of the semester. This change also confirms that the peso has depreciated during this period. ●

Direct versus Indirect Exchange Rates over Time From the relationship just described between the direct and indirect exchange rates it follows that, if a currency's direct exchange rate is rising over time, then its indirect exchange rate must be declining over time (and vice versa).

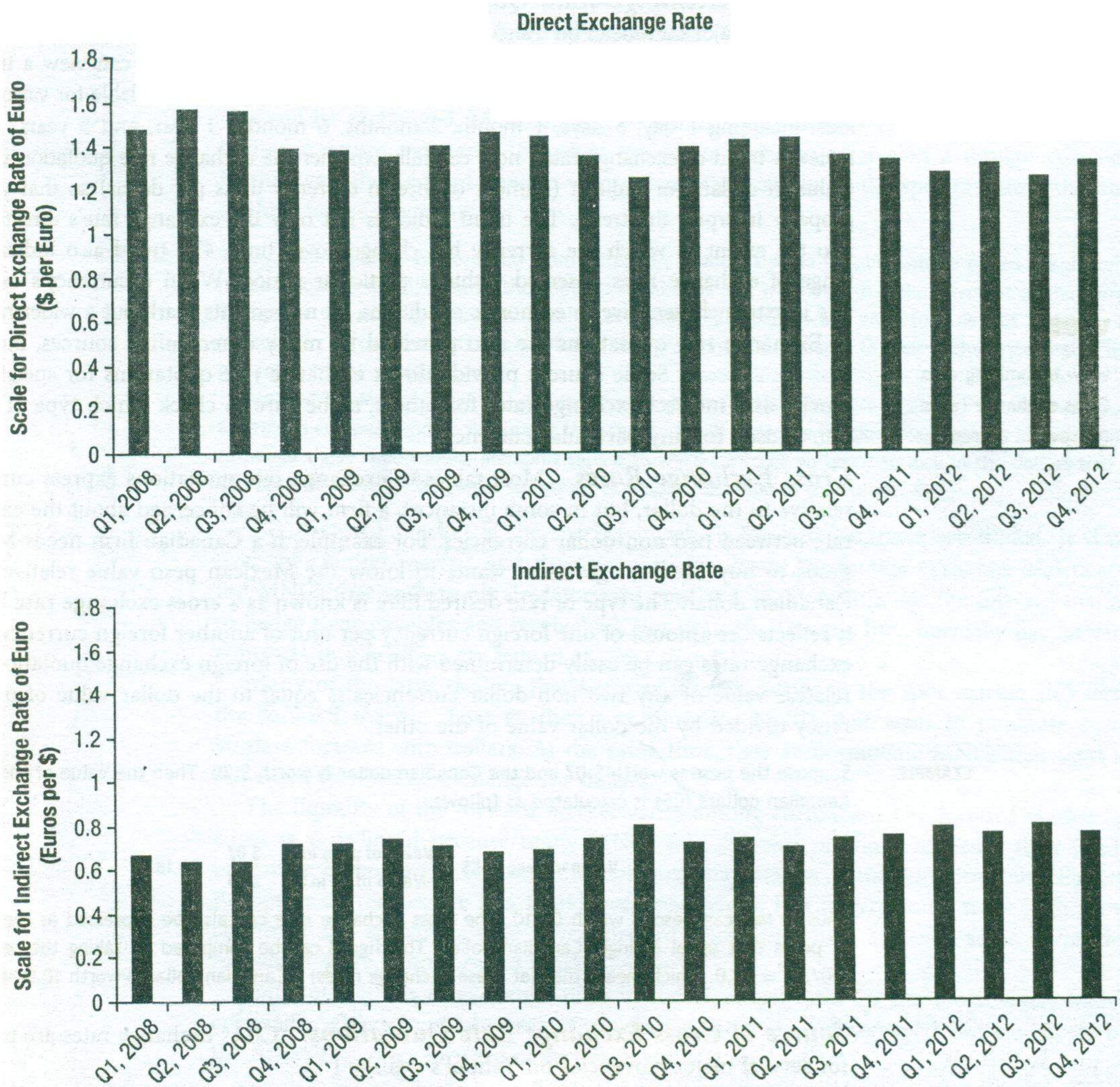
EXAMPLE The trend for the euro's exchange rate is shown in Exhibit 3.3. You can see that, in some periods (e.g., from the second quarter of 2009 to the first quarter of 2010), the direct exchange rate of the euro increased to reflect the euro's appreciation against the dollar. In such periods the indirect exchange rate of the euro declines, which represents a decrease over time in the amount of euros that equal $1. As the euro's spot rate rises, fewer euros are needed to purchase a dollar.

In other periods (e.g., from the third quarter of 2011 to the second quarter of 2012), the direct exchange rate of the euro decreased to reflect depreciation of the euro against the dollar. In such periods the indirect exchange rate of the euro increases, which represents an increase over time in the amount of euros that equal $1. As the euro's spot rate falls, more euros are needed to purchase a dollar.

Exhibit 3.2 Direct and Indirect Exchange Rate Quotations

(1) CURRENCY	(2) DIRECT QUOTATION (dollars per unit) AT SEMESTER'S START	(3) INDIRECT QUOTATION (units per dollar) AT SEMESTER'S START	(4) DIRECT QUOTATION AT SEMESTER'S END	(5) INDIRECT QUOTATION AT SEMESTER'S END
Canadian dollar	$.66	1.51	$.70	1.43
Euro	$1.031	.97	$1.064	.94
Japanese yen	$.009	111.11	$.0097	103.09
Mexican peso	$.12	8.33	$.11	9.09
Swiss franc	$.62	1.61	$.67	1.49
U.K. pound	$1.50	.67	$1.60	.62

Exhibit 3.3 Relationship over Time between the Euro's Direct and Indirect Exchange Rates



It is important to recognize the difference between direct and indirect exchange rates over time because both types are used in the presentations by different analysts and firms. When a discussion about depreciation of a currency is illustrated with a rising trend for that currency, the trend must be based on an indirect exchange rate. ●

If you are conducting an extensive analysis of exchange rates, convert all exchange rates into direct quotations. In this way, you can more easily compare currencies and are less likely to make a mistake in determining whether a currency is appreciating or depreciating over a particular period.

Discussions of exchange rate movements can be confusing if some comments refer to direct quotations while others refer to indirect quotations. For consistency, the examples in this text use direct quotations unless an example can be clarified by the use of indirect quotations.

Source of Exchange Rate Quotations Updated currency quotations are provided for several major currencies on Yahoo!'s website (finance.yahoo.com/currency). You can select any currency for which you want an exchange rate quotation, and you can view a trend of the historical exchange rate movements for any currency. Trends are available for various periods, including 1 day, 5 days, 1 month, 3 months, 6 months, 1 year, and 5 years. As you review a trend of exchange rates, note carefully whether the exchange rate quotation is direct (value in dollars) or indirect (number of foreign currency units per dollar) so that you can properly interpret the trend. The trend indicates not only the exchange rate's direction but also the extent to which the currency has changed over time. The trend also indicates the range of exchange rates observed within a particular period. When a currency's exchange rate is extremely sensitive to economic conditions, its movements mark out a wider range.

WEB

www.bloomberg.com
Cross exchange rates for several currencies.

Exchange rate quotations are also provided by many other online sources, including www.oanda.com. Some sources provide direct exchange rate quotations for specific currencies and indirect exchange rates for others, so be sure to check which type of quotation is used for any particular currency.

Cross Exchange Rates Most tables of exchange rate quotations express currencies relative to the dollar, but in some instances, a firm will be concerned about the exchange rate between two non-dollar currencies. For example, if a Canadian firm needs Mexican pesos to buy Mexican goods, it wants to know the Mexican peso value relative to the Canadian dollar. The type of rate desired here is known as a **cross exchange rate** because it reflects the amount of one foreign currency per unit of another foreign currency. Cross exchange rates can be easily determined with the use of foreign exchange quotations. The relative value of any two non-dollar currencies is equal to the dollar value of one currency divided by the dollar value of the other.

EXAMPLE Suppose the peso is worth $.07 and the Canadian dollar is worth $.70. Then the value of the peso in Canadian dollars (C$) is calculated as follows:

$$\text{Value of peso in C\$} = \frac{\text{Value of peso in \$}}{\text{Value of C\$ in \$}} = \frac{\$.07}{\$.70} = \text{C\$.10}$$

Thus, a Mexican peso is worth C$.10. The cross exchange rate can also be expressed as the number of pesos that equal a single Canadian dollar. This figure can be computed by taking the reciprocal: .70/.07 = 10.0, which means that (at these exchange rates) a Canadian dollar is worth 10.0 pesos. ●

Source of Cross Exchange Rate Quotations Cross exchange rates are provided for several major currencies on Yahoo!'s website (finance.yahoo.com/currency-investing). You can also view the recent trend of a particular cross exchange rate for periods such as 1 day, 5 days, 1 month, 3 months, or 1 year. The trend indicates the volatility of a cross exchange rate over a particular period. Two non-dollar currencies may exhibit high volatility against the U.S. dollar, but if their movements are strongly correlated then their cross exchange rate should be relatively stable over time. For example, the values of the euro and the British pound typically move in the same direction against the dollar and, over time, also to a similar extent. For this reason, the cross exchange rate between the euro and British pound has been fairly stable.

Currency Derivatives A currency derivative is a contract with a price that is partially derived from the value of the underlying currency that it represents. Three types

of currency derivatives that are often used by MNCs are forward contracts, currency futures contracts, and currency options contracts. Each of these currency derivatives will be explained in turn.

Forward Contracts In some cases, an MNC may prefer to lock in an exchange rate at which it can obtain a currency in the future. A **forward contract** is an agreement between an MNC and a foreign exchange dealer that specifies the currencies to be exchanged, the exchange rate, and the date at which the transaction will occur. The **forward rate** is the exchange rate, specified in the forward contract, at which the currencies will be exchanged. Multinational corporations commonly request forward contracts to hedge future payments that they expect to make or receive in a foreign currency. In this way, they do not have to worry about fluctuations in the spot rate until the time of their future payments.

EXAMPLE Today, Memphis Co. has ordered from European countries some supplies whose prices are denominated in euros. It will receive the supplies in 90 days and will need to make payment at that time. It expects the euro to increase in value over the next 90 days and therefore desires to hedge its payables in euros. Memphis buys a 90-day forward contract on euros to lock in the price that it will pay for euros at a future time.

Meanwhile, Memphis will receive Mexican pesos in 180 days because of an order it received from a Mexican company today. It expects that the peso will decrease in value over this period and wants to hedge these receivables. Memphis sells a forward contract on pesos to lock in the dollars that it will receive when it exchanges the pesos at a specified time in the future. ●

The **forward market** is the market in which forward contracts are traded. It is an over-the-counter market, and its main participants are the foreign exchange dealers and the MNCs that wish to obtain a forward contract. Many MNCs use the forward market to hedge their payables and receivables. For example, Google, Inc., normally has forward contracts in place that are valued at more than $1 billion.

Many of the large dealers that serve as intermediaries in the spot market also serve the forward market. That is, they accommodate MNCs that want to purchase euros 90 days forward with dollars. At the same time, they accommodate MNCs that want to sell euros forward in exchange for dollars.

The liquidity of the forward market varies among currencies. The forward market for euros is very liquid because many MNCs take forward positions to hedge their future payments in euros. In contrast, the forward markets for Latin American and Eastern European currencies are less liquid because there is less international trade with those countries and so MNCs take fewer forward positions. There are even some currencies for which there is no forward market.

Some quotations of exchange rates include forward rates for the most widely traded currencies. Other forward rates are not quoted in business newspapers but are quoted by the banks that offer forward contracts in various currencies.

Currency Futures Contracts Futures contracts are similar to forward contracts but are sold on an exchange instead of over the counter. A **currency futures contract** specifies a standard volume of a particular currency to be exchanged on a specific settlement date. Some MNCs involved in international trade use the currency futures markets to hedge their positions. The **futures rate** is the exchange rate at which one can purchase or sell a specified currency on the settlement date in accordance with the futures contract. Thus, the futures rate's role in a futures contract is analogous to the forward rate's role in a forward contract.

It is important to distinguish between the *futures rate* and the *future spot rate*. The future spot rate is the spot rate that will exist at some future time and so, today, that

rate is uncertain. If a U.S. firm needs Japanese yen in 90 days and if it expects the spot rate 90 days from now to exceed the current 90-day futures rate (from a futures contract) or 90-day forward rate (from a forward contract), then the firm should seriously consider hedging with a futures or forward contract.

Additional details on futures contracts, including other differences from forward contracts, are given in Chapter 5.

Currency Options Contracts Currency options contracts can be classified as calls or puts. A **currency call option** provides the right to buy a specific currency at a specific price (called the **strike price** or **exercise price**) within a specific period of time. It is used to hedge future payables. A **currency put option** provides the right to sell a specific currency at a specific price within a specific period of time. It is used to hedge future receivables.

Currency call and put options can be purchased on an exchange. They offer more flexibility than forward or futures contracts because they are not obligations. That is, the firm can elect not to exercise the option.

Currency options have become a popular means of hedging. The Coca-Cola Co. has replaced 30 to 40 percent of its forward contracting with currency options. Although most MNCs use forward contracts, many also use currency options. Additional details about currency options, including other differences from futures and forward contracts, are provided in Chapter 5.

3-2 International Money Market

In most countries, local corporations must often borrow short-term funds to support their operations. Country governments may also need to borrow short-term funds in order to finance their budget deficits. A money market facilitates the process by which surplus units (individuals or institutions with available short-term funds) can transfer funds to deficit units (institutions or individuals in need of funds). Financial institutions such as commercial banks accept short-term deposits and redirect the funds toward deficit units. In addition, corporations and governments may issue short-term securities that are purchased by local investors.

The growth in international business has led to the corporations and governments of a given country needing short-term funds denominated in a currency other than their own, home currency. First, they may need to borrow funds to pay for imports denominated in a foreign currency. Second, even if funds are needed to support local operations, they may consider borrowing in a nonlocal currency featuring lower interest rates. This strategy is especially appropriate for firms expecting future receivables denominated in that currency. Third, they may consider borrowing in a currency that will depreciate against their home currency, since this would enable repayment of the loan, over time, at a more favorable exchange rate. In this case, the actual cost of borrowing would be less than the interest rate quoted for that currency.

At the same time, some corporations and institutional investors have incentives to invest in a foreign currency. First, the interest rate receivable from investing in their home currency might be lower than what could be earned on short-term investments denominated in a different currency. Second, they may consider investing in a currency that will appreciate against their home currency because then, at the end of the investment period, they could convert that currency into their home currency at a more favorable exchange rate. In this case, the actual return on their investment would be greater than the interest rate quoted for the foreign currency.

The preferences of corporations and governments to borrow in foreign currencies and of investors to make short-term investments in foreign currencies resulted in the creation

of the international money market. The intermediaries serving this market are willing both to accept deposits and provide loans in various currencies. These intermediaries typically serve also as dealers in the foreign exchange market.

3-2a Origins and Development

The international money market includes large banks in countries around the world. Two other important components of this market are the European money market and the Asian money market.

European Money Market As MNCs expanded their operations in the 1970s, international financial intermediation emerged to accommodate their needs. Because the U.S. dollar was widely used even by foreign countries as a medium for international trade, there was a consistent demand for dollars in Europe and elsewhere. To conduct international trade with European countries, corporations in the United States deposited U.S. dollars in European banks. The banks accepted the deposits because they could then lend the dollars to corporate customers based in Europe. These dollar deposits in banks in Europe (and on other continents) are known as **Eurodollars** (not to be confused with the *euro*, which is the currency of many European countries today).

The growing importance of the Organization of the Petroleum Exporting Countries (OPEC) also contributed to the growth in Eurodollar deposits. Because OPEC generally requires payment for oil in dollars, the OPEC countries began to deposit a portion of their oil revenues in European banks. These dollar-denominated deposits are sometimes referred to as **petrodollars**. Oil revenues deposited in banks have sometimes been lent to oil-importing countries that are short of cash. As these countries purchase more oil, funds are again transferred to the oil-exporting countries, which in turn creates new deposits. This recycling process has been an important source of funds for some countries.

Multinational corporations also use other widely traded currencies (such as the British pound) in their European transactions, and these other currencies are deposited for the short term in European banks by some MNCs and then borrowed for short-term periods by other MNCs. Banks serve as the European money market's financial intermediaries by accepting short-term deposits and providing short-term loans in various currencies. These European banks also lend to each other in an interbank market whenever some banks have a surplus of funds (from deposits) relative to their volume of loans while other banks need more funds to accommodate loan requests from MNCs and/or government agencies.

The **London Interbank Offer Rate (LIBOR)** is the rate most often charged for very short-term loans (such as for one day) between banks. The LIBOR varies among currencies because both the market supply of and market demand for funds vary among currencies. As the supply and demand for funds changes, so does the LIBOR.. The term LIBOR is commonly used even though many international interbank transactions do not pass through London. Since the euro is now the currency of many European countries, it is the main currency for interbank transactions in most of Europe. Hence the term "euro-bor" is widely used to reflect the interbank offer rate on euros.

The official LIBOR was historically measured as the average of the rates reported by banks at a particular time. The prices and performance of most of these banks' positions in loans and derivative securities are affected by LIBOR. Many types of financial transactions have a floating value or interest rate that is tied to a market interest rate, and LIBOR (or some offset from LIBOR) is typically specified as the market interest rate for those transactions. In 2012, country governments detected that some banks were falsely

reporting the interest rate they offered in the interbank market in order to manipulate LIBOR and thereby boost the values of their investments that were tied to LIBOR. This scandal prompted financial markets to devise ways of establishing the market interest rate that do not rely on the rates reported by participating banks.

Asian Money Market Like the European money market, the **Asian money market** originated as a market involving mostly dollar-denominated deposits; in fact, it was originally known as the Asian dollar market. This market emerged to accommodate the needs of businesses that were using the U.S. dollar (and some other foreign currencies) as a medium of exchange for international trade. These businesses could not rely on banks in Europe because of the distance and different time zones. Today, the Asian money market is centered in Hong Kong and Singapore, where large banks accept deposits and make loans in various foreign currencies. The major sources of deposits in this market are MNCs with excess cash and government agencies. Manufacturers are major borrowers in this market.

Banks within the Asian money market usually lend to each other when some banks have excess funds and other banks need more funds. The Asian money market is integrated with the European money market in that banks in Asia lend to and borrow from banks in Europe.

3-2b Money Market Interest Rates among Currencies

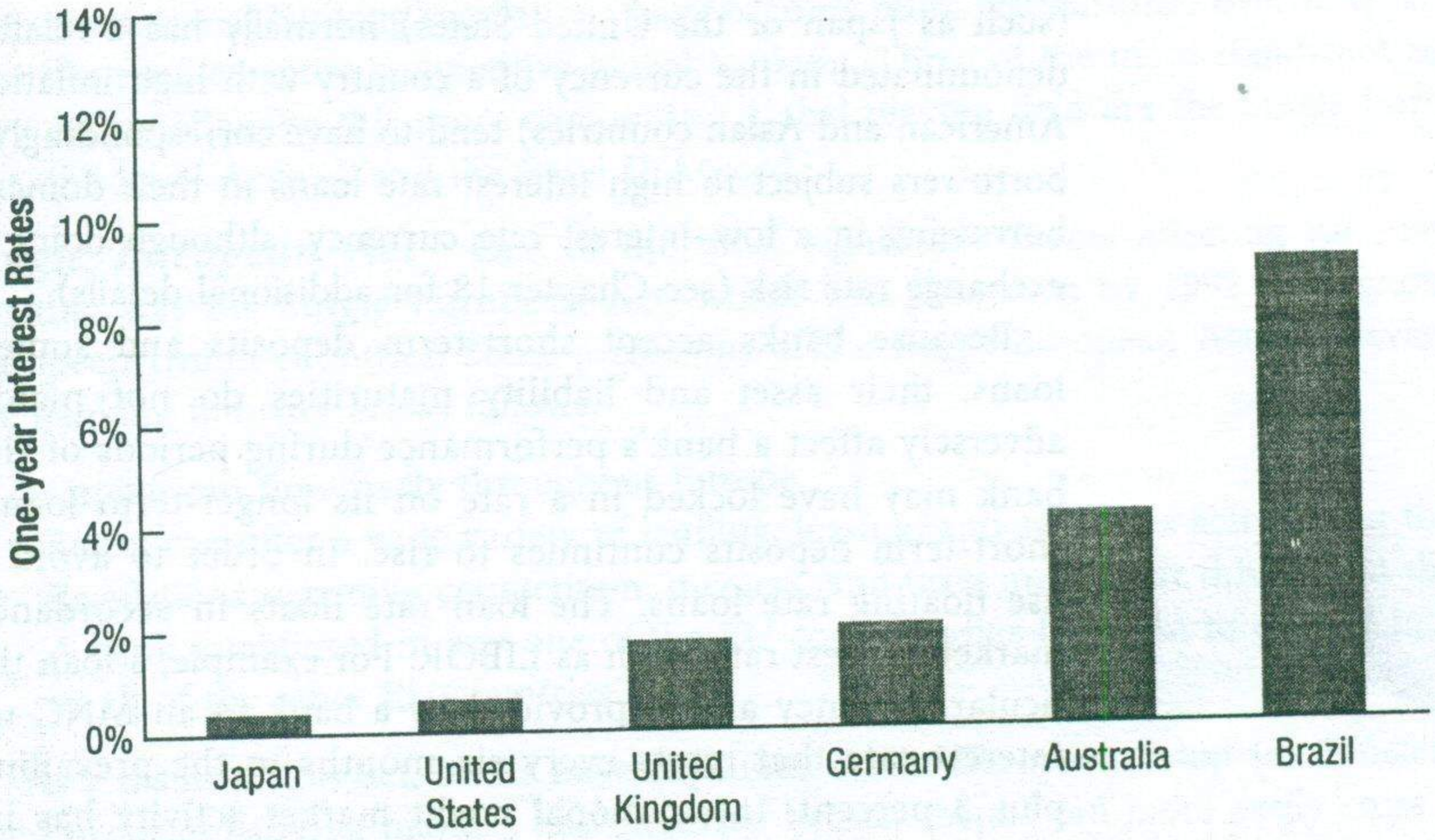
The money market interest rates in any particular country depend on the demand for short-term funds by borrowers relative to the supply of short-term funds provided by savers. In general, a country that experiences both a high demand for and a small supply of short-term funds will have relatively high money market interest rates. Conversely, a country with both a low demand and a large supply of short-term funds will have relatively low money market interest rates. Money market rates tend to be higher in developing countries because they experience higher rates of growth and so more funds are needed (relative to the available supply) to finance that growth.

Quoted money market interest rates for various currencies are displayed in Exhibit 3.4. Notice how the money market rates vary substantially among some currencies. This variance is due to differences in the interaction between the country's total supply of short-term funds available (bank deposits) and that country's total demand for short-term funds by borrowers.

Normally, the money market interest rate paid by corporations that borrow short-term funds in a given country is slightly higher than the rate paid by that country's national government. The rate paid by the government is considered to be a risk-free rate by investors who believe there is no risk of the government defaulting on the funds it borrows. Corporations pay a higher rate because investors who supply the funds require it to reflect the risk of corporate default on the borrowed funds.

Global Integration of Money Market Interest Rates Money market interest rates among countries tend to be highly correlated over time because conditions that affect the supply and demand for short-term funds tend to change in a similar manner among countries. When economic conditions weaken in many countries, the corporate need for liquidity declines and so corporations reduce the amount of short-term funds they wish to borrow. Then the aggregate demand for short-term funds and also money market interest rates will decline in many countries. Conversely, when economic conditions strengthen in many countries, there is an increase in corporate expansion and so corporations need additional liquidity to support their expansion. Under these conditions, the aggregate demand for funds (and also money market interest rates) will rise in many countries.

Exhibit 3.4 Comparison of 2011 International Money Market Interest Rates



Risk of International Money Market Securities When MNCs and government agencies issue debt securities with a short-term maturity (one year or less) in the international money market, these instruments are referred to as **international money market securities**. Normally these securities are perceived to be very safe, especially when they are rated high by rating agencies. And because the typical maturity of these securities is one year or less, investors are less concerned about the issuer's financial condition deteriorating by the time of maturity than if the securities had a longer-term maturity. However, some international money market securities have defaulted, so investors in this market need to consider the possible credit (default) risk of the securities that are issued.

International money market securities are also exposed to exchange rate risk when the currency denominating the securities differs from the investor's home currency. Specifically, the return on investment in the international money market security will be reduced when currency denominating the money market security weakens against the home currency. This means that, even for securities without credit risk, investors can lose money because of exchange rate risk.

3-3 International Credit Market

Multinational corporations and domestic firms sometimes obtain medium-term funds via term loans from local financial institutions or by issuing notes (medium-term debt obligations) in their local markets. However, MNCs also have access to medium-term funds through banks located in foreign markets. Loans of one year or longer that are extended by banks to MNCs or government agencies in Europe are commonly called Eurocredits or **Eurocredit loans**, which are transacted in the **Eurocredit market**. These loans can be denominated in dollars or in one of many other currencies, and their typical maturity is five years.

Borrowers usually prefer that loans be denominated in the currency of their primary in which they receive most of their cash flows, which eliminates the borrower's exchange rate risk. However, the loan's interest rate depends on the currency in which the loan is denominated. A loan denominated in the currency of a country with very low inflation (such as Japan or the United States) normally has a relatively low interest rate; loans denominated in the currency of a country with high inflation rates (such as some Latin American and Asian countries) tend to have correspondingly higher interest rates. Hence borrowers subject to high interest rate loans in their domestic currency might consider borrowing in a low–interest rate currency, although doing so exposes the borrower to exchange rate risk (see Chapter 18 for additional details).

Because banks accept short-term deposits and sometimes provide longer-term loans, their asset and liability maturities do not match. This misalignment can adversely affect a bank's performance during periods of rising interest rates, since the bank may have locked in a rate on its longer-term loans while the rate it pays on short-term deposits continues to rise. In order to avoid this risk, banks commonly use floating rate loans. The loan rate floats in accordance with the movement of a market interest rate, such as LIBOR. For example, a loan that is denominated in a particular currency and is provided by a bank to an MNC might be structured with an interest rate that resets every six months to the prevailing LIBOR for that currency plus 3 percent. International credit market activity has increased over time, yet the growth is mostly concentrated in regions where economic conditions are relatively strong. Those regions tend to have more funds deposited by MNCs as well as a strong demand for loans by MNCs that are expanding their business. Conversely, lending tends to decline in regions where economic conditions are weak because MNCs are less willing to expand and thus do not borrow additional funds. Banks then are also less willing to grant loans because credit risk is higher in regions where economic conditions are weak.

3-3a Syndicated Loans in the Credit Market

Sometimes a single bank is unwilling or unable to lend the amount needed by a particular corporation or government agency. In this case, a **syndicate** of banks may be organized. Each bank within the syndicate participates in the lending. A lead bank is responsible for negotiating terms with the borrower, after which this bank organizes a group of banks to underwrite the loans.

Borrowers that receive a syndicated loan incur various fees besides the interest on the loan. Front-end management fees are paid to cover the costs of organizing the syndicate and underwriting the loan. In addition, a commitment fee of about .25 or .50 percent is charged annually on the unused portion of the available credit extended by the syndicate.

Syndicated loans can be denominated in a variety of currencies. The interest rate depends on the currency denominating the loan, the loan's maturity, and the borrower's creditworthiness of the borrower. Interest rates on syndicated loans are usually adjusted to reflect movements in an interbank lending rate, and the adjustment may occur every six months or every year.

For each bank involved, syndicated loans reduce the default risk of a large loan to the extent of that individual bank's participation. In addition, borrowers have an extra incentive to repay loans of this type. If a borrower defaults on a loan to a syndicate then word will quickly spread among banks, in which case the borrower will find it difficult to obtain loans in the future. Borrowers are therefore strongly encouraged to repay syndicated loans promptly. From the banks' perspective, syndicating a loan increases the likelihood of its timely repayment.

3-3b Regulations in the Credit Market

Regulations contributed to the development of the credit market because they imposed restrictions on some local markets, thereby encouraging local investors and borrowers to circumvent these restrictions. Differences in regulations among countries allowed banks in some countries to have comparative advantages over banks in other countries. Yet international banking regulations have become more standardized over time, a trend that has enabled more competitive global banking. Three of the more significant regulatory events allowing this more competitive global playing field are the Single European Act, the Basel Accord, and the Basel II Accord.

Single European Act One of the most significant events affecting international banking was the **Single European Act**, which was phased in by 1992 throughout the European Union countries. Some provisions of the Single European Act of relevance to the banking industry are as follows.

- Capital can flow freely throughout Europe.
- Banks can offer a wide variety of lending, leasing, and securities activities in the EU.
- Regulations regarding competition, mergers, and taxes are similar throughout the EU.
- A bank established in any one of the EU countries has the right to expand into any or all of the other EU countries.

As a result of this act, banks have expanded across European countries. Efficiency in the European banking markets has increased because banks can more easily cross countries without concern for the country-specific regulations that prevailed in the past.

Another key provision of the act is that banks entering Europe receive the same banking powers as other banks there. Similar provisions apply to non-U.S. banks that enter the United States.

Basel Accord Before 1988, capital standards imposed on banks varied across countries; this variance gave some banks a comparative global advantage over others when extending their loans to MNCs. Banks in countries that were subject to lower capital requirements had a competitive advantage over other banks because (1) they could grow more easily and (2) a given level of profits represented a higher return on their capital. Furthermore, a bank so advantaged was not perceived by investors to have excessive risk, despite its limited capital, because they presumed that its government would protect it from failure. In 1988, the central banks of 12 developed countries established the **Basel Accord**, according to which their respective commercial banks were required to maintain capital (common stock and retained earnings) equal to at least 4 percent of their assets. For this purpose, banks' assets are weighted by risk, which means that a higher capital ratio is required for riskier assets. Off–balance sheet items are also accounted for, so banks cannot circumvent capital requirements by focusing on services that are not explicitly shown as assets on a balance sheet.

Basel II Accord Banking regulators who formed the so-called Basel Committee completed another accord (called Basel II) that subjected banks to more stringent collateral guidelines to back their loans. In addition, this accord encourages banks to improve their techniques for controlling operational risk, which could reduce failures in the banking system.

Basel III Accord The financial crisis in 2008–2009 revealed that banks were still highly exposed to risk, as many banks might have failed without government funding. The crisis also illustrated how financial problems at some banks could spread to other banks and how financial problems in the banking system could paralyze economies. A global committee of bank supervisors discussed solutions that would enhance the safety

of the global banking system with the aim of preventing another financial crisis. This led to a global agreement among bank regulators in September 2010 that is informally referred to as "Basel III."

The accord called for estimating risk-weighted assets with new methods that would increase the level of risk-weighted assets and thus require banks to maintain higher levels of capital. It also required that capital be at least 6% of total risk-weighted assets. Basel III also recommended that by 2016 banks establish an extra layer of capital, a *capital conservation buffer,* amounting to at least 2.5 percent of risk-weighted assets. Banks that do not maintain this buffer could be restricted from making dividend payments, repurchasing stock, or granting bonuses to executives.

This accord also focused on ensuring that banks maintain a sufficient level of liquid assets that can be easily sold if access to cash is needed. The liquidity provisions are controversial because severe restrictions on liquidity could force a bank to hold assets that earn less than its cost of funds. As a consequence, banks could be exposed to higher default risk.

All of the Basel III provisions are meant to be phased in. Some provisions may not take effect until 2019, and other provisions have not yet been finalized. For example, there is still debate concerning whether the provisions should apply to all banks or only to large banks.

3-3c Impact of the Credit Crisis

In 2008, the United States experienced a credit crisis that affected the international credit market. The credit crisis was triggered by the substantial defaults on subprime (lower-quality) mortgages. This led to a halt in housing development, which reduced income, spending, and jobs. Financial institutions holding the mortgages or securities representing the mortgages experienced major losses. Financial institutions in other countries, such as the United Kingdom, had also offered subprime mortgage loans and also experienced high default rates. Because of the global integration of financial markets, the problems in the U.S. and U.K. financial markets spread to other markets. Some financial institutions based in Asia and Europe were common purchasers of subprime mortgages that were originated in the United States and United Kingdom. Furthermore, the resulting weakness of the U.S. and European economies reduced their demand for imports from other countries. Thus the U.S. credit crisis blossomed into an international credit crisis and increased concerns about credit risk in international markets. Creditors reduced the amount of credit that they were willing to provide, and some MNCs and government agencies were then no longer able to obtain funds in the international credit market.

3-4 International Bond Market

The international bond market facilitates the flow of funds between borrowers who need long-term funds and investors who are willing to supply long-term funds. Within a given country, local borrowers that issue bonds at a given time may pay different yields. Normally, the national government pays a lower yield than other corporations on bonds issued within a country because bonds issued by the national government are perceived to have either no default risk or much less default risk than bonds issued by corporations.

The yield that borrowers must pay (and that investors will receive) on a newly issued bond varies among countries because of differences in the demand and supply of funds available in the bond market in a given country. The yield of a bond issue by a corporation is equal to the risk-free interest rate in that country plus a risk premium that reflects the credit risk of that corporation.

EXAMPLE In developed countries, there are many institutional and individual investors who are willing to invest long-term funds in bonds. Consequently, governments and many corporations in these countries can easily obtain long-term funds by issuing bonds, and the yield that they pay on the bonds is relatively low. The yields on bonds may be lower in developed countries, such as Japan, where the supply of long-term funds provided by institutional investors is high.

In developing countries, there are few investors with a large amount of long-term funds available. Those investors in developing countries who could afford to invest long-term funds locally may be unwilling to do so for fear that the home country's prospective borrowers will default on the bonds. Investors may also be unwilling to tie up their funds over the long term because they fear a loss in purchasing power due to high inflation. For these reasons, any borrowers in developing countries that want to issue bonds will almost always have to pay a relatively high yield in order to attract investors. ●

Multinational corporations can obtain long-term debt by issuing bonds in their local markets, and they can also access long-term funds in foreign markets. An MNC may choose to issue bonds in the international bond markets for three reasons. First, issuers recognize that they may be able to attract a stronger demand by issuing their bonds in a particular foreign country rather than in their home country. Some countries have a limited investor base, so MNCs in those countries naturally seek financing elsewhere.

Second, MNCs may prefer to finance a specific foreign project in a particular currency and thus may seek funds where that currency is widely used. Third, an MNC might attempt to finance projects in a foreign currency with a lower interest rate in order to reduce its cost of financing, although doing so would increase its exposure to exchange rate risk (as explained in later chapters).

Institutional investors such as commercial banks, mutual funds, insurance companies, and pension funds from many countries are major investors in the international bond market. Institutional investors may prefer to invest in international bond markets, rather than in their respective local markets, when they can earn a higher return on bonds denominated in foreign currencies.

International bonds are often classified as either foreign bonds or Eurobonds. A **foreign bond** is issued by a borrower foreign to the country where the bond is placed. For example, a U.S. corporation may issue a bond denominated in Japanese yen that is sold to investors in Japan. In some cases, a firm may issue a variety of bonds in various countries. The currency denominating each type of bond is determined by the country where it is sold. The foreign bonds in these cases are sometimes referred to as **parallel bonds**.

3-4a Eurobond Market

Eurobonds are bonds that are sold in countries other than the country whose currency is used to denominate the bonds.

Eurobonds have become popular as a means of attracting funds. One reason is that, because they circumvent registration requirements and avoid some disclosure requirements, these bonds can be issued quickly and at a low cost. Such U.S.-based MNCs as McDonald's and Walt Disney commonly issue Eurobonds, and non-U.S. firms (e.g., Guinness, Nestlé, Volkswagen) also use the Eurobond market as a source of funds. Those MNCs without a strong credit record may have difficulty obtaining funds in the Eurobond market because the limited disclosure requirements may discourage investors from trusting unknown issuers.

In recent years, governments and corporations from emerging markets such as Croatia, Hungary, Romania, and Ukraine have frequently utilized the Eurobond market. New corporations that have been established in emerging markets rely on this market to finance their growth. However, they typically pay a risk premium of at least 3 percentage points annually above the U.S. Treasury bond rate on dollar-denominated Eurobonds.

Features of Eurobonds Eurobonds have several distinctive features. They are usually issued in bearer form, which means that no records are kept regarding ownership. Coupon payments are made yearly. Some Eurobonds carry a convertibility clause that allows for them to be converted into a specified number of shares of common stock. An advantage to the issuer is that Eurobonds typically have few, if any, protective covenants. Furthermore, even short-maturity Eurobonds include call provisions. Some Eurobonds, called **floating rate notes (FRNs)**, have a variable rate provision that adjusts the coupon rate over time according to prevailing market rates.

Denominations Eurobonds are denominated in a number of currencies. Although the U.S. dollar is used most often (accounting for 70 to 75 percent of Eurobonds), the euro will likely also be used to a significant extent in the future. Some firms have begun to issue debt denominated in Japanese yen in order to take advantage of Japan's extremely low interest rates. Because credit conditions and the interest rates for each currency change constantly, the popularity of particular currencies in the Eurobond market changes over time.

Underwriting Process Eurobonds are underwritten by a multinational syndicate of investment banks and are simultaneously placed in many countries, providing a wide spectrum of fund sources to tap. The underwriting process takes place in a sequence of steps. The multinational managing syndicate sells the bonds to a large underwriting crew. In many cases, a special distribution to regional underwriters is allocated before the bonds finally reach the bond purchasers. One problem with the distribution method is that the second- and third-stage underwriters do not always follow up on their promise to sell the bonds. The managing syndicate is then forced to redistribute the unsold bonds or to sell them directly, which creates "digestion" problems in the market and adds to the distribution cost. To avoid such problems, bonds are often distributed in higher volume to underwriters that have fulfilled their commitments in the past at the expense of those that have not. This practice has helped the Eurobond market maintain its desirability as a bond placement center.

Secondary Market Eurobonds also have a secondary market. The market makers are in many cases the same underwriters who sell the primary issues. A technological advance known as Euro-clear helps to inform all traders about outstanding issues for sale, thus allowing a more active secondary market. The intermediaries in the secondary market are based in ten different countries, with those in the United Kingdom dominating the action. These intermediaries can act not only as brokers but also as dealers that hold inventories of Eurobonds.

Impact of the Euro on the Eurobond Market Before the euro's adoption throughout much of Europe, MNCs in European countries usually preferred to issue bonds denominated in their local currency. However, the market for bonds in each particular currency was relatively limited. With widespread adoption of the euro, MNCs from many different countries can issue bonds denominated in that currency; hence there is now a much larger and more liquid market. Multinational corporations have benefitted because they can more easily obtain debt by issuing bonds, since investors know there will be adequate liquidity in the secondary market.

3-4b Development of Other Bond Markets

Bond markets have developed in Asia and South America. Government agencies and MNCs in these regions use international bond markets to issue bonds when they believe they can reduce their financing costs. Investors in some countries use international bond markets because they expect their local currency to weaken in the future and prefer to

invest in bonds denominated in a strong foreign currency. The South American bond market has experienced limited growth because the interest rates in some countries there are usually high. MNCs and government agencies in those countries are unwilling to issue bonds when interest rates are so high, so they rely heavily on short-term financing.

3-4c Risk of International Bonds

Because international bonds are commonly sold in secondary markets, investors must worry about any type of risk that could cause the price of the bonds to decline by the time they wish to sell the bonds. From the perspective of investors, international bonds are subject to four forms of risk: interest rate risk, exchange rate risk, liquidity risk, and credit (default) risk.

Interest Rate Risk The interest rate risk of international bonds is the potential for their value to decline in response to rising long-term interest rates. When long-term interest rates rise, the required rate of return by investors rises. In that case, the discount rate used by investors to measure the present value of future expected cash flows of bonds also rises. Therefore, the valuations of bonds decline. Even bonds with no exposure to credit risk tend to experience a decline in value when interest rates rise. Interest rate risk is more pronounced for fixed rate than for floating rate bonds because the coupon rate remains fixed on fixed-rate bonds even when interest rates rise. Hence the market price of these bonds must be reduced to compensate investors for accepting a coupon rate that is below the return required by investors.

Exchange Rate Risk Exchange rate risk is the potential for a bond's value to decline (from the investor's perspective) because the currency denominating the bond depreciates against the investor's home currency. As a result, the future expected coupon or principal payments to be received from the bond may convert to a smaller amount of the investor's home currency.

Liquidity Risk Liquidity risk is the potential for the value of bonds to be lower at the time they are for sale because no consistently active market exists for them. Thus, investors who wish to sell the bonds may have to lower their price in order to do so. A consistently active market entails a nearly continuous set of buyers and sellers of the bonds, which reduces liquidity risk. So when international bonds are not actively traded, an investor must sell them at a discount in order to entice other investors to purchase them in the secondary market.

Credit Risk The credit risk of international bonds is the potential for default: interest and/or principal payments to investors being suspended either temporarily or permanently. This risk is especially relevant in countries where creditor rights are limited, because creditors may be unable to require that debtor firms take the actions necessary to enable debt repayment.

Even if the firm that issued the bonds is still meeting its periodic coupon payments, adverse economic or firm-specific conditions can increase the perceived likelihood of bankruptcy by the issuing firm. As the credit risk of the issuing firm increases, the risk premium required by investors also increases. Consequently, the required return on these bonds rises because potential investors will seek compensation for the increase in credit risk. Any investors who want to sell their holdings of the bonds under these conditions must sell the bonds for a lower price to compensate potential buyers for the credit risk.

International Integration of Credit Risk The general credit risk levels of loans among countries is correlated because country economies are correlated. When one country experiences weak economic conditions, its consumers tend to reduce their

demand not only for local products but also for foreign products. The credit risk of the local firms increases because the weak economy reduces their revenue and earnings, which could make it difficult to repay their loans. Furthermore, as the country's consumers reduce their demand for foreign products, the producers of those products in foreign countries experience lower revenue and earnings and so may not be able to repay their loans to creditors within their own country. In this way, higher credit risk in one country is transmitted to another country. This process is sometimes referred to as *credit contagion,* which means that a high credit risk in one country can infect other countries whose economies are integrated with it. Contagion effects associated with the economic crisis in Greece are discussed in the next section.

Another reason why general credit risk levels are correlated is that creditors from various countries participate in international syndicated loans, so that all the participating creditors suffer when borrowers based in a particular country suffer. This dynamic can create financial problems for commercial banks in various countries that specialize in loans. Many firms in any country rely heavily on local banks for credit. When these banks suffer losses because of defaults on their loans, they tend to reduce the amount of credit extended to borrowers. Thus, their financial losses from loans to one country may cause them to limit their loans to borrowers in other foreign countries or to those within their own country. As banks extend less credit, firms have less access to funds, which restricts their growth. A country's economy tends to weaken when the credit available to its firms is restricted.

3-4d Impact of the Greek Crisis

In spring of 2010, Greece experienced weak economic conditions and a large increase in the government budget deficit. Investors were concerned that the government of Greece would not be able to repay its debt. As of March 2010, bonds issued by the government of Greece offered a 6.5 percent yield, which reflected a 4 percent annualized premium above bonds issued by other European governments (such as Germany) that also used the euro as their currency. This implies that the borrowing of the equivalent of $10 billion dollars from a bond offering would require that Greece pay an additional $400 million in interest payments every year because of its higher degree of default risk. These high interest payments caused even more concern that Greece would not be able to repay its debt.

WEB

www.stockmarkets.com
Information about stock markets around the world.

In May 2010, many European countries and the International Monetary Fund agreed to provide Greece with new loans. The agreement enabled Greece to immediately access 20 billion euros so that it could cover its payments on existing debt. The agreement could result in financing of more than $100 billion over time. As a condition for receiving the loans, the government of Greece agreed to increase taxes and to reduce spending on public sector wages and pensions.

Contagion Effects Because of the international integration of credit markets, the Greek financial problems were not limited to that country. The weak economy in Greece caused a decline in the Greek demand for products in other European countries, which weakened some European economies. It also caused financial losses for banks in Greece and other European countries that provided loans to Greece, which caused some banks to restrict their credit. As these banks restricted credit, they reduced the extent to which firms could expand and thereby restricted economic growth.

The Greece crisis also forced creditors to recognize that government debt is not always risk free. Hence creditors began to assess more carefully the credit risk of other countries that had large budget deficits, such as Portugal, Spain, and Italy. Such concerns

about risk reduced the access by governments of these other European countries to the debt market, since some financial institutions were no longer willing to loan them funds. In addition, those governments had to pay a higher risk premium to compensate for their credit risk, which increased their cost of borrowing funds.

3-5 International Stock Markets

Multinational corporations and domestic firms both obtain long-term funding by issuing stock locally. Yet MNCs can also attract funds from foreign investors by issuing stock in international markets. The stock offering may be more easily digested when it is issued in several markets. Moreover, issuing stock in a foreign country can enhance the firm's image and name recognition there.

3-5a Issuance of Stock in Foreign Markets

Some U.S. firms issue stock in foreign markets to enhance their global image. The existence of various markets for new issues provides corporations in need of equity with a choice. This competition among various new-issues markets should increase the efficiency of new issues.

The locations of an MNC's operations can influence the decision about where to place its stock. The MNC may well desire a country in which it is likely to generate enough future cash flows to cover dividend payments. The stocks of some U.S.-based MNCs are widely traded on numerous stock exchanges around the world, which gives non-U.S. investors easy access to those stocks.

An MNC must have its stock listed on an exchange in any country where it issues shares. Investors in a foreign country are willing to purchase stock only if they can later easily sell their holdings locally in the secondary market. The stock is denominated in the currency of the country where it is placed.

EXAMPLE

Dow Chemical Co., a large U.S.-based MNC, does much business in Japan. It has supported its operations in Japan by issuing stock to investors there, which is denominated in Japanese yen. Thus Dow can use the yen proceeds to finance its expansion in Japan, and does not need to convert dollars to yen. In order to ensure that Japanese investors can easily sell the stock that they purchase, Dow Chemical Co. lists its stock on the Tokyo exchange; that listing allows Japanese investors to obtain the stock locally and to avoid the higher transaction costs of purchasing it from the New York Stock Exchange (NYSE). Since the stock listed on the Tokyo exchange is denominated in Japanese yen, Japanese investors who are buying or selling this stock need not convert to or from dollars. If Dow plans to expand its business in Japan, it may consider a secondary offering of stock in Japan. Since its stock is already listed there, it may be easy for Dow to place additional shares in that market and thereby raise equity funding for its expansion. ●

Impact of the Euro The conversion of many European countries to a single currency (the euro) has resulted in more stock offerings in Europe by U.S.- and European-based MNCs. In the past, an MNC needed a different currency in every country where it conducted business and therefore borrowed currencies from local banks in those countries. Now it can use the euro to finance its operations across several European countries and may be able to obtain all the financing it needs with a single, euro-denominated stock offering. The MNC can then use a portion of its revenue (in euros) for paying dividends to shareholders who have purchased the stock. The euro also allows European investors to purchase stocks across many European countries without being exposed to exchange rate risk.

3-5b Issuance of Foreign Stock in the United States

Non-U.S. corporations that need large amounts of funds sometimes issue stock in the United States (these are called **Yankee stock offerings**) because the U.S. new-issues market is so liquid. In other words, a foreign corporation is most likely to sell an entire issue of stock in the U.S. market; in other, smaller markets, it will be more difficult to sell the entire issue.

When a non-U.S. firm issues stock in its own country, its shareholder base is quite limited. A few large institutional investors may own most of the shares. By issuing stock in the United States, non-U.S. firms may diversify their shareholder base; this can lessen the share price volatility induced by large investors selling shares.

Investment banks and other financial institutions in the United States often serve as underwriters of stock targeted for the U.S. market, and they receive underwriting fees of about 7 percent of the issued stock's value. Because many financial institutions in the United States purchase non-U.S. stocks as investments, non-U.S. firms may be able to place an entire stock offering within the United States.

Many of the recent stock offerings in the United States by non-U.S. firms have resulted from privatization programs in Latin America and Europe. That is, businesses that were previously government owned are being sold to U.S. shareholders. Given the large size of some of these businesses, their local stock markets are not large enough to digest the stock offerings. Consequently, U.S. investors are financing many privatized businesses based in foreign countries.

Firms that issue stock in the United States are normally required to satisfy stringent disclosure rules regarding their financial condition. However, they are exempt from some of these rules when they qualify for a Securities and Exchange Commission guideline (called Rule 144a) through a direct placement of stock to institutional investors.

American Depository Receipts Non-U.S. firms also obtain equity financing by issuing **American depository receipts (ADRs)**, which are certificates representing bundles of the firm's stock. The use of ADRs circumvents some disclosure requirements imposed on stock offerings in the United States while enabling non-U.S. firms to tap the U.S. market for funds. The ADR market grew when national businesses were being privatized in the early 1990s, since some of these businesses issued ADRs to obtain financing. Examples include Cemex (ticker symbol CX, based in Mexico), China Telecom Corp. (CHA, China), Nokia (NOK, Finland), Heinekin (HINKY, Netherlands), and Credit Suisse Group (CS, Switzerland).

Because ADR shares can be traded just like shares of a stock, the price of an ADR changes each day in response to demand and supply conditions. Over time, however, the value of an ADR should move in tandem with the value of the corresponding stock that is listed on the foreign stock exchange (after exchange rate effects are taken into account). The formula for calculating the price of an ADR is

$$P_{ADR} = P_{FS} \times S$$

Here P_{ADR} denotes the price of the ADR, P_{FS} is the price of the foreign stock measured in foreign currency, and S is the spot rate of the foreign currency. Holding the price of the foreign stock constant, the ADR price should move proportionately (against the dollar) with movement in the currency denominating the foreign stock. American depository receipts are especially attractive to U.S. investors who anticipate that the foreign stock will perform well and that the currency in which it is denominated will appreciate against the dollar.

EXAMPLE A share of the ADR of the French firm Pari represents one share of this firm's stock that is traded on a French stock exchange. The share price of Pari was 20 euros when the French market closed. As the U.S. stock market opens, the euro is worth $1.05, so the ADR price can be calculated as

$$P_{ADR} = P_{FS} \times S$$
$$= 20 \times \$1.05$$
$$= \$21$$ ●

WEB

www.wall-street.com/foreign.html
Provides links to many stock markets.

If there is a difference between the ADR price and the price of the foreign stock (after adjusting for the exchange rate), then investors can use arbitrage to capitalize on this discrepancy. Over time, arbitrage will realign the prices.

EXAMPLE Continuing with the previous example, assume that there are no transaction costs. If $P_{ADR} < (P_{FS} \times S)$ then ADR shares will flow back to France; they will be converted to shares of the French stock and then traded in the French market. Investors can engage in arbitrage by buying the ADR shares in the United States, converting them to shares of the French stock, and then selling those shares on the French stock exchange where the stock is listed.

The arbitrage will (1) reduce the supply of ADRs traded in the U.S. market, putting upward pressure on the ADR price, and (2) increase the supply of the French shares traded in the French market, putting downward pressure on the stock price in France. The arbitrage will continue until the discrepancy in prices disappears. ●

The preceding example assumed a conversion rate of one ADR share per share of stock. Some ADRs are convertible into more than one share of the corresponding stock. Under these conditions, arbitrage will occur only if:

$$P_{ADR} = \text{Conv} \times P_{FS} \times S$$

where Conv denotes the number of shares of foreign stock that can be obtained for the ADR.

EXAMPLE If the Pari ADR described previously is convertible into two shares of stock, the ADR price should be:

$$P_{ADR} = 2 \times 20 \times \$1.05$$
$$= \$42$$

In this case, the ADR shares will be converted into shares of stock only if the ADR price is less than $42. ●

WEB

finance.yahoo.com
Access to various domestic and international financial markets and financial market news; also gives links to national financial news servers.

In reality, there are some transaction costs associated with converting ADRs to foreign shares. This means that arbitrage will occur only if the potential arbitrage profit exceeds the transaction costs. One can find ADR price quotations on various websites, such as www.adr.com. Many of the sites that provide stock prices for ADRs are segmented by country.

3-5c Non-U.S. Firms Listing on U.S. Exchanges

Non-U.S. firms that issue stock in the United States have their shares listed on the New York Stock Exchange or the Nasdaq market. By listing their stock on a U.S. stock exchange, the shares placed in the United States can be easily traded in the secondary market.

Effect of the Sarbanes-Oxley Act on Foreign Stock Listings In 2002 the U.S. Congress passed the Sarbanes-Oxley Act, which required firms whose stock is listed on U.S. stock exchanges to provide more complete financial disclosure. The legislation resulted from financial scandals involving the U.S.-based MNCs Enron and WorldCom, which had used misleading financial statements to hide their weak financial condition. Investors therefore overestimated the value of these companies' stocks and eventually lost most or all of their investment. Sarbanes-Oxley was intended to ensure that financial reporting was more accurate and complete, although the cost for complying was estimated to be more than $1 million annually for some firms. Many non-U.S. firms decided

to place new issues of their stock in the United Kingdom, rather than the United States, so they could avoid complying with the law. Some U.S. firms that went public also decided to place their stock in the United Kingdom for the same reason. Furthermore, some non-U.S. firms listed on U.S. stock exchanges before the Sarbanes-Oxley Act de-registered after its passage; such withdrawals may be attributed to the high cost of compliance.

3-5d Investing in Foreign Stock Markets

WEB

www.worldbank.org/data
Information about the market capitalization, stock trading volume, and turnover in each stock market.

Just as some MNCs issue stock outside their home country, many investors purchase stocks outside of the home country. There are several reasons for such a strategy. First, these investors may expect favorable economic conditions in a particular country and therefore invest in stocks of the firms in that country. Second, investors may wish to acquire stocks denominated in currencies that they expect to strengthen over time, since that would enhance the return on their investment. Third, some investors invest in stocks of other countries as a means of diversifying their portfolio. Thus, their investment is less sensitive to possible adverse stock market conditions in their home country. More details about investing in international stock markets are provided in the appendix to this chapter.

Comparing the Size of Stock Markets Exhibit 3.5 gives a summary of the major stock markets, although there are numerous other exchanges. Some foreign stock markets are much smaller than the U.S. markets because their firms have traditionally relied more on debt financing than on equity financing. However, recent trends indicate that firms outside the United States now issue stock more frequently, which has led to the growth of non-U.S. stock markets. The percentage of individual versus institutional

Exhibit 3.5 Comparison of Stock Exchanges (2013)

COUNTRY	MARKET CAPITALIZATION (billions of dollars)	NUMBER OF LISTED COMPANIES
Argentina	42	107
Australia	1,422	2,056
Brazil	1,257	364
Chile	335	245
China	3,911	2,494
Greece	49	265
Hong Kong	2,978	1,547
Hungary	22	52
Japan	3,827	3,481
Mexico	551	136
Norway	259	228
Slovenia	20	61
Spain	1,038	3,200
Switzerland	1,222	265
Taiwan	740	840
United Kingdom	3,846	2,767
United States	20,948	5,003

Source: *World Federation of Exchanges.*

ownership of shares varies across stock markets. Outside the United States, financial institutions (and other firms) own a large proportion of the shares whereas individual investors own a relatively small proportion. Some related generalization (that applies to stock markets *in* the United States) goes here.

Large MNCs have begun to float new stock issues simultaneously in various countries. In this case, investment banks underwrite stocks through one or more syndicates across countries. The global distribution of stock can then reach a much larger market, so greater quantities of stock can be issued at a given price.

In 2000, the stock exchanges of Amsterdam, Brussels, and Paris merged to create the Euronext market; since then, the Lisbon stock exchange has also joined. In 2007, the NYSE joined Euronext to create NYSE Euronext, the largest global exchange. It represents a major step in creating a global stock exchange and will probably lead to more consolidation of stock exchanges across countries in the future. Most of the largest firms based in Europe have listed their stock on the Euronext market. This market is likely to grow over time because other stock exchanges may well join. A single European stock market with similar guidelines for all stocks, irrespective of their home country, would make it easier for investors who prefer to do all of their trading in one market.

In recent years, many new stock markets have been developed. Such *emerging markets* allow foreign firms to raise large amounts of capital by issuing stock. These markets should enable U.S. firms doing business in developing countries to raise funds by issuing stock there and listing their stock on the local stock exchanges. Market characteristics, such as the amount of trading relative to market capitalization and the applicable tax rates, can vary substantially among different emerging markets.

3-5e How Market Characteristics Vary among Countries

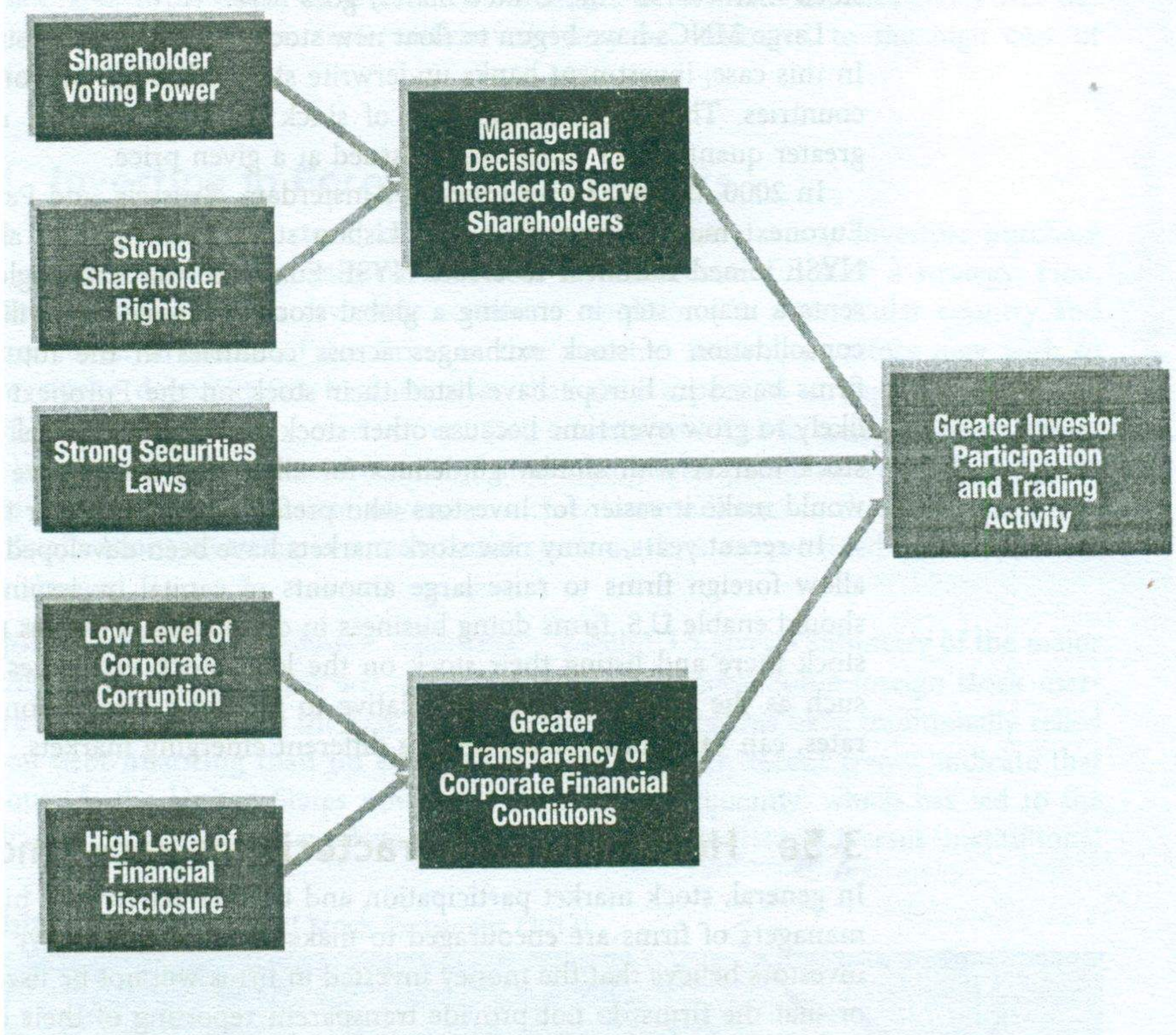
In general, stock market participation and trading activity are higher in countries where managers of firms are encouraged to make decisions that serve shareholder interests. If investors believe that the money invested in firms will not be used to serve their interests or that the firms do not provide transparent reporting of their condition or operations, then they will probably not invest in the stocks of that country's firms. An active stock market requires the trust of local investors, and increased trust leads to more participation and trading. Exhibit 3.6 identifies some factors that enable stronger governance and thus may increase the trading activity in a stock market. These factors are discussed next.

Rights Shareholders in some countries have more rights than those in other countries. For example, shareholders have more voting power in some countries than others, and they can have influence on a wider variety of management issues in some countries.

Legal Protection The legal protection of shareholders varies substantially among countries. Shareholders in some countries may have more power to sue publicly traded firms if their executives or directors commit financial fraud. In general, common-law countries (e.g., Canada, the United Kingdom, the United States) allow for more legal protection than civil-law countries (e.g., France and Italy). Managers are more likely to serve shareholder interests when shareholders have more legal protection.

Government Enforcement Government enforcement of securities laws varies among countries. A country might have laws to protect shareholders yet not adequately enforce those laws, which means that shareholders are not protected. Some countries tend to have less corporate corruption than others. In these countries, shareholders are less susceptible to major losses due to agency problems whereby managers use shareholder money for their own benefit.

Exhibit 3.6 Impact of Governance on Stock Market Participation and Trading Activity



Accounting Laws The amount of financial information that must be provided by public companies varies among countries. The variation may be due to accounting laws set by the government for public companies or to reporting rules enforced by local stock exchanges. Shareholders are less susceptible to losses stemming from insufficient information when more transparency is required of public companies in their financial reporting.

In general, stock markets that allow more voting rights for shareholders, more legal protection, more enforcement of the laws, less corruption, and more stringent accounting requirements attract more investors who are willing to invest in stocks. This allows for more confidence in the stock market and greater pricing efficiency (since there is a large set of investors who monitor each firm). At the same time, the presence of many investors will attract a company to the stock market because under these conditions it can easily raise funds. A stock market that does not attract investors will not attract companies in search of funds; in this case, companies must rely either on stock markets in other countries or on credit markets (such as bank loans).

3-5f Integration of Stock Markets

Since the economies of countries are integrated and since conditions in the stock market reflect the host country's prevailing and anticipated economic conditions, it follows that

stock market conditions are integrated. In particular, stock market conditions among European countries are highly correlated because the European economies are highly correlated. Strong stock market conditions in a few European countries have a favorable effect on other European stock markets because optimism in one market can spread throughout Europe. Likewise, adverse stock market conditions in one or more European countries can adversely affect other European stock markets because one market's pessimism can spread throughout Europe.

3-5g Integration of International Stock Markets and Credit Markets

Conditions in the international credit and stock markets are integrated. The key link is the risk premium, which affects the rate of return required by financial institutions who provide credit or invest in stock. Under favorable conditions, the risk premium required by investors is low and valuations of debt securities (such as bonds) and stocks is high. When economic conditions become unfavorable, however, there is more uncertainty surrounding the future cash flows of firms; hence the risk premium required by investors rises and valuations of debt securities and stocks fall. Consequently, stock prices often decline in response to any news that hints at a possible credit crisis.

EXAMPLE In the 2010-2012 period, news of government budget deficit problems in Greece caused concerns about credit risk that led to a decline in bank stock valuations. Greek banks could not increase their capital levels by issuing new stock because their stock prices were weak. Since they experienced serious loan losses and could not easily boost their capital levels, they were subject to possible bankruptcy. Financial media reported on problems with banks in other European countries and frequently asked which European country would become "the next Greece." Prospective investors and depositors avoided European banks for fear of suffering directly from the credit losses those banks might incur. As concerns about risk increased in countries such as Portugal, Spain, and Italy, their governments and firms were perceived as higher credit risks and forced to pay higher interest rates when seeking credit from banks. These higher rates further reduced their ability to repay the loans that they received. As the uncertainty surrounding firms increased, their stock prices declined.

As the European crisis intensified, its effects stretched beyond Europe. European banks serve as a major financial intermediary for emerging markets in Asia. The financial problems experienced by banks in Europe caused them to restrict their credit, which had the effect of limiting the access of some Asian companies to credit. Thus, economies of some Asian countries were restricted by the limited amount of credit that their firms could obtain. As the Asian economies weakened, their demand for products in Europe declined. These events provide another illustration of contagion effects resulting from the international integration of economies. Note also that the weakness in the Asian credit markets caused more uncertainty about stock values and thus declining stock values. ●

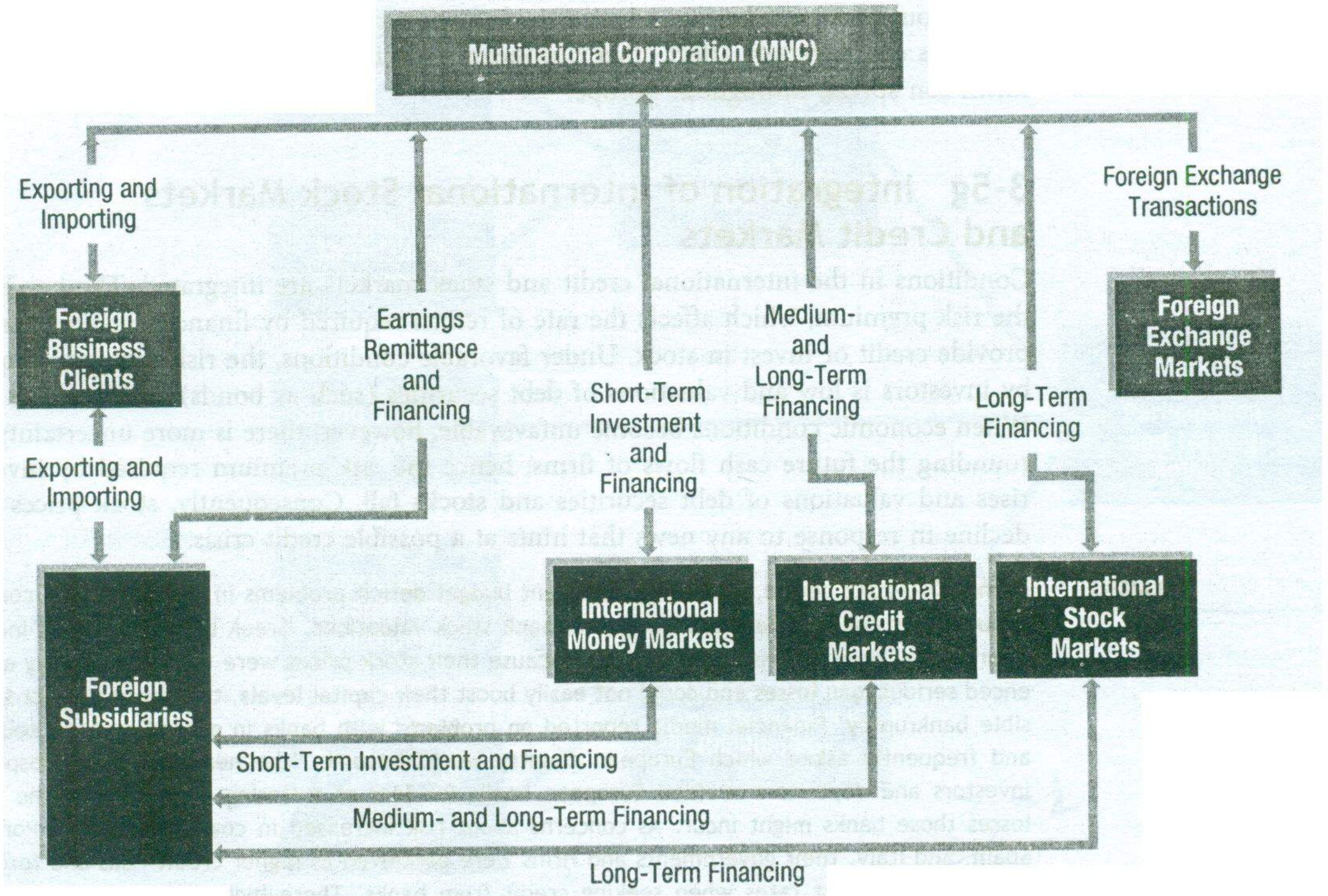
3-6 How Financial Markets Serve MNCs

Exhibit 3.7 illustrates the foreign cash flow movements of a typical MNC. These cash flows can be classified into four corporate functions, all of which generally require use of the foreign exchange markets. The spot market, forward market, currency futures market, and currency options market are all classified as foreign exchange markets.

The first function is foreign trade with business clients. Exports generate foreign cash inflows while imports require cash outflows. A second function is direct foreign investment, or the acquisition of foreign real assets. This function requires cash outflows but generates future inflows either through remitted earnings back to the MNC or through

T. MADURA 12TH-8-A

Exhibit 3.7 Foreign Cash Flow Chart of a Multinational Corporation (MNC)



the sale of these foreign assets. A third function is short-term investment or financing in foreign securities, and the fourth function is longer-term financing in the international bond or stock markets. An MNC may use international money or bond markets to obtain funds at a lower cost than they can be obtained locally.

SUMMARY

- The foreign exchange market allows currencies to be exchanged in order to facilitate international trade or financial transactions. Commercial banks serve as financial intermediaries in this market. They stand ready to exchange currencies for immediate delivery in the spot market. In addition, they are also willing to negotiate forward contracts with MNCs that wish to buy and/or sell currencies in the future.
- The international money markets are composed of several large banks that accept deposits and provide short-term loans in various currencies. This market is used primarily by governments and large corporations.
- The international credit markets are composed of the same commercial banks that serve the international money market. These banks convert

some of the deposits received into loans (for medium-term periods) to governments and large corporations.

- The international bond markets facilitate international transfers of long-term credit, thereby enabling governments and large corporations to borrow funds from various countries. The international bond market transactions are facilitated by multinational syndicates of investment banks that help to place the bonds.
- International stock markets enable firms to obtain equity financing in foreign countries. Thus, these markets help MNCs finance their international expansion.

Point Counter-Point

Should Firms That Go Public Engage in International Offerings?

Point Yes. When a U.S. firm issues stock to the public for the first time in an initial public offering (IPO), it is naturally concerned about whether it can place all of its shares at a reasonable price. It will be able to issue its stock at a higher price by attracting more investors. It will increase its demand by spreading the stock across countries. The higher the price at which it can issue stock, the lower its cost of using equity capital. It can also establish a global name by spreading stock across countries.

Counter-Point No. If a U.S. firm spreads its stock across different countries at the time of the IPO, there will be less publicly traded stock in the United States. Thus, it will not have as much liquidity in the secondary market. Investors desire stocks that they can easily sell in the secondary market, which means that they require that the stocks have liquidity. To the extent that a firm reduces its liquidity in the United States by spreading its stock across countries, it may not attract sufficient U.S. demand for the stock. Thus, its efforts to create global name recognition may reduce its name recognition in the United States.

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. Stetson Bank quotes a bid rate of $.784 for the Australian dollar and an ask rate of $.80. What is the bid/ask percentage spread?

2. Fullerton Bank quotes an ask rate of $.190 for the Peruvian currency (new sol) and a bid rate of $.188. Determine the bid/ask percentage spread?

3. Briefly explain how MNCs can make use of each international financial market described in this chapter.

Questions and Applications

1. Motives for Investing in Foreign Money Markets Explain why an MNC may invest funds in a financial market outside its own country.

2. Motives for Providing Credit in Foreign Markets Explain why some financial institutions prefer to provide credit in financial markets outside their own country.

3. Exchange Rate Effects on Investing Explain how the appreciation of the Australian dollar against the U.S. dollar would affect the return to a U.S. firm that invested in an Australian money market security.

4. Exchange Rate Effects on Borrowing Explain how the appreciation of the Japanese yen against the U.S. dollar would affect the return to a U. S. firm that borrowed Japanese yen and used the proceeds for a U.S. project.

5. Bank Services List some of the important characteristics of bank foreign exchange services that MNCs should consider.

6. Bid/Ask Spread Utah Bank's bid price for Canadian dollars is $.7938 and its ask price is $.8100. What is the bid/ask percentage spread?

7. Bid/Ask Spread Compute the bid/ask percentage spread for Mexican peso retail transactions in which the ask rate is $.11 and the bid rate is $.10.

8. Forward Contract The Wolfpack Corp. is a U.S. exporter that invoices its exports to the United Kingdom in British pounds. If it expects that the pound will appreciate against the dollar in the future, should it hedge its exports with a forward contract? Explain.

9. Euro Explain the foreign exchange situation for countries that use the euro when they engage in international trade among themselves.

10. Indirect Exchange Rate If the direct exchange rate of the euro is $1.25, what is the euro's indirect exchange rate? That is, what is the value of a dollar in euros?

11. Cross Exchange Rate Assume Poland's currency (the zloty) is worth $.17 and the Japanese yen is worth $.008. What is the cross rate of the zloty with respect to yen? That is, how many yen equal a zloty?

12. Syndicated Loans Explain how syndicated loans are used in international markets.

13. Loan Rates Explain the process used by banks in the Eurocredit market to determine the rate to charge on loans.

14. International Markets What is the function of the international money markets? Briefly describe the reasons for the development and growth of the European money market. Explain how the international money, credit, and bond markets differ from one another.

15. Evolution of Floating Rates Briefly describe the historical developments that led to floating exchange rates as of 1973.

16. International Diversification Explain how the Asian crisis would have affected the returns to a U.S. firm investing in the Asian stock markets as a means of international diversification. (See the chapter appendix.)

17. Eurocredit Loans

a. With regard to Eurocredit loans, who are the borrowers?

b. Why would a bank desire to participate in syndicated Eurocredit loans?

c. What is LIBOR, and how is it used in the Eurocredit market?

18. Foreign Exchange You just came back from Canada, where the Canadian dollar was worth $.70. You still have C$200 from your trip and could exchange them for dollars at the airport, but the airport foreign exchange desk will only buy them for $.60. Next week, you will be going to Mexico and will need pesos. The airport foreign exchange desk will sell you pesos for $.10 per peso. You met a tourist at the airport who is from Mexico and is on his way to Canada. He is willing to buy your C$200 for 1,300 pesos. Should you accept the offer or cash the Canadian dollars in at the airport? Explain.

19. Foreign Stock Markets Explain why firms may issue stock in foreign markets. Why might U.S. firms issue more stock in Europe since the conversion to the euro in 1999?

20. Financing with Stock Chapman Co. is a privately owned MNC in the United States that plans to engage in an initial public offering (IPO) of stock so that it can finance its international expansion. At the present time, world stock market conditions are very weak but are expected to improve. The U.S. market tends to be weak in periods when the other stock markets around the world are weak. A financial manager of Chapman Co. recommends that it wait until the world stock markets recover before it issues stock. Another manager believes that Chapman Co. could issue its stock now even if the price would be low, since its stock price should rise later once world stock markets recover. Who is correct? Explain.

Advanced Questions

21. Effects of September 11 Why do you think the terrorist attack on the United States was expected to cause a decline in U.S. interest rates? Given the expectations for a decline in U.S. interest rates and stock prices, how were capital flows between the United States and other countries likely affected?

22. International Financial Markets Walmart has established two retail outlets in the city of Shanzen, China, which has a population of 3.7 million. These outlets are massive and contain imports in addition to products purchased locally. As Walmart generates

earnings beyond what it needs in Shanzen, it may remit those earnings back to the United States. Walmart is likely to build additional outlets in Shanzen or in other Chinese cities in the future.

a. Explain how the Walmart outlets in China would use the spot market in foreign exchange.

b. Explain how Walmart might use the international money markets when it is establishing other Walmart stores in Asia.

c. Explain how Walmart could use the international bond market to finance the establishment of new outlets in foreign markets.

23. Interest Rates Why do interest rates vary among countries? Why are interest rates normally similar for those European countries that use the euro as their currency? Offer a reason why the government interest rate of one country could be slightly higher than the government interest rate of another country, even though the euro is the currency used in both countries.

24. Interpreting Exchange Rate Quotations Today you notice the following exchange rate quotations:(a) $1 = 3.00 Argentine pesos and (b) 1 Argentine peso = .50 Canadian dollars. You need to purchase 100,000 Canadian dollars with U.S. dollars. How many U.S. dollars will you need for your purchase?

25. Pricing ADRs Today, the stock price of Genevo Co. (based in Switzerland) is priced at SF80 per share. The spot rate of the Swiss franc (SF) is $.70. During the next year, you expect that the stock price of Genevo Co. will decline by 3 percent. You also expect that the Swiss franc will depreciate against the U.S. dollar by 8 percent during the next year. You own American depository receipts (ADRs) that represent Genevo stock. Each share that you own represents one share of the stock traded on the Swiss stock exchange. What is the estimated value of the ADR per share in 1 year?

26. Explaining Variation in Bid/Ask Spreads Go to the currency converter at finance.yahoo.com/currency and determine the bid/ask spread for the euro. Then determine the bid/ask spread for a currency in a less developed country. What do you think is the main reason for the difference in the bid/ask spreads between these two currencies?

27. Direct versus Indirect Exchange Rates Assume that during this semester, the euro appreciated against the dollar. Did the direct exchange rate of the euro increase or decrease? Did the indirect exchange rate of the euro increase or decrease?

28. Transparency and Stock Trading Activity Explain the relationship between transparency of firms and investor participation (or trading activity) among stock markets. Based on this relationship, how can governments of countries increase the amount of trading activity (and therefore liquidity)of their stock markets?

29. How Governance Affects Stock Market Liquidity Identify some of the key factors that can allow for stronger governance and therefore increase participation and trading activity in a stock market.

30. International Impact of the Credit Crisis Explain how the international integration of financial markets caused the credit crisis to spread across many countries.

31. Issuing Stock in Foreign Markets Bloomington Co. is a large U.S.–based MNC with large subsidiaries in Germany. It has issued stock in Germany in order to establish its business. It could have issued stock in the United States and then used the proceeds in order to support the growth in Europe. What is a possible advantage of issuing the stock in Germany to finance German operations? Also, why might the German investors prefer to purchase the stock that was issued in Germany rather than purchase the stock of Bloomington on a U.S. stock exchange?

32. Interest Rates Among Countries As of today, the interest rate in Countries X, Y, and Z, are similar. In the next month, Country X is expected to have a weak economy, while Countries Y and Z are expected to experience a 6% increase in economic growth. However, conditions this month will also cause an increase in default risk of borrowers in Country Z in the next month because of political concerns, while the default risk of Countries X and Y remain unchanged. During the next month, which country should have the highest interest rate? Which country should have the lowest interest rate?

Discussion in the Boardroom

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

Running Your Own MNC

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

BLADES, INC. CASE

Decisions to Use International Financial Markets

As a financial analyst for Blades, Inc., you are reasonably satisfied with Blades' current setup of exporting "Speedos" (roller blades) to Thailand. Due to the unique arrangement with Blades' primary customer in Thailand, forecasting the revenue to be generated there is a relatively easy task. Specifically, your customer has agreed to purchase 180,000 pairs of Speedos annually, for a period of 3 years, at a price of THB4,594 (THB = Thai baht) per pair. The current direct quotation of the dollar-baht exchange rate is $0.024.

The cost of goods sold incurred in Thailand (due to imports of the rubber and plastic components from Thailand) runs at approximately THB2,871 per pair of Speedos, but Blades currently only imports materials sufficient to manufacture about 72,000 pairs of Speedos. Blades' primary reasons for using a Thai supplier are the high quality of the components and the low cost, which has been facilitated by a continuing depreciation of the Thai baht against the U.S. dollar. If the dollar cost of buying components becomes more expensive in Thailand than in the United States, Blades is contemplating providing its U.S. supplier with the additional business.

Your plan is quite simple; Blades is currently using its Thai-denominated revenues to cover the cost of goods sold incurred there. During the last year, excess revenue was converted to U.S. dollars at the prevailing exchange rate. Although your cost of goods sold is not fixed contractually as the Thai revenues are, you expect them to remain relatively constant in the near future. Consequently, the baht-denominated cash inflows are fairly predictable each year because the Thai customer has committed to the purchase of 180,000 pairs of Speedos at a fixed price. The excess dollar revenue resulting from the conversion of baht is used either to support the U.S. production of Speedos if needed or to invest in the United States. Specifically, the revenues are used to cover cost of goods sold in the U.S. manufacturing plant, located in Omaha, Nebraska.

Ben Holt, Blades' CFO, notices that Thailand's interest rates are approximately 15 percent (versus 8 percent in the United States). You interpret the high interest rates in Thailand as an indication of the uncertainty resulting from Thailand's unstable economy. Holt asks you to assess the feasibility of investing Blades' excess funds from Thailand operations in Thailand at an interest rate of 15 percent. After you express your opposition to his plan, Holt asks you to detail the reasons in a detailed report.

1. One point of concern for you is that there is a trade-off between the higher interest rates in Thailand and the delayed conversion of baht into dollars. Explain what this means.
2. If the net baht received from the Thailand operation are invested in Thailand, how will U.S. operations be affected? (Assume that Blades is currently paying 10 percent on dollars borrowed and needs more financing for its firm.)
3. Construct a spreadsheet to compare the cash flows resulting from two plans. Under the first plan, net baht-denominated cash flows (received today) will be invested in Thailand at 15 percent for a 1-year period, after which the baht will be converted to dollars. The expected spot rate for the baht in 1 year is about $.022 (Ben Holt's plan). Under the second plan, net baht-denominated cash flows are converted to dollars immediately and invested in the United States for 1 year at 8 percent. For this question, assume that all baht-denominated cash flows are due today. Does Holt's plan seem superior in terms of dollar cash flows available after 1 year? Compare the choice of investing the funds versus using the funds to provide needed financing to the firm.

SMALL BUSINESS DILEMMA

Use of the Foreign Exchange Markets by the Sports Exports Company

Each month, the Sports Exports Company (a U.S. firm) receives an order for footballs from a British sporting goods distributor. The monthly payment for the footballs is denominated in British pounds, as requested by the British distributor. Jim Logan, owner of the Sports Exports Company, must convert the pounds received into dollars.

1. Explain how the Sports Exports Company could utilize the spot market to facilitate the exchange of currencies. Be specific.

2. Explain how the Sports Exports Company is exposed to exchange rate risk and how it could use the forward market to hedge this risk.

INTERNET/EXCEL EXERCISES

The Yahoo! website provides quotations of various exchange rates and stock market indexes. Its website address is www.yahoo.com.

1. Go to the Yahoo! site for exchange rate data (finance.yahoo.com/currency).

a. What is the prevailing direct exchange rate of the Japanese yen?

b. What is the prevailing direct exchange rate of the euro?

c. Based on your answers to questions a and b, show how to determine the number of yen per euro.

d. One euro is equal to how many yen according to the table in Yahoo!?

e. Based on your answer to question d, show how to determine how many euros are equal to one Japanese yen.

f. Click on the euro in the first column in order to generate a historical trend of the direct exchange rate of the euro. Click on 5y to review the euro's exchange rate over the last 5 years. Briefly explain this trend (whether it is mostly upward or downward), and the point(s)at which there was an abrupt shift in the opposite direction.

g. Click on the euro in the column heading in order to generate a historical trend of the indirect exchange rate of the euro. Click on 5y to review the euro's exchange rate over the last 5 years. Briefly explain this trend, and the point(s) at which there was an abrupt shift in the opposite direction. How does this trend of the indirect exchange rate compare to the trend of the direct exchange rate?

h. Based on the historical trend of the direct exchange rate of the euro, what is the approximate percentage change in the euro over the last full year?

i. Just above the foreign exchange table in Yahoo!, there is a currency converter. Use this table to convert euros into Canadian dollars. A historical trend is provided. Explain whether the euro generally appreciated or depreciated against the Canadian dollar over this period.

j. Notice from the currency converter that bid and ask exchange rates are provided. What is the percentage bid/ask spread based on the information?

2. Go to the section on currencies within the website. First, identify the direct exchange rates of foreign currencies from the U.S. perspective. Then, identify the indirect exchange rates. What is the direct exchange rate of the euro? What is the indirect exchange rate of the euro? What is the relationship between the direct and indirect exchange rates of the euro?

3. Use the Yahoo! website to determine the cross exchange rate between the Japanese yen and the Australian dollar. That is, determine how many yen must be converted to an Australian dollar for Japanese importers that purchase Australian products today. How many Australian dollars are equal to a Japanese yen? What is the relationship between the exchange rate measured as number of yen per Australian dollar and the exchange rate measured as number of Australian dollars per yen?

ONLINE ARTICLES WITH REAL-WORLD EXAMPLES

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

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

For recent online articles and real world examples applied to this chapter, consider using the following

search terms and include the prevailing year as a search term to ensure that the online articles are recent:

1. foreign exchange market
2. foreign exchange quotations
3. company AND forward contracts
4. Inc. AND forward contracts
5. international money market
6. loan AND international syndicate
7. international capital market
8. banks AND Basel capital requirements
9. international stock listings
10. American depository receipts

APPENDIX 3

Investing in International Financial Markets

WEB

money.cnn.com
Current national and international market data and analyses.

WEB

www.sec.gov/investor/pubs/ininvest.htm
Information from the Securities and Exchange Commission about international investing.

The trading of financial assets (such as stocks or bonds) by investors in international financial markets has a major impact on MNCs. First, this type of trading can influence the level of interest rates in a specific country (and therefore the cost of debt to an MNC) because it affects the amount of funds available there. Second, it can affect the price of an MNC's stock (and therefore the cost of equity to an MNC) because it influences the demand for the MNC's stock. Third, it enables MNCs to sell securities in foreign markets. So even though international investing in financial assets is not the most crucial activity of MNCs, international investing by individual and institutional investors can indirectly affect the actions and performance of an MNC. Consequently, an understanding of the motives and methods of international investing is necessary to anticipate how the international flow of funds may change in the future and how that change may affect MNCs.

Background on International Stock Exchanges

The international trading of stocks has grown over time but has been limited by three barriers: transaction costs, information costs, and exchange rate risk. But in recent years these barriers have been reduced, as explained here.

Reduction in Transaction Costs

Most countries tend to have their own stock exchanges, where the stocks of local publicly held companies are traded. Recently, however, exchanges have been consolidated within countries; this consolidation has increased efficiency and reduced transaction costs. Some European stock exchanges now have extensive cross-listings so that investors in a given European country can easily purchase stocks of companies based in other European countries.

Trades are normally conducted by electronic communications networks (ECNs), which match buyers and sellers of stocks. These networks do not have a visible trading floor; the trades are executed by a computer network. With an ECN, investors can place orders on their own computers that are then executed by the trader's computer system with the investor receiving confirmation via the Internet. Thus, computers are involved in all stages of the trading process, from placement of the order to confirmation that the transaction has been executed. When there are many more buy orders than sell orders for a given stock, the computer is unable to accommodate all orders. Some buyers will

then increase the price they are willing to pay for the stock. As a result, the price adjusts in response to the demand (buy orders) for the stock and the supply (sell orders) of the stock for sale recorded by the computer system. Similar dynamics would be evident on the trading floor as on the computer, but the computerized system follows documented criteria when prioritizing the execution of orders. In contrast, traders on the floor can execute some trades in ways that favor themselves at the expense of investors.

Impact of Alliances Several stock exchanges have created international alliances with the stock exchanges of other countries, thereby enabling firms to more easily cross-list their shares among various stock markets. This gives investors easier and cheaper access to foreign stocks. The alliances also allow greater integration between markets. At some point in the future, there may be one global stock market in which any stock of any country can be easily purchased or sold by investors around the world. A single global stock market would allow U.S. investors to easily purchase any stock, regardless of where the corporation is based or the currency in which the stock is denominated. The international alliances are a first step toward a single global stock market. The costs of international stock transactions have already been substantially reduced as a result of some of these alliances.

Reduction in Information Costs

The Internet provides investors with access to extensive information about foreign stocks, enabling them to make more informed decisions without having to purchase information about these stocks. Consequently, investors should be more comfortable assessing foreign stocks. Although differences in accounting rules still limit the degree to which financial data about foreign companies can be accurately interpreted or compared to data about firms in other countries, there is some momentum toward making accounting standards uniform across some countries.

Exchange Rate Risk

When investing in a foreign stock that is denominated in a foreign currency, investors are subject to the possibility that the currency denominating the stock may depreciate over time against the investor's currency. The potential for currency depreciation to induce a major decline in the stock's value is greater in emerging markets, such as Indonesia and Russia, where the local currency's value can change by 10 percent or more on a single day.

Measuring the Impact of Exchange Rates The return to a U.S. investor from investing in a foreign stock is a function of the stock's own return R, which includes the dividend, and the percentage change in the exchange rate e; thus:

$$R_S = (1 + R)(1 + e) - 1$$

EXAMPLE A year ago, Rob Grady invested in the stock of Vopka, a Russian company. Over the last year, the stock increased in value by 35 percent. Over this same period, however, the Russian ruble's value declined by 30 percent. Rob sold the Vopka stock today. His return is:

$$\begin{aligned} R_S &= (1 + R)(1 + e) - 1 \\ &= (1 + .35)[1 + (-.30)] - 1 \\ &= -.055 \text{ or } -5.5\% \end{aligned}$$

Even though the return on this stock was more pronounced than the exchange rate movement, Rob lost money on his investment. The reason is that the exchange rate movement of −30 percent wiped out not only 30 percent of his initial investment but also 30 percent of the stock's return. ●

As the preceding example illustrates, investors should consider the potential influence of exchange rate movements on foreign stocks before investing in them. Foreign investments are especially risky in developing countries, where exchange rates tend to be volatile.

Reducing the Exchange Rate Risk of Foreign Stocks One method of reducing exchange rate risk is to take short positions in the foreign currencies denominating the foreign stocks. For example, a U.S. investor holding Mexican stocks who expects the stocks to be worth 10 million Mexican pesos one year from now could sell forward contracts (or futures contracts) representing 10 million pesos. The stocks could be liquidated at that time, and the pesos could be exchanged for dollars at a locked-in price.

Although hedging the exchange rate risk of an international stock portfolio can be effective, it has three limitations. First, the number of foreign currency units to be converted to dollars at the end of the investment horizon is unknown. If the units received from liquidating the foreign stocks are more (less) than the amount hedged, then the investor has a net long (short) position in that foreign currency and so the return will be unfavorably affected by its depreciation (appreciation). Yet even though the hedge is therefore imperfect, investors can usually hedge most of their exchange rate risk.

A second limitation of hedging exchange rate risk is that the investors may decide to retain the foreign stocks beyond the initially planned investment horizon. Of course, they can create another forward contract after the initial forward contract is completed. If they ever decide to liquidate the foreign stocks prior to the forward delivery date, the hedge will be less effective. They could use the proceeds to invest in foreign money market securities denominated in that foreign currency in order to postpone conversion to dollars until the forward delivery date. However, this prevents them from using the funds for other opportunities until that delivery date.

A third limitation of hedging is that forward rates for less widely traded currencies may not exist or may exhibit a large discount.

International Stock Diversification

A substantial amount of research has demonstrated that investors in stocks can benefit by diversifying internationally. The stocks of most firms are strongly influenced by the countries where those firms reside (although some firms are more vulnerable than others to economic conditions).

Since stock markets partially reflect the current and/or forecasted state of their respective countries' economies, they do not move in tandem. Thus, the value of particular stocks that are listed in the various markets are not expected to be highly correlated. This contrasts with a purely domestic portfolio, in which most stocks often move in the same direction and by similar magnitudes.

The risk of a stock portfolio can be measured by its volatility. Investors prefer a less volatile stock portfolio because its future returns are less subject to uncertainty. The volatility of a single stock is commonly measured by its standard deviation of returns over a recent period, and the same holds for the volatility of a stock portfolio. The standard deviation of a stock portfolio is determined by the standard deviation of returns for each individual stock along with the correlations of returns between each pair of stocks in the portfolio. Thus, for a two-stock portfolio:

$$\sigma_p = \sqrt{w_X^2\sigma_X^2 + w_Y^2\sigma_Y^2 + 2w_X w_Y \sigma_X \sigma_Y (\mathbf{CORR}_{XY})}$$

Here w_X is the proportion of funds invested in stock X, w_Y is the proportion of funds invested in stock Y, σ_X is the standard deviation of returns for stock X, σ_Y is the standard

WEB

finance.yahoo.com/intlindices?u
Charts showing recent stock market performance for each market. The prevailing stock index level is shown for each country as well as the performance of each market during the previous day. For some markets, you can assess the performance over the last year by clicking on Chart next to the country's name.

deviation of returns for stock Y, and $CORR_{XY}$ is the correlation coefficient of returns between stock X and stock Y. From this equation, it should be clear that the standard deviation of returns (and therefore the risk) of a stock portfolio is positively related to the standard deviation of the individual stocks included within the portfolio and is also positively related to the correlations between individual stock returns.

Much research has documented that stock returns are driven by their country market conditions. Therefore, individual stocks within a given country tend to be highly correlated. If country economies are segmented then their stock market returns should not be highly correlated, so the individual stocks of one country are not highly correlated with individual stocks of other countries. Thus, investors should be able to reduce the risk of their stock portfolio by investing in stocks among different countries.

Limitations of International Diversification In general, correlations between stock indexes have been higher in recent years than they were several years ago. The general increase in correlations among stock market returns may have implications for MNCs that attempt to diversify internationally. To the extent that stock prices in each market reflect anticipated earnings, the increased correlations may suggest that more highly correlated anticipated earnings are expected among countries. Thus, the potential risk-reduction benefits to an MNC that diversifies its business may be limited.

One reason for the increased correlations among stock market returns is increased integration of business between countries. Increased integration results in more inter-country flow of trade and capital, which increases the influence of each country on other countries. In particular, many European countries have become more integrated as regulations have been standardized throughout Europe to facilitate trade between countries. In addition, the adoption of the euro has removed exchange rate risk due to trade between participating countries.

Valuation of Foreign Stocks

When investors consider investing in foreign stocks, they need methods for valuing those stocks.

Dividend Discount Model

One valuation possibility is to use the dividend discount model with an adjustment to accommodate expected exchange rate movements. Foreign stocks pay dividends in the currency in which they are denominated. Thus, the cash flow per period to U.S. investors is the dividend (denominated in the foreign currency) multiplied by the value of that foreign currency in dollars. The dividend can normally be forecast with more accuracy than the value of the foreign currency. Because of exchange rate uncertainty, the value of the foreign stock from a U.S. investor's perspective is subject to much uncertainty.

Price/Earnings Method

An alternative method of valuing foreign stocks is to apply price/earnings ratios. The expected earnings per share of the foreign firm are multiplied by the appropriate price/earnings ratio (based on the firm's risk and industry) to determine the appropriate price of the firm's stock. Although this method is easy to use, it is subject to some limitations when applied to valuing foreign stocks. The price/earnings ratio for a given industry may change continuously in some foreign markets, especially when the industry consists of only a few firms. It is therefore difficult to determine what price/earnings ratio should

be applied to a specific foreign firm. In addition, the price/earnings ratio for any particular industry may need to be adjusted for the firm's country, since reported earnings can be influenced by the firm's accounting guidelines and tax laws. Furthermore, even if U.S. investors are comfortable with their estimate of the proper price/earnings ratio, the value derived by this method is denominated in the foreign currency (since the estimated earnings are denominated in that currency). Therefore, U.S. investors would still need to consider exchange rate effects. Even if the stock is undervalued in the foreign country, it may not generate a reasonable return for U.S. investors if the foreign currency depreciates against the dollar.

Other Methods

Some investors adapt these methods when selecting foreign stocks. For example, they may first assess the macroeconomic conditions of all countries to screen out those that are expected to experience poor conditions in the future. Then they use other methods, such as the dividend discount model or the price/earnings approach, to value specific firms within the countries that are appealing.

Why Stock Valuations Differ among Countries

A stock that seems undervalued to investors in one country may seem overvalued to investors in another country. Some of the more common reasons why perceptions of a stock's valuation may vary among investors in different countries are discussed next.

Required Rate of Return Some investors attempt to value a stock according to the present value of the future cash flows that it will generate. The dividend discount model is one of many models that employ this approach. The required rate of return that is used to discount the cash flows can vary substantially among countries, but it is always based on the prevailing risk-free interest rate available to investors plus a risk premium. For investors in the United States, the risk-free rate is typically less than 10 percent. Therefore, U.S. investors would in some cases apply a 12–15 percent required rate of return. In contrast, investors in an emerging country that has a high risk-free rate would be unwilling to accept such a low return. If they can earn a high return by investing in a risk-free asset, they would require a still higher return to invest in risky assets such as stocks.

Exchange Rate Risk The exposure of investors to exchange rate risk from investing in foreign stocks depends on their home country. Investors in the United States who invest in a Brazilian stock are highly exposed to exchange rate risk because the Brazilian currency (the real) has depreciated substantially against the dollar over time. However, Brazilian investors are less exposed to exchange rate risk when investing in U.S. stocks because the U.S. dollar is unlikely to depreciate significantly against the Brazilian real. In fact, Brazilian investors normally benefit from investing in U.S. stocks owing to the dollar's appreciation against the real. Indeed, that appreciation is often necessary to generate an adequate return for Brazilian investors, given their high required return when investing in foreign stocks.

Taxes The tax effects of dividends and capital gains also vary among countries. The lower a country's tax rates, the higher the share of pretax cash flows received that the investor can retain. Other things being equal, investors based in low-tax countries should value stocks higher.

The valuation of stocks by investors within a given country changes in response to changes in tax laws. Before 2003, dividend income received by U.S. investors was taxed at ordinary income tax rates, which could be nearly 40 percent for some taxpayers.

This explains why many U.S. investors placed higher valuations on foreign stocks that paid low or no dividends (especially investors who were not reliant on the stocks for periodic income). The maximum tax on long-term capital gains during this period was 20 percent, a rate that increased the attractiveness of foreign stocks that paid no dividends but had the potential to generate large capital gains. In 2003, however, the maximum tax rate on both dividends and long-term capital gains was set at 15 percent. Thereafter, U.S. investors became more willing to consider foreign stocks that paid high dividends.

Methods Used to Invest Internationally

For investors attempting international stock diversification, five common approaches are available:

- direct purchases of foreign stocks,
- investment in MNC stocks,
- American depository receipts (ADRs),
- exchange-traded funds (ETFs), and
- international mutual funds (IMFs).

Each approach is discussed in turn.

Direct Purchases of Foreign Stocks

Foreign stocks can be purchased on foreign stock exchanges. Such purchases require the services of brokerage firms that can execute the trades desired by investors at the foreign stock exchange of concern. However, this approach is inefficient because of market imperfections such as insufficient information, transaction costs, and tax differentials among countries.

An alternative method of investing directly in foreign stocks is to purchase stocks of foreign companies that are sold on the local stock exchange. In the United States, for example, Royal Dutch Shell (of the Netherlands), Sony (of Japan), and many other foreign stocks are sold on U.S. stock exchanges. Because the number of foreign stocks listed on any local stock exchange is typically quite limited, this method by itself may not be adequate to achieve the full benefits of international diversification.

Brokerage firms have expanded the list of non-U.S. stocks that are available to U.S. investors. For example, Fidelity now executes stock transactions in many different countries for its U.S. investors. The transaction cost of investing directly in foreign stocks is higher than that of purchasing stocks on U.S. stock exchanges. One reason for the higher cost is that the foreign shares purchased by U.S. investors typically remain in the foreign country, and there is a cost of storing the stocks and processing records of ownership. Some brokerage firms have substantially reduced their fees for international stock transactions recently; however, they may require a larger minimum transaction value (such as $5,000) to execute the transaction. The fees may even vary among foreign stocks at a given brokerage firm. For example, the fees charged by E*Trade for executing foreign stock transactions vary with the home country of the stock.

Investment in MNC Stocks

The operations of an MNC are a form of international diversification. Like an investor with a well-managed stock portfolio, an MNC can reduce risk (variability in net cash flows) by diversifying sales not only among industries but also among countries. In this

sense, the MNC as a single firm can achieve stability similar to that of an internationally diversified stock portfolio.

If MNC stocks behave like an international stock portfolio, then they should be sensitive to the stock markets of the various countries in which they operate. Yet some studies have found MNCs based in a particular country are typically affected only by their respective local stock markets and not by other stock market movements. This finding suggests that the diversification benefits from investing in an MNC are limited.

American Depository Receipts

WEB

www.adr.com
Performance of ADRs.

Another approach to investing internationally is to purchase American depository receipts (ADRs), which are certificates representing ownership of foreign stocks. More than 1,000 ADRs are available in the United States, and most are traded on the over-the-counter (OTC) stock market. An investment in ADRs may be an adequate substitute for direct investment in foreign stocks.

Exchange-Traded Funds

WEB

finance.yahoo.com/etf
Performance of ETFs.

Although investors have closely monitored international stock indexes for years, they were typically unable to invest directly in these indexes. The index was simply a measure of performance for a set of stocks but was not traded. Exchange-traded funds (ETFs) are indexes that reflect composites of stocks for particular countries; they were created so that investors could invest directly in a stock index representing any one of several countries. Note that ETFs are sometimes referred to as world equity benchmark shares (WEBS) or as iShares.

International Mutual Funds

One last approach to consider is purchasing shares of **international mutual funds (IMFs)**, which are portfolios of stocks from various countries. Several investment firms, such as Fidelity and Vanguard, have constructed IMFs for their customers. Like domestic mutual funds, IMFs are popular because of (1) the low minimum investment necessary to participate in the funds, (2) the presumed expertise of the portfolio managers, and (3) the high degree of diversification achieved by the portfolios' inclusion of several stocks. Many investors believe an IMF can better reduce risk than a purely domestic mutual fund because the IMF includes foreign securities. An IMF represents a prepackaged portfolio, so investors who use it do not need to construct their own portfolios. Even for those who normally prefer to construct their own portfolios, the existence of numerous IMFs on the market today allows investors to select the one that most closely resembles the type of portfolio that they would construct. In addition, some investors are more comfortable when a professional manager is in charge of the international portfolio.

4 Exchange Rate Determination

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- explain how exchange rate movements are measured,
- explain how the equilibrium exchange rate is determined,
- examine factors that affect the equilibrium exchange rate,
- explain the movements in cross exchange rates, and
- explain how financial institutions attempt to capitalize on anticipated exchange rate movements.

Financial managers of MNCs that conduct international business must continuously monitor exchange rates because their cash flows are highly dependent on them. They need to understand what factors influence exchange rates so that they can anticipate how exchange rates may change in response to specific conditions. This chapter provides a foundation for understanding how exchange rates are determined.

4-1 Measuring Exchange Rate Movements

Exchange rate movements affect an MNC's value because they can affect the amount of cash inflows received from exporting or from a subsidiary and the amount of cash outflows needed to pay for imports. An exchange rate measures the value of one currency in units of another currency. As economic conditions change, exchange rates can change substantially. A decline in a currency's value is known as **depreciation**. When the British pound depreciates against the U.S. dollar, this means that the U.S. dollar is strengthening relative to the pound. An increase in currency value is known as **appreciation**.

When a foreign currency's spot rate at two different times are compared, the spot rate at the more recent date is denoted S and the spot rate at the earlier date is denoted as S_{t-1}. The percentage change in the value of the foreign currency is then computed as follows:

$$\text{Percent } \Delta \text{ in foreign currency value} = \frac{S - S_{t-1}}{S_{t-1}}$$

A positive percentage change indicates that the foreign currency has appreciated, and a negative percentage change indicates that it has depreciated. The values of some currencies have changed as much as 10 percent over a 24-hour period.

On some days, most foreign currencies appreciate against the dollar (although by different degrees); on other days, most currencies depreciate against the dollar (though again by different degrees). There are also days when some currencies appreciate while others depreciate against the dollar; the financial media describe this scenario by stating that "the dollar was *mixed* in trading."

WEB

www.xe.com/ict
Real-time exchange rate quotations.

EXAMPLE

Exchange rates for the Canadian dollar and the euro are shown in the second and fourth columns of Exhibit 4.1 for the months from January 1 to July 1. First, observe that the direction of the movement may persist for consecutive months in some cases but in other cases may not persist at all. The magnitude of the movement tends to vary every month, although the range of percentage movements over these months is a reasonable indicator of the range of percentage movements in

Exhibit 4.1 How Exchange Rate Movements and Volatility Are Measured

	VALUE OF CANADIAN DOLLAR (C$)	MONTHLY % CHANGE IN C$	VALUE OF EURO	MONTHLY % CHANGE IN EURO
Jan. 1	$0.70	—	$1.18	—
Feb. 1	$0.71	1.43%	$1.16	−1.69%
March 1	$0.70	−0.99%	$1.15	−0.86%
April 1	$0.70	−0.85%	$1.12	−2.61%
May 1	$0.69	−0.72%	$1.11	−0.89%
June 1	$0.70	+0.43%	$1.14	+2.70%
July 1	$0.69	−1.29%	$1.17	+2.63%
Standard deviation of monthly changes		1.04%		2.31%

WEB

www.bis.org/statistics/eer/index.htm
Information on how each currency's value has changed against a broad index of currencies.

future months. A comparison of the movements in these two currencies suggests that they move independently of each other.

The movements in the euro are typically larger (regardless of direction) than movements in the Canadian dollar. This means that, from a U.S. perspective, the euro is a more volatile currency. The standard deviation of the exchange rate movements for each currency (shown at the bottom of the table) confirms this point. The standard deviation should be applied to percentage movements (not to the actual exchange rate values) when comparing volatility among currencies. From the U.S. perspective, some currencies (such as the Australian dollar, Brazilian real, Mexican peso, New Zealand dollar) tend to exhibit higher volatility than does the euro. Financial managers of MNCs closely monitor the volatility of any currencies to which they are exposed, because a more volatile currency has more potential to deviate far from what is expected and could have a major impact on their cash flows. ●

Foreign exchange rate movements tend to be larger for longer time horizons. Thus, if *yearly* exchange rate data were assessed then the movements would be more volatile for each currency than what is shown here, but the euro's movements would still be more volatile than the Canadian dollar's movements. If *daily* exchange rate movements were assessed then the movements would be less volatile for each currency than shown here, but the euro's movements would still be more volatile than the Canadian dollar's movements. A review of daily exchange rate movements is important to an MNC that will need to obtain a foreign currency in a few days and wants to assess the possible degree of movement over that period. A review of annual exchange movements would be more appropriate for an MNC that conducts foreign trade every year and wants to assess the possible degree of movements on a yearly basis. Many MNCs review exchange rates based on both short- and long-term horizons because they expect to engage in international transactions in both the near and distant future.

WEB

www.federalreserve.gov/releases
Current and historic exchange rates.

4-2 Exchange Rate Equilibrium

Although it is easy to measure the percentage change in a currency's value, it is more difficult to explain why the value changed or to forecast how it may change in the future. To achieve either of these objectives, the concept of an **equilibrium exchange rate** must be understood in addition to the factors that affect this rate.

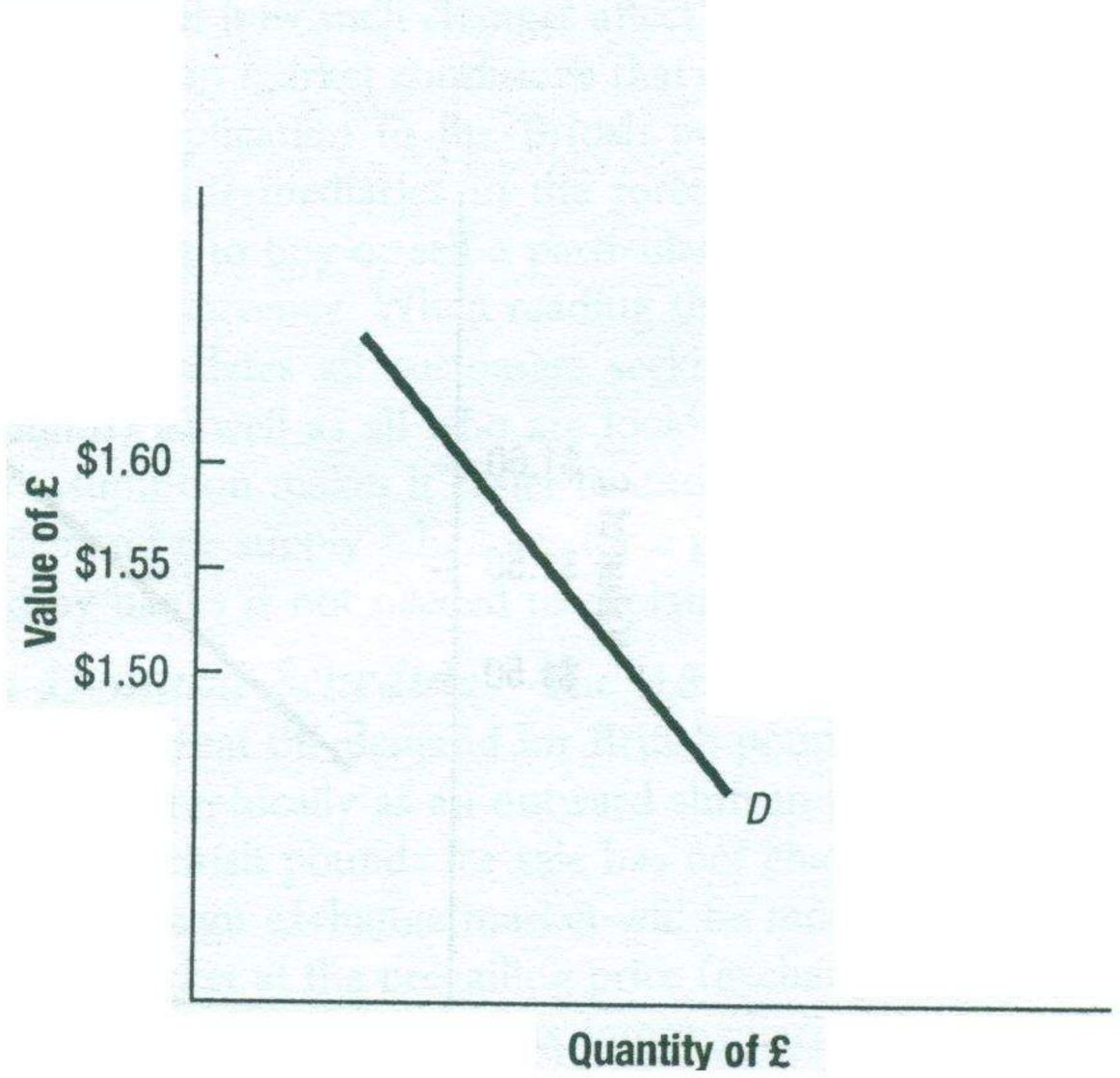
Before considering why an exchange rate changes, recall that an exchange rate (at a given time) represents the *price* of a currency, or the rate at which one currency can be exchanged for another. The exchange rate always involves two currencies, but the focus in this text is the U.S. perspective. So unless specified otherwise, the "exchange rate" of any currency is the rate at which it can be exchanged for U.S. dollars.

Like any other product sold in markets, the price of a currency is determined by the demand for that currency relative to its supply. Thus, for each possible price of a British pound, there is a corresponding demand for pounds and a corresponding supply of pounds for sale (to be exchanged for dollars). At any given moment, a currency should exhibit the price at which the demand for that currency is equal to supply; this is the equilibrium exchange rate. Of course, conditions can change over time. These changes induce adjustments in the supply of or demand for any currency of interest, which in turn creates movement in the currency's price. A thorough discussion of this topic follows.

4-2a Demand for a Currency

The British pound is used here to explain exchange rate equilibrium. The United Kingdom has not adopted the euro as its currency and continues to use the pound. The U.S. demand for British pounds results partly from international trade, as U.S. firms obtain British pounds to purchase British products. In addition, there is U.S. demand for pounds due to international capital flows, as U.S. firms and investors obtain pounds to invest in British securities. Exhibit 4.2 shows a hypothetical number of pounds that would be demanded under several different values of the exchange rate. At any point in time, there is only one exchange rate; the exhibit shows how many pounds would be demanded at various exchange rates for a given time. This *demand schedule* is downward sloping because corporations and individuals in the United States would purchase more British goods when the pound is worth less (since then it takes fewer dollars to obtain the desired amount of pounds). Conversely, if the pound's exchange rate is high then corporations and individuals in the United States are less willing to purchase British goods (since the products or securities could be acquired at a lower price in the United States or other countries).

Exhibit 4.2 Demand Schedule for British Pounds



4-2b Supply of a Currency for Sale

Having considered the U.S. demand for pounds, the next step is to consider the British demand for U.S. dollars. This can be viewed as a British *supply of pounds for sale,* since pounds are supplied in the foreign exchange market in exchange for U.S. dollars.

A supply schedule of pounds for sale in the foreign exchange market can be developed in a manner similar to the demand schedule for pounds. Exhibit 4.3 shows the quantity of pounds for sale (supplied to the foreign exchange market in exchange for dollars) corresponding to each possible exchange rate at a given time. One can clearly see a positive relationship between the value of the British pound and the quantity of British pounds for sale (supplied), which is explained as follows. When the pound's valuation is high, British consumers and firms are more willing to exchange their pounds for dollars to purchase U.S. products or securities; hence they supply a greater number of pounds to the market to be exchanged for dollars. Conversely, when the pound's valuation is low, the supply of pounds for sale (to be exchanged for dollars) is smaller, reflecting less British desire to obtain U.S. goods.

4-2c Equilibrium

The demand and supply schedules for British pounds are combined in Exhibit 4.4 for a given moment in time. At an exchange rate of $1.50, the quantity of pounds demanded would exceed the supply of pounds for sale. Consequently, the banks that provide foreign exchange services would experience a *shortage* of pounds at that exchange rate. At an exchange rate of $1.60, the quantity of pounds demanded would be less than the supply of pounds for sale; in this case, banks providing foreign exchange services would experience a *surplus* of pounds at that exchange rate. According to Exhibit 4.4, the equilibrium exchange rate is $1.55 because this rate equates the quantity of pounds demanded with the supply of pounds for sale.

Exhibit 4.3 Supply Schedule of British Pounds for Sale

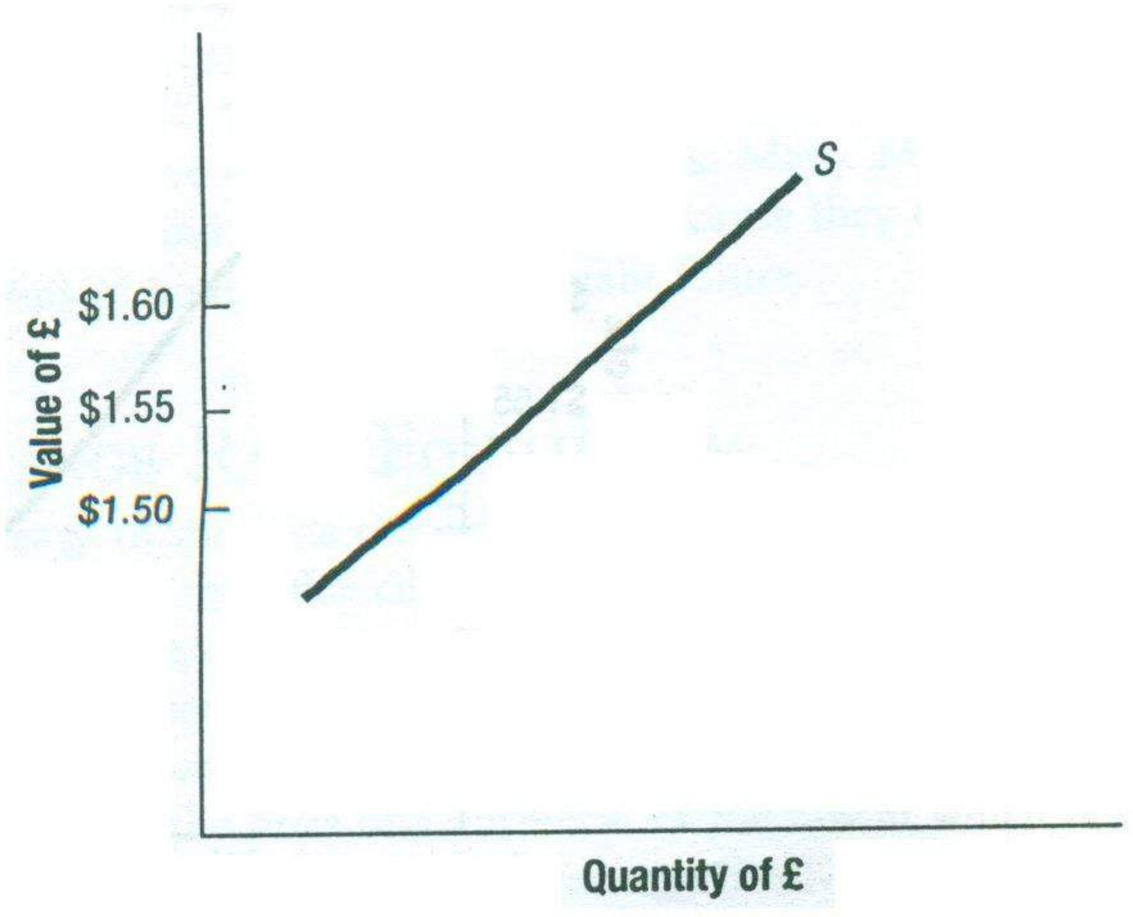
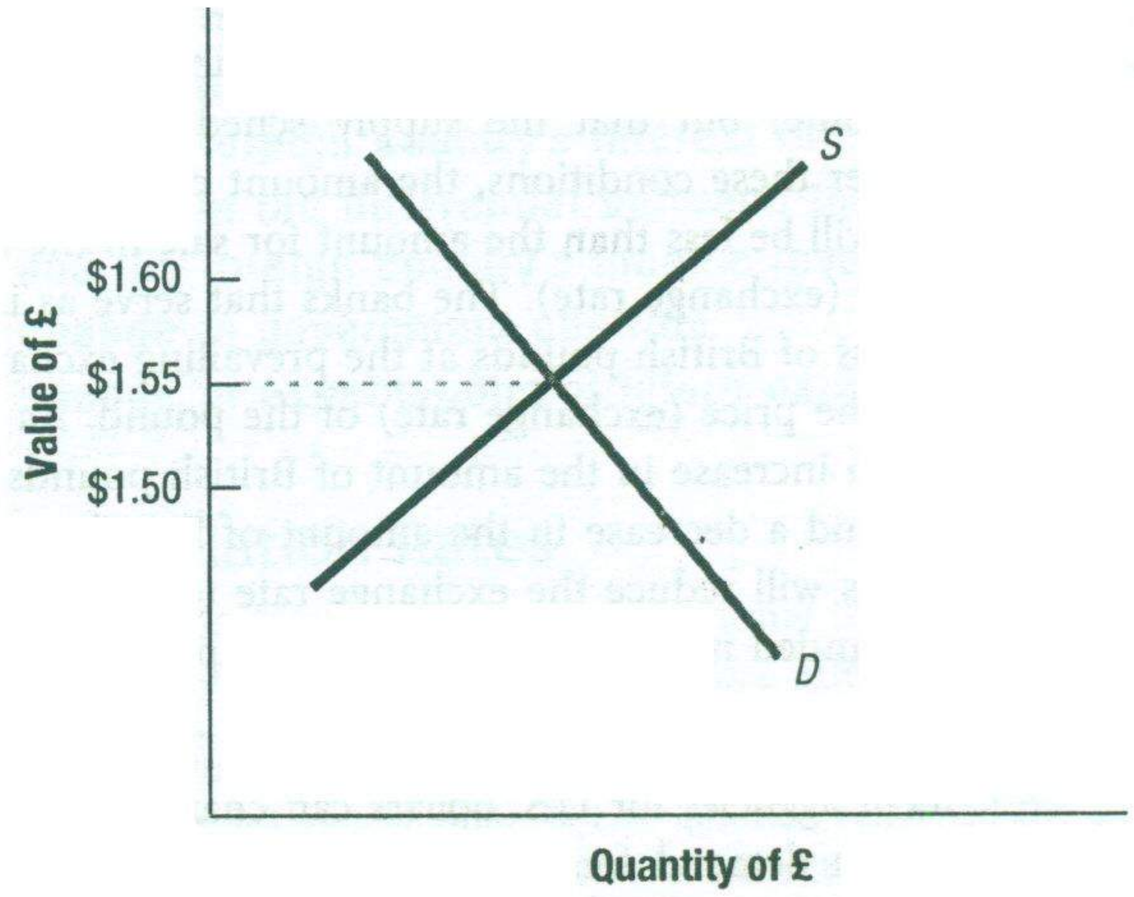


Exhibit 4.4 Equilibrium Exchange Rate Determination



4-2d Change in the Equilibrium Exchange Rate

Changes in the demand and supply schedules of a currency force a change in the equilibrium exchange rate in the foreign exchange market. Before considering the factors that could cause changes in the demand and supply schedules of a currency, it is important to understand the logic of how such changes affect the equilibrium exchange rate. There are four possible changes in market conditions that can affect this rate, and each condition is explained with an application to the British pound. The exchange rate varies because banks that serve as intermediaries in the foreign exchange market adjust the price at which they are willing to buy or sell a particular currency in the face of a sudden shortage or excess of that currency. When reading the descriptions that follow, assume that a single bank accommodates all customers seeking to buy British pounds (to exchange dollars for pounds) as well as all who are looking to sell them (to exchange pounds for dollars). This assumption makes it easier to understand why the exchange rate adjusts to shifts in the demand or supply schedules for a particular currency. Note that the bid/ask spread quoted by banks is not needed to explain this connection.

Increase in Demand Schedule The U.S. demand for British pounds can change at any time. Assume that the demand for British pounds in the foreign exchange market increases (depicted graphically as an outward shift in the demand schedule) but that the supply schedule of British pounds for sale has not changed. Then the amount of pounds demanded in the foreign exchange market will be more than the amount for sale in the foreign exchange market at the prevailing price (exchange rate), resulting in a shortage of British pounds. The banks that serve as intermediaries in the foreign exchange market will not have enough British pounds to accommodate demand for pounds at the prevailing exchange rate. These banks will respond by raising the price (exchange rate) of the pound. As they raise the exchange rate, there will be a decline in the amount of British pounds demanded in the foreign exchange market as well as an increase in the amount

of British pounds supplied (sold) in the foreign exchange market. The banks will increase the exchange rate to the level at which the amount of British pounds demanded is equal to the amount of British pounds supplied in the foreign exchange market.

Decrease in Demand Schedule Now suppose that conditions cause the demand for British pounds to decrease (depicted graphically as an inward shift in the demand schedule) but that the supply schedule of British pounds for sale has not changed. Under these conditions, the amount of pounds demanded in the foreign exchange market will be less than the amount for sale in the foreign exchange market at the prevailing price (exchange rate). The banks that serve as intermediaries in this market will have an excess of British pounds at the prevailing exchange rate, and they will respond by lowering the price (exchange rate) of the pound. As they reduce the exchange rate, there will be an increase in the amount of British pounds demanded in the foreign exchange market and a decrease in the amount of British pounds supplied (sold) in that market. The banks will reduce the exchange rate to the level at which the amount of British pounds demanded is equal to the amount supplied in the foreign exchange market.

Increase in Supply Schedule The demand of British firms, consumers, or government agencies for U.S. dollars can change at any time. Assume that conditions cause that British demand for U.S. dollars to increase. Then there is an increase in the amount of British pounds to be supplied (exchanged for dollars) in the foreign exchange market (depicted graphically as an outward shift in the supply schedule) even though the demand schedule for British pounds has not changed. In this case, the amount of the currency supplied in the foreign exchange market will exceed the amount of British pounds demanded in that market at the prevailing price (exchange rate), resulting in a surplus of British pounds. The banks that serve as intermediaries in the foreign exchange market will respond by reducing the price of the pound. As they reduce the exchange rate, there will be an increase in the amount of British pounds demanded in the foreign exchange market. The banks will reduce the exchange rate to the level at which the amount of British pounds demanded is equal to the amount of British pounds supplied (sold) in the foreign exchange market.

Decrease in Supply Schedule Now assume that conditions cause British firms, consumers, and government agencies to need fewer U.S. dollars. Hence there is a decrease in the supply of British pounds to be exchanged for dollars in the foreign exchange market (depicted graphically as an inward shift in the supply schedule), although the demand schedule for British pounds has not changed. In this case, the amount of pounds supplied will be less than the amount demanded in the foreign exchange market at the prevailing price (exchange rate), resulting in a shortage of British pounds. Banks that serve as intermediaries in the foreign exchange market will respond by increasing the price (exchange rate) of the pound. As they increase the exchange rate, there will be an reduction in the amount of British pounds demanded and an increase in the amount of British pounds supplied. The banks will increase the exchange rate to the level at which the amount of British pounds demanded is equal to the amount of British pounds supplied (sold) in the foreign exchange market.

4-3 Factors That Influence Exchange Rates

The factors that cause currency supply and demand schedules to change are discussed next by relating each factor's influence to the demand and supply schedules graphed in Exhibit 4.4. The following equation summarizes the factors that can influence a currency's spot rate:

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

where

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

WEB

www.bloomberg.com
Latest information from financial markets around the world.

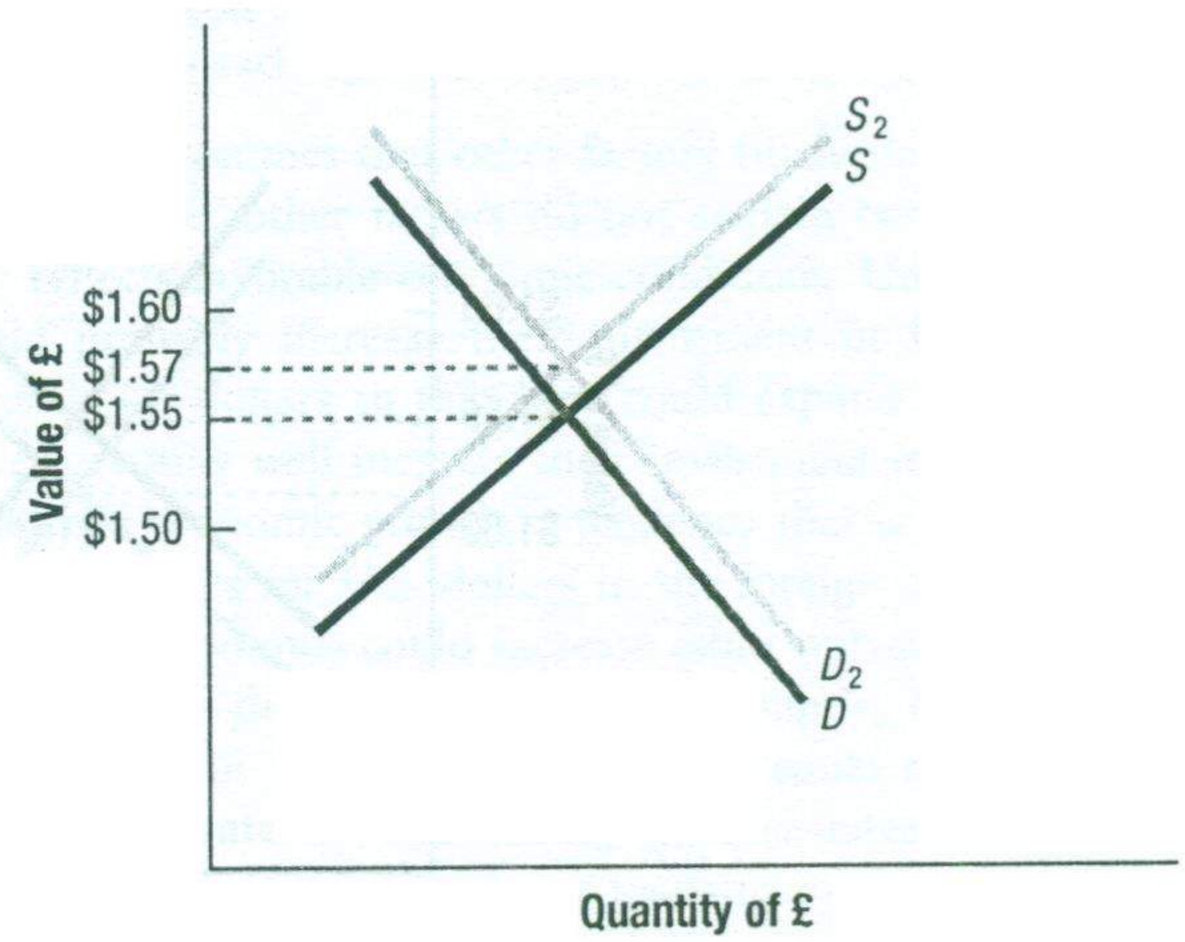
4-3a Relative Inflation Rates

Changes in relative inflation rates can affect international trade activity, which influences the demand for and supply of currencies and therefore affects exchange rates.

EXAMPLE Consider how the demand and supply schedules displayed in Exhibit 4.4 would be affected if U.S. inflation suddenly increased substantially while British inflation remained the same. (Assume that both British and U.S. firms sell goods that can serve as substitutes for each other.) The sudden jump in U.S. inflation should cause some U.S. consumers to buy more British products instead of U.S. products. At any given exchange rate, there would be an increase in the U.S. demand for British goods, which represents an increase in the U.S. demand for British pounds in Exhibit 4.5.

In addition, the jump in U.S. inflation should reduce the British desire for U.S. goods and thereby reduce the supply of pounds for sale at any given exchange rate. These market reactions are illustrated in Exhibit 4.5. At the previous equilibrium exchange rate of $1.55, there will now be a shortage of pounds in the foreign exchange market. The increased U.S. demand for pounds and the reduced supply of pounds for sale together place upward pressure on the value of the pound. According to Exhibit 4.5, the new equilibrium value is $1.57. If British inflation increased (rather than U.S. inflation), the opposite dynamic would prevail. ●

Exhibit 4.5 Impact of Rising U.S. Inflation on Equilibrium Value of the British Pound



EXAMPLE

Assume there is a sudden and substantial increase in British inflation while U.S. inflation remains low. (1) How is the demand schedule for pounds affected? (2) How is the supply schedule of pounds for sale affected? (3) Will the new equilibrium value of the pound increase, decrease, or remain unchanged? Given the described circumstances, the answers are as follows. (1) The demand schedule for pounds should shift inward. (2) The supply schedule of pounds for sale should shift outward. (3) The new equilibrium value of the pound will decrease. Of course, the actual amount by which the pound's value will decrease depends on the magnitude of the shifts. Not enough information is given here to determine their exact magnitude. ●

In reality, the actual demand and supply schedules, and therefore the true equilibrium exchange rate, will reflect several factors simultaneously. The purpose of the preceding example is to demonstrate how the change in a single factor (higher inflation) can affect an exchange rate. Each factor can be assessed in isolation to determine its effect on exchange rates while holding all other factors constant. Then, all factors can be tied together to fully explain exchange rate movements.

4-3b Relative Interest Rates

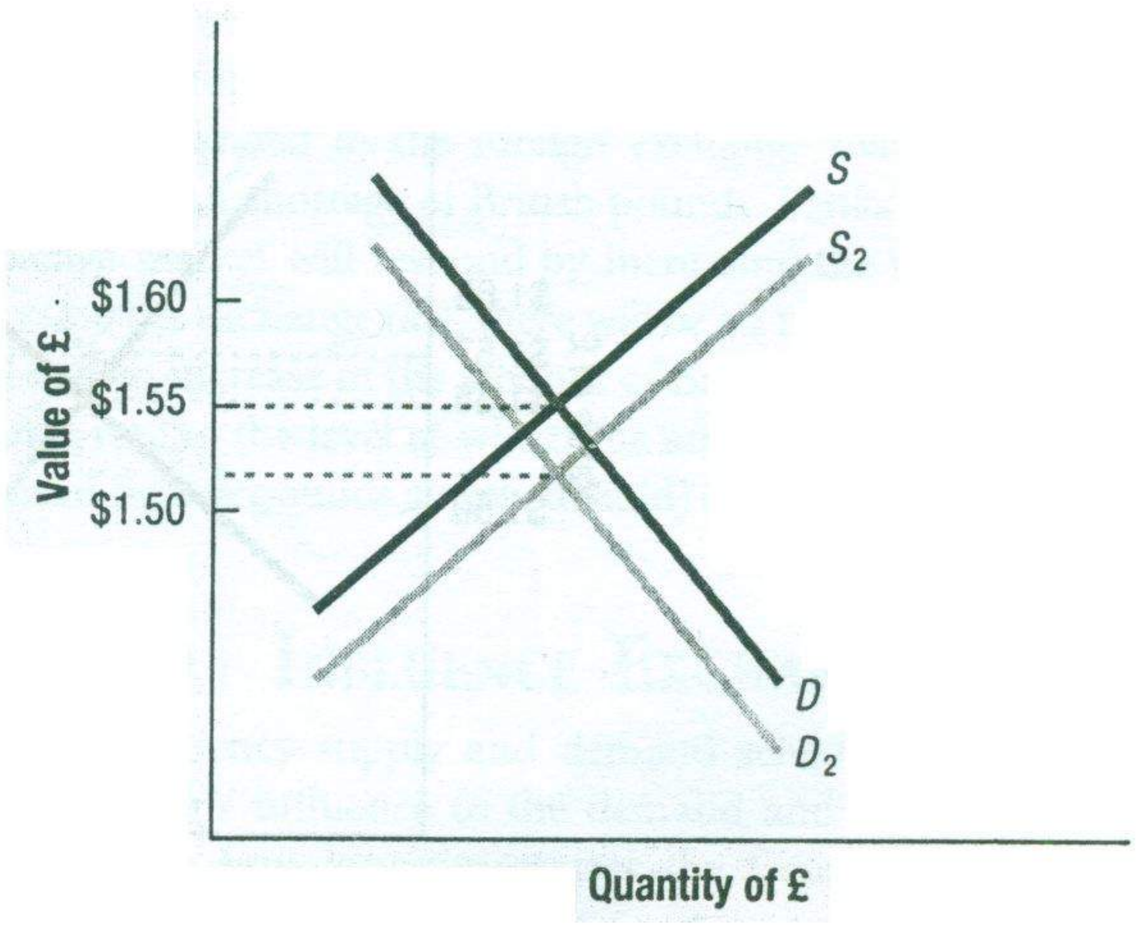
Changes in relative interest rates affect investment in foreign securities, which influences the demand for and supply of currencies and thus affects the equilibrium exchange rate.

EXAMPLE

Assume that U.S. and British interest rates are initially equal but then U.S. interest rates rise while British rates remain constant. Then U.S. investors will likely reduce their demand for pounds, since U.S. rates are now more attractive than British rates.

Because U.S. rates will now look more attractive to British investors with excess cash, the supply of pounds for sale by British investors should increase as they establish more bank deposits in the United States. In response to this inward shift in the demand for pounds and outward shift in the supply of pounds for sale, the equilibrium exchange rate should decrease. These movements are represented graphically in Exhibit 4.6. If U.S. interest rates decreased relative to British interest rates, then the opposite shifts would be expected. ●

Exhibit 4.6 Impact of Rising U.S. Interest Rates on Equilibrium Value of the British Pound



To ensure that you understand these effects, predict the shifts in both the supply and demand curves for British pounds as well as the likely impact of these shifts on the pound's value under the following scenario.

EXAMPLE

Assume that U.S. and British interest rates are initially equal but then British interest rates rise while U.S. rates remain constant. Then British interest rates may become more attractive to U.S. investors with excess cash, which would cause the demand for British pounds to increase. At the same time, the U.S. interest rates should look less attractive to British investors and so the British supply of pounds for sale would decrease. Given this outward shift in the demand for pounds and inward shift in the supply of pounds for sale, the pound's equilibrium exchange rate should increase. ●

WEB

http://research.stlouisfed.org/fred2 Numerous economic and financial time series, including balance-of-payment statistics and interest rates.

Real Interest Rates Although a relatively high interest rate may attract foreign inflows (to invest in securities offering high yields), that high rate may reflect expectations of relatively high inflation. Because high inflation can place downward pressure on the local currency, some foreign investors may be discouraged from investing in securities denominated in that currency. In such cases it is useful to consider the **real interest rate**, which adjusts the nominal interest rate for inflation:

$$\text{Real interest rate} = \text{Nominal interest rate} - \text{Inflation rate}$$

This relationship is sometimes called the Fisher effect.

The real interest rate is appropriate for international comparisons of exchange rate movements because it incorporates both the nominal interest rate and inflation, each of which influences exchange rates. Other things held constant, a high U.S. real rate of interest (relative to other countries) tends to boost the dollar's value.

4-3c Relative Income Levels

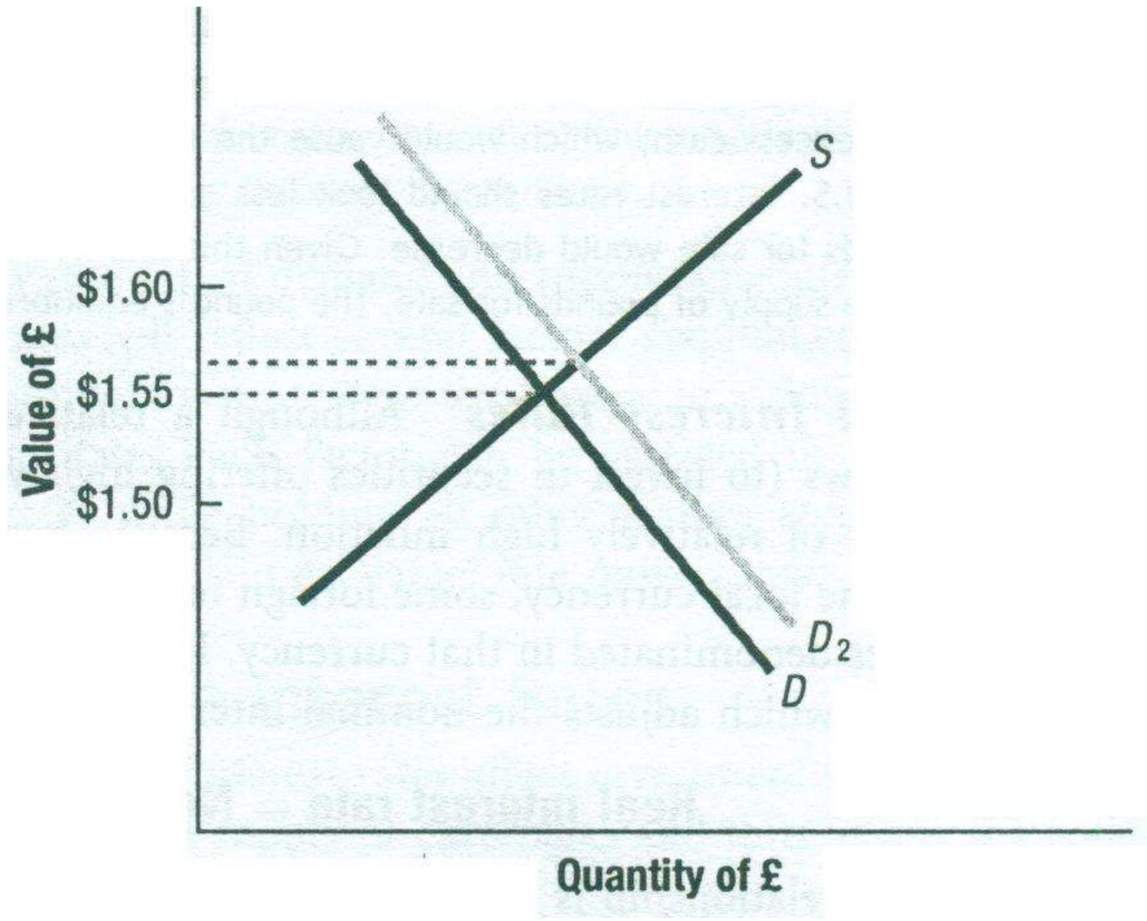
A third factor affecting exchange rates is relative income levels. Because income can affect the amount of imports demanded, it can also affect exchange rates.

EXAMPLE

Assume that the U.S. income level rises substantially while the British income level remains unchanged. Consider the impact of this scenario on (1) the demand schedule for pounds, (2) the supply schedule of pounds for sale, and (3) the equilibrium exchange rate. First, the demand schedule for pounds will shift outward, reflecting the increase in U.S. income and attendant increased demand for British goods. Second, the supply schedule of pounds for sale is not expected to change. Hence the equilibrium exchange rate of the pound should rise, as shown in Exhibit 4.7. ●

This example presumes that other factors (including interest rates) are held constant. In reality, of course, other factors do not remain constant. An increasing U.S. income level likely reflects favorable economic conditions. Under such conditions, some British firms would probably increase their investment in U.S. operations, exchanging more British pounds for dollars so that they could expand their U.S. operations. In addition, British investors may well increase their investment in U.S. stocks in order to capitalize on the country's economic growth, a tendency that is also reflected in the increased sale (exchange) of pounds for U.S. dollars in the foreign exchange market. Thus, the supply schedule of British pounds could increase (shift outward), which might more than offset any impact on the demand schedule for pounds. Furthermore, an increase in U.S. income levels (and in U.S. economic growth) could also have an indirect effect on the pound's exchange rate by influencing interest rates. Under conditions of economic growth, the business demand for loans tends to increase and thus cause a rise in interest rates. Higher interest rates in the United States could attract more U.K.-based investors; this is another reason why the supply schedule of British pounds may increase enough to offset any effect of increased U.S. income levels on the demand schedule. The interaction

Exhibit 4.7 Impact of Rising U.S. Income Levels on Equilibrium Value of the British Pound



of various factors that can affect exchange rates will be discussed in more detail once the other factors that could influence a currency's demand or supply schedule are identified.

4-3d Government Controls

A fourth factor affecting exchange rates is government controls. The governments of foreign countries can influence the equilibrium exchange rate in the following ways: (1) imposing foreign exchange barriers; (2) imposing foreign trade barriers; (3) intervening (buying and selling currencies) in the foreign exchange markets; and (4) affecting macro variables such as inflation, interest rates, and income levels. Chapter 6 covers these activities in detail.

EXAMPLE Recall the example in which U.S. interest rates rose relative to British interest rates. The expected reaction was an increase in the British supply of pounds for sale to obtain more U.S. dollars (in order to capitalize on high U.S. money market yields). However, if the British government placed a heavy tax on interest income earned from foreign investments, such taxation would likely discourage the exchange of pounds for dollars. ●

4-3e Expectations

A fifth factor affecting exchange rates is market expectations of future exchange rates. Like other financial markets, foreign exchange markets react to any news that may have a future effect. News of a potential surge in U.S. inflation may cause currency traders to sell dollars because they anticipate a future decline in the dollar's value. This response places immediate downward pressure on the dollar.

Impact of Favorable Expectations Many institutional investors (such as commercial banks and insurance companies) take currency positions based on anticipated interest rate movements in various countries.

EXAMPLE

Investors may temporarily invest funds in Canada if they expect Canadian interest rates to increase. Such a rise may cause further capital flows into Canada, which could place upward pressure on the Canadian dollar's value. By taking a position based on expectations, investors can fully benefit from the rise in the Canadian dollar's value because they will have purchased Canadian dollars before the change occurred. Although these investors face the obvious risk that their expectations may be wrong, the point is that expectations can influence exchange rates because they commonly motivate institutional investors to take foreign currency positions. ●

Impact of Unfavorable Expectations Just as speculators can place upward pressure on a currency's value when they expect it to appreciate, they can place downward pressure on a currency when they expect it to depreciate.

EXAMPLE

During the 2010–2012 period, Greece experienced a major debt crisis because of concerns that it could not repay its existing debt. Some institutional investors expected that the Greece crisis might spread throughout the eurozone, which could cause a flow of funds out of the eurozone. There were also concerns that Greece would abandon the euro as its currency, which caused additional concerns to investors who had investments in euro-denominated securities. Consequently, many institutional investors liquidated their investments in the eurozone, exchanging their euros for other currencies in the foreign exchange market. Investors who owned euro-denominated securities attempted to liquidate their positions before the euro's value declined. These conditions played a large part in the euro's substantial depreciation during this period.

When a country experiences a crisis, its economy typically weakens and political problems often arise. These conditions lead to reduced demand for the country's currency because investors are wary of countries experiencing economic or political problems. These conditions also lead to an increase in the supply of the country's currency for sale in the foreign exchange market because foreign investors who previously invested in the country now want to get out. In some cases, even the local citizens sell their local currency in exchange for other currency so that they can move their money out of the country. Thus, any concerns about a potential crisis can trigger money movements out of the country before the crisis develops. Yet such actions can themselves cause a major imbalance in the foreign exchange market and a significant decline in the local currency's value. That is, expectations of a crisis may lead to conditions that make the crisis worse. The affected country's government might even attempt to impose foreign exchange restrictions in order to stabilize the currency situation, but this possibility may create still more panic because investors fear that their money will be subject to crisis conditions. ●

WEB

www.ny.frb.org
Links to information on economic conditions that affect foreign exchange rates and potential speculation in the foreign exchange market.

Impact of Signals on Currency Speculation Day-to-day speculation on future exchange rate movements is typically driven by signals of future interest rate movements, but it can also be driven by other factors. Signals of the future economic conditions that affect exchange rates can change quickly; hence speculative positions in currencies may adjust quickly, which increases exchange rate volatility. It is not unusual for a currency to strengthen substantially on a given day, only to weaken substantially on the next day. This can occur when speculators overreact to news on one day (causing a currency to be overvalued), which results in a correction on the next day. Overreactions occur because speculators often take positions based on signals of future actions (not on the confirmation of past actions), and these signals may be misleading.

4-3f Interaction of Factors

Transactions within foreign exchange markets facilitate either trade or financial flows. Trade-related foreign exchange transactions are generally less responsive to news. In contrast, financial flow transactions are extremely responsive to news because decisions to hold securities denominated in a particular currency often depend on anticipated changes in currency values. Sometimes trade-related factors and financial factors interact and simultaneously affect exchange rate movements.

Exhibit 4.8 Summary of How Factors Affect Exchange Rates

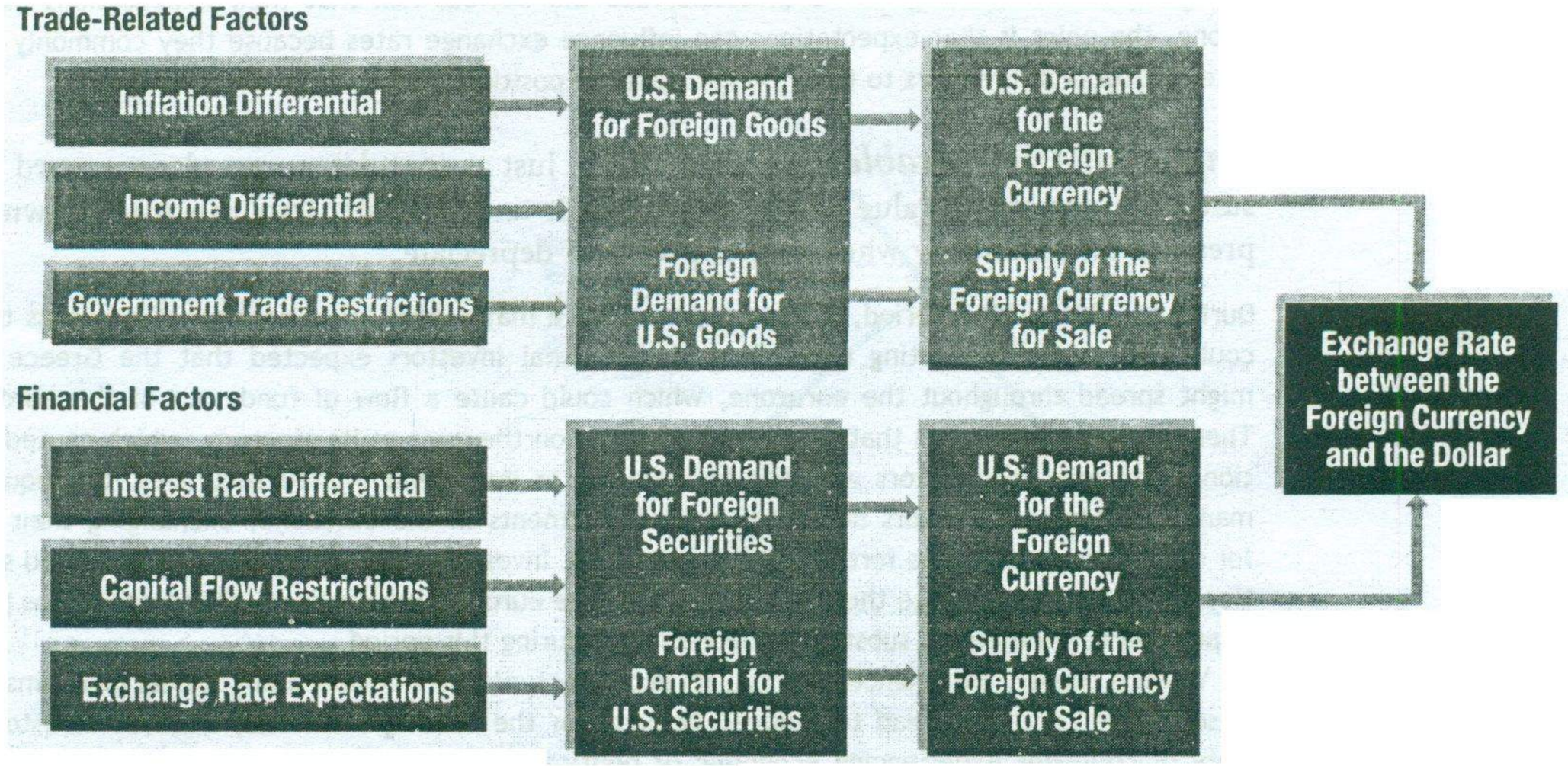


Exhibit 4.8 separates payment flows between countries into trade-related and finance-related flows; it also summarizes the factors that affect these flows. Over a particular period, some factors may place upward pressure on the value of a foreign currency while other factors place downward pressure on that value.

The sensitivity of an exchange rate to these factors depends on the volume of international transactions between the two countries. If the two countries engage in a large volume of international trade but a small volume of international capital flows, then the relative inflation rates will likely be more influential. If the two countries engage in a large volume of capital flows, however, then interest rate fluctuations may be more influential.

EXAMPLE Assume the simultaneous occurrence of (1) a sudden increase in U.S. inflation and (2) a sudden increase in U.S. interest rates. If the British economy is relatively unchanged, then the increase in U.S. inflation will place upward pressure on the pound's value because of its impact on international trade. At the same time, however, the increase in U.S. interest rates places downward pressure on the pound's value because of its impact on capital flows. ●

EXAMPLE Assume that Morgan Co., a U.S.-based MNC, frequently purchases supplies from Mexico and Japan and therefore desires to forecast the direction of the Mexican peso and the Japanese yen. Morgan's financial analysts have developed the following one-year projections for economic conditions.

FACTOR	UNITED STATES	MEXICO	JAPAN
Change in interest rates	−1%	−2%	−4%
Change in inflation	+2%	−3%	−6%

Assume that the United States and Mexico conduct a large volume of international trade but engage in minimal capital flow transactions. Also assume that the United States and Japan conduct very little international trade but frequently engage in capital flow transactions. What should Morgan expect regarding the future value of the Mexican peso and the Japanese yen?

The peso should be influenced most by trade-related factors because of Mexico's assumed heavy trade with the United States. The expected inflationary changes should place upward pressure on the value of the peso. Interest rates are expected to have little direct impact on the peso because of the assumed infrequent capital flow transactions between the United States and Mexico.

The Japanese yen should be most influenced by interest rates because of Japan's assumed heavy capital flow transactions with the United States. The expected interest rate changes should place downward pressure on the yen. The inflationary changes are expected to have little direct impact on the yen because of the assumed infrequent trade between the two countries. ●

Capital flows have become larger over time and can easily overwhelm trade flows. For this reason, the relationship between the factors (such as inflation and income) that affect trade and exchange rates is sometimes weaker than expected.

An understanding of exchange rate equilibrium does not guarantee accurate forecasts of future exchange rates, because that will depend in part on how the factors that affect exchange rates change in the future. Even if analysts fully realize how factors influence exchange rates, they may still be unable to predict how those factors will change.

4-3g Influence of Factors across Multiple Currency Markets

Each exchange rate has its own market, meaning its own demand and supply conditions. The value of the British pound in dollars is influenced by the U.S. demand for pounds and the amount of pounds supplied to the market (by British consumers and firms) in exchange for dollars. The value of the Swiss franc in dollars is influenced by the U.S. demand for francs and the amount of francs supplied to the market (by Swiss consumers and firms) in exchange for dollars.

In some periods, most currencies move in the same direction against the dollar. This is typically because of a particular underlying factor in the United States that has a similar impact on the demand and supply conditions across all currencies in that period.

EXAMPLE

Assume that interest rates are unusually low in the United States in a particular period, which causes U.S. firms and individual investors with excess short-term cash to invest their cash in various foreign currencies where interest rates are higher. This results in an increased U.S. demand for British pounds, Swiss francs, and euros as well as other currencies for countries in which the interest rate is relatively high (compared to the United States) and economic conditions are generally stable. Hence there is upward pressure on each of these currencies against the dollar.

Now assume that, in the following period, U.S. interest rates rise above the interest rates of European countries. This could cause the opposite flow of funds, as investors from European countries invest in dollars in order to capitalize on the higher U.S. interest rates. Consequently, there is an increased supply of British pounds, Swiss francs, and euros for sale by European investors in exchange for dollars. The excess supply of these currencies in the foreign exchange market places downward pressure on their values against the dollar. ●

It is not unusual for these European currencies to move in the same direction against the dollar because their economic conditions tend to change over time in a related manner. However, it is possible for one of the countries to experience different economic conditions in a particular period, which may cause its currency's movement against the dollar to deviate from the movements of other European currencies.

EXAMPLE

Continuing with the previous example, assume that U.S. interest rates remain relatively high compared to the European countries but that the Swiss government suddenly imposes a special tax on interest earned by Swiss firms and consumers from investments in foreign countries. Such a tax will

reduce Swiss investment in the United States (and so reduce the supply of Swiss francs to be exchanged for dollars), which may stabilize the Swiss franc's value. Meanwhile, investors in other parts of Europe continue to exchange their euros for dollars to capitalize on high U.S. interest rates, which causes the euro to depreciate against the dollar. ●

4-3h Impact of Liquidity on Exchange Rate Adjustment

For all currencies, the equilibrium exchange rate is reached through transactions in the foreign exchange market; however, the adjustment process is more volatile for some currencies than others. The liquidity of a currency affects the exchange rate's sensitivity to specific transactions. If the currency's spot market is liquid then its exchange rate will not be highly sensitive to a single large purchase or sale, so the change in the equilibrium exchange rate will be relatively small. With many willing buyers and sellers of the currency, transactions can be easily accommodated. In contrast, if a currency's spot market is illiquid then its exchange rate may be highly sensitive to a single large purchase or sale transaction. In this case there are not enough buyers or sellers to accommodate a large transaction, which means that the price of the currency must change in order to rebalance its supply and demand. Illiquid currencies, such as those in emerging markets, tend to exhibit more volatile exchange rate movements because the equilibrium prices of their currencies adjust to even minor changes in supply and demand conditions.

EXAMPLE The market for the Russian currency (the ruble) is not very active, which means that the volume of rubles purchased or sold in the foreign exchange market is small. Therefore, news that encourages speculators to take positions by purchasing rubles can create a major imbalance between the U.S. demand for rubles and the supply of rubles to be exchanged for dollars. So when U.S. speculators rush to invest in Russia, the result may be an abrupt increase in the ruble's value. Conversely, the ruble may decline abruptly when U.S. speculators attempt to withdraw their investments and exchange rubles back for dollars. ●

4-4 Movements in Cross Exchange Rates

There are distinct international trade and financial flows between every pair of countries. These flows dictate the unique supply and demand conditions for these two countries' currencies, conditions that affect movements in the equilibrium exchange rate between them. The value of the British pound in Swiss francs (from a U.S. perspective, this is a cross exchange rate) is influenced by the Swiss demand for pounds and the supply of pounds to be exchanged (by British consumers and firms) for Swiss francs. The movement in a cross exchange rate over a particular period can be measured as its percentage change in that period, just as demonstrated previously for any currency's movement against the dollar. You can measure the percentage change in a cross exchange rate over some time period even when you lack cross exchange rate quotations; as shown here:

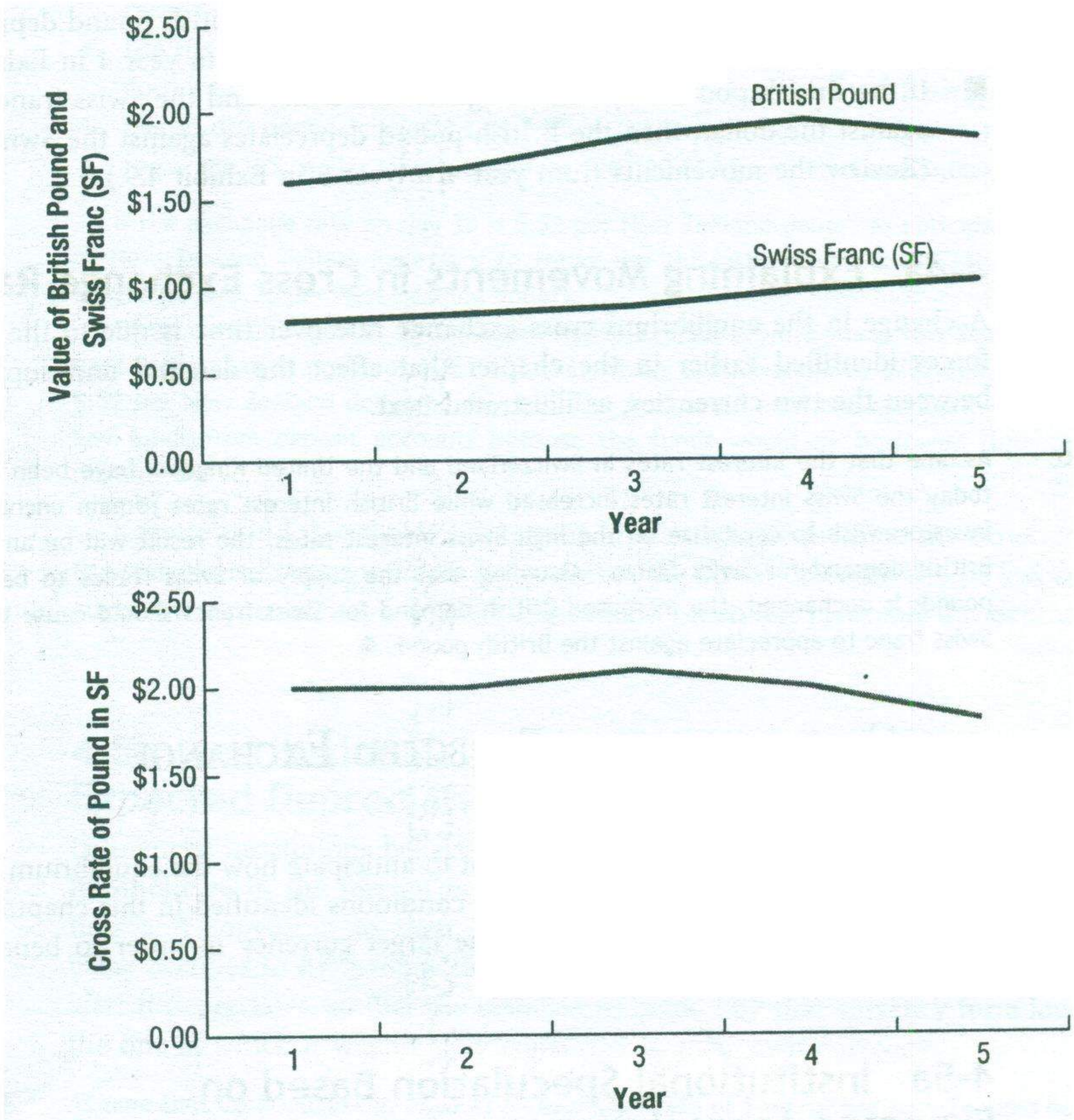
EXAMPLE One year ago, you observed that the British pound was valued at $1.54 while the Swiss franc (SF) was valued at $.78. Today, the pound is valued at $1.60 and the Swiss franc is worth $.80. This information allows you to determine how the British pound changed against the Swiss franc over the last year:

$$\text{Cross rate of British pound one year ago} = 1.482/.78 = 1.9 [£1 = SF1.9]$$
$$\text{Cross rate of British pound today} = 1.50/.75 = 2.0 [£1 = SF2.0]$$
$$\text{Percentage change in cross rate of British pound} = (2.0 - 1.9)/1.9 = .05263.$$

Thus, the British pound depreciated against the Swiss franc by about 5.26 percent over the last year. ●

The cross exchange rate changes when either currency's value changes against the dollar. These relationships are illustrated in Exhibit 4.9. The upper graph shows movements of the

Exhibit 4.9 Example of How Forces Affect the Cross Exchange Rate



BEGINNING OF YEAR	VALUE OF BRITISH POUND	VALUE OF SWISS FRANC (SF)	% ANNUAL CHANGE IN POUND	% ANNUAL CHANGE IN SF	CROSS RATE OF POUND IN SF
1	$1.60	$.80	—	—	1.60/.80 = 2.0
2	$1.68	$.84	5%	5%	1.68/.84 = 2.0
3	$1.848	$.882	10%	5%	1.848/.882 = 2.095
4	$1.9404	$.9702	5%	10%	1.9404/.9702 = 2.0
5	$1.84338	$1.01871	−5%	5%	1.84338/1.01871 = 1.81

British pound value against the dollar and the Swiss franc value against the dollar; the lower graph shows the cross exchange rate (pound value against the Swiss franc). Notice the following relationships:

- If the British pound and Swiss franc move by the same percentage against the dollar, then there is no change in the cross exchange rate. (Review the movements from year 1 to year 2 in Exhibit 4.9.)

- If the British pound appreciates against the dollar by a greater percentage than the Swiss franc appreciates against the dollar, then the British pound appreciates against the Swiss franc. (Review the movements from year 2 to year 3 in Exhibit 4.9.)
- If the British pound appreciates against the dollar by a smaller percentage than the Swiss franc appreciates against the dollar, then the British pound depreciates against the Swiss franc. (Review the movements from year 3 to year 4 in Exhibit 4.9.)
- If the British pound depreciates against the dollar and the Swiss franc appreciates against the dollar, then the British pound depreciates against the Swiss franc. (Review the movements from year 4 to year 5 in Exhibit 4.9.)

4-4a Explaining Movements in Cross Exchange Rates

A change in the equilibrium cross exchange rate over time is due to the same types of forces identified earlier in the chapter that affect the demand and supply conditions between the two currencies, as illustrated next.

EXAMPLE Assume that the interest rates in Switzerland and the United Kingdom have been similar but that today the Swiss interest rates increased while British interest rates remain unchanged. If British investors wish to capitalize on the high Swiss interest rates, the result will be an increase in the British demand for Swiss francs. Assuming that the supply of Swiss francs to be exchanged for pounds is unchanged, the increased British demand for Swiss francs should cause the value of the Swiss franc to appreciate against the British pound. ●

4-5 Capitalizing on Expected Exchange Rate Movements

Some large financial institutions attempt to anticipate how the equilibrium exchange rate will change in the near future based on conditions identified in this chapter. These institutions may then take a position in the target currency in order to benefit from their expectations.

4-5a Institutional Speculation Based on Expected Appreciation

When financial institutions believe that a particular currency is presently valued lower than it should be in the foreign exchange market, they may consider investing in that currency now before it appreciates. They would hope to liquidate their investment in that currency after it appreciates and so to benefit from selling it for a higher price than they paid.

EXAMPLE

- Chicago Co. expects the exchange rate of the New Zealand dollar (NZ$) to appreciate from its present level of $.50 to $.52 in 30 days.
- Chicago Co. is able to borrow $20 million on a short-term basis from other banks.
- Present short-term interest rates (annualized) in the interbank market are as given in the table.

CURRENCY	LENDING RATE	BORROWING RATE
U.S. dollars	6.72%	7.20%
New Zealand dollars (NZ$)	6.48%	6.96%

Given this information, Chicago Co. could proceed as follows.

1. Borrow $20 million.
2. Convert the $20 million to NZ$40 million (computed as $20,000,000/$.50).

3. Invest the New Zealand dollars at 6.48 percent annualized, which represents a .54 percent return over the 30-day period [computed as 6.48% × (30/360)]. After 30 days, Chicago Co. will receive NZ$40,216,000 [computed as NZ$40,000,000 × (1 + .0054)].
4. Use the proceeds from the New Zealand dollar investment (on day 30) to repay the U.S. dollars borrowed. The annual interest on the U.S. dollars borrowed is 7.2 percent, or .6 percent over the 30-day period [computed as 7.2% × (30/360)]. The total U.S. dollar amount necessary to repay the U.S. dollar loan is therefore $20,120,000 [computed as $20,000,000 × (1 + .006)].

If the exchange rate on day 30 is $.52 per New Zealand dollar, as anticipated, then the number of New Zealand dollars necessary to repay the U.S. dollar loan is NZ$38,692,308 (computed as $20,120,000/$.52 per New Zealand dollar).

Given that Chicago Co. accumulated NZ$40,216,000 from lending New Zealand dollars, it would earn a speculative profit of NZ$1,523,692, which is equivalent to $792,320 (given a spot rate of $.52 per New Zealand dollar on day 30). The firm could earn this speculative profit without using any funds from deposit accounts because the funds would be borrowed through the interbank market. ●

Keep in mind that the computations in the example measure the expected profits from the speculative strategy. There is a risk that the actual outcome will be less favorable if the currency appreciates to a smaller degree (and much less favorable if it depreciates).

4-5b Institutional Speculation Based on Expected Depreciation

If financial institutions believe that a particular currency is presently valued higher than it should be in the foreign exchange market, they may borrow funds in that currency now and convert it to their local currency now, that is, before the target currency's value declines to its "proper" level. The plan would be to repay the loan in that currency after it depreciates, so that the institutions could buy that currency for a lower price than the one at which it was initially converted to their own currency.

EXAMPLE Assume that Carbondale Co. expects an exchange rate of $.48 for the New Zealand dollar on day 30. It can borrow New Zealand dollars, convert them to U.S. dollars, and lend the U.S. dollars out. On day 30, it will close out these positions. Using the rates quoted in the previous example and assuming that the firm can borrow NZ$40 million, Carbondale takes the following steps.

1. Borrow NZ$40 million.
2. Convert the NZ$40 million to $20 million (computed as NZ$40,000,000 × $.50).
3. Lend the U.S. dollars at 6.72 percent, which represents a .56 percent return over the 30-day period. After 30 days, it will receive $20,112,000 [computed as $20,000,000 × (1 + .0056)].
4. Use the proceeds of the U.S. dollar loan repayment (on day 30) to repay the New Zealand dollars borrowed. The annual interest on the New Zealand dollars borrowed is 6.96 percent, or .58 percent over the 30-day period [computed as 6.96% × (30/360)]. The total New Zealand dollar amount necessary to repay the loan is therefore NZ$40,232,000 [computed as NZ$40,000,000 × (1 + .0058)].

If that the exchange rate on day 30 is $.48 per New Zealand dollar, as anticipated, then the number of U.S. dollars necessary to repay the NZ$ loan is $19,311,360 (computed as NZ$40,232,000 × $.48 per New Zealand dollar). Given that Carbondale accumulated $20,112,000 from its U.S. dollar loan, it would earn a speculative profit of $800,640 without using any of its own money (computed as $20,112,000 – $19,311,360). ●

Most money center banks continue to take some speculative positions in foreign currencies. In fact, some banks' currency trading profits have exceeded $100 million per quarter.

WEB

www.forex.com
Individuals can open a foreign exchange trading account with a small amount of money.

The potential returns from foreign currency speculation are high for financial institutions that have large borrowing capacity. Yet because foreign exchange rates are volatile, a poor forecast could result in a large loss. In September 2008, Citic Pacific (based in Hong Kong) experienced a loss of $2 billion due to speculation in the foreign exchange market. Some other MNCs, including Aracruz (Brazil) and Cemex (Mexico), also incurred large losses in 2008 owing to speculation in the foreign exchange market.

4-5c Speculation by Individuals

WEB

www.fxcom.com
Facilitates the trading of foreign currencies.

There is speculation in foreign currencies even by individuals whose careers have nothing to do with foreign exchange markets. Individuals can take positions in the currency futures market or options market, as detailed in Chapter 5. Alternatively, they can set up an account at a foreign exchange trading website (such as **FXCM.com**) with a small initial amount, after which they can move their money into one or more foreign currencies. Individuals can also establish a *margin account* on some websites; in this way, they can take positions in foreign currency while financing a portion of their investment with borrowed funds.

Many of the websites have a demonstration (demo) that allows prospective speculators to simulate the process of speculating in the foreign exchange market. Thus, speculators can determine how much they would have earned or lost by pretending to take a position with an assumed investment and borrowed funds. Borrowing to fund an investment increases the potential return and risk on that investment. In other words, speculative gains and speculative losses will both be magnified when the position is partially funded with borrowed money.

WEB

www.nadex.com
Facilitates the trading of foreign currencies.

Individual speculators quickly realize that the foreign exchange market remains active even after financial markets in their own country close. This means that the value of a currency can change substantially overnight while local financial markets are closed or support only limited trading. Individuals are naturally attracted by the potential for large gains, but just as with other forms of gambling, there is the risk of losing the entire investment. In that case, they would still be liable for any debt created from borrowing money to support the speculative position.

4-5d The "Carry Trade"

One of the most common strategies used by institutional and individual investors to speculate in the foreign exchange market is the *carry trade*, whereby investors attempt to capitalize on the difference in interest rates between two countries. Specifically, the strategy involves borrowing a currency with a low interest rate and investing the funds in a currency with a high interest rate. The investor may execute a carry trade for only a day or for several months. The term "carry trade" is derived from the phrase "cost of carry," which in financial markets represents the cost of holding (or carrying) a position in some asset.

Institutional and individual investors engage in carry trades, and there are brokers who facilitate both the borrowing of one currency (assuming the investor posts adequate collateral) and the investing in a different currency. There are numerous websites established by brokers that facilitate this process.

Before taking any speculative position in a foreign currency, carry traders must consider the prevailing interest rates at which they can invest or borrow in addition to their expectations about the movement of exchange rates.

EXAMPLE

Hampton Investment Co. is a U.S. firm that executes a carry trade in which it borrows euros (where interest rates are presently low) and invests in British pounds (where interest rates are presently high). Hampton uses $100,000 of its own funds and borrows an additional 600,000 euros. It will pay .5 percent on its euros borrowed for the next month and will earn 1.0 percent on funds invested in

British pounds. Assume that the euro's spot rate is $1.20 and that the British pound's spot rate is $1.80 (so the pound is worth 1.5 euros at this time). Hampton uses today's spot rate as its best guess of the spot rate one month from now. Hampton's expected profits from its carry trade can be derived as follows.

At Beginning of Investment Period

1. Hampton invests $100,000 of its own funds into British pounds:
   $100,000/($1.80 per pound) = 55,555 pounds
2. Hampton borrows 600,000 euros and converts them into British pounds:
   600,000 euros/(1.5 euros per pound) = 400,000 pounds
3. Hampton's total investment in pounds:
   55,555 pounds + 400,000 pounds = 455,555 pounds

At End of Investment Period

4. Hampton receives:
   455,555 × 1.01 = 460,110 pounds
5. Hampton repays loan in euros:
   600,000 euros × 1.005 = 603,000 euros
6. Amount of pounds Hampton needs to repay loan in euros:
   603,000 euros/(1.5 euros per pound) = 402,000 pounds
7. Amount of pounds Hampton has after repaying loan:
   460,110 pounds − 402,000 pounds = 58,110 pounds
8. Hampton converts pounds held into U.S. dollars:
   58,110 pounds × $1.80 per pound = $104,598
9. Hampton's profit:
   $104,598 − $100,000 = $4,598

The profit of $4,598 to Hampton as a percentage of its own funds used in this carry trade strategy over a 1-month period is therefore $4,598/$100,000 = 4.598 percent. ●

Notice the large return to Hampton over a single month, even though the interest rate on its investment is only .5% above its borrowing rate. Such a high return on its investment over a one-month period is possible when Hampton borrows a large portion of the funds used for its investment. This illustrates the power of financial leverage.

At the end of the month, Hampton may roll over (repeat) its position for the next month. Alternatively, it could decide to execute a new carry trade transaction in which it borrows a different currency and invests in still another currency.

Impact of Appreciation in the Investment Currency If the British pound had appreciated against both the euro and the dollar during the month, Hampton's profits would be even higher for two reasons. First, if the pound appreciated against the euro, then each British pound at the end of the month would have converted into more euros and so Hampton would have needed fewer British pounds to repay the funds borrowed in euros. Second, if the pound also appreciated against the dollar then the remaining British pounds held (after repaying the loan) would have converted into more dollars. Thus, the choice of the currencies to borrow and purchase is influenced not only by prevailing interest rates but also by expected exchange rate movements. Investors prefer to borrow a currency with a low interest rate that they expect will weaken and to invest in a currency with a high interest rate that they expect will strengthen.

When many investors executing carry trades share the same expectations about a particular currency, they execute similar types of transactions and their trading volume can have a major influence on exchange rate movements over a short period. Over time, as many carry traders borrow one currency and convert it into another, there is downward pressure on the currency being converted (sold), and upward pressure on the currency

being purchased. This type of pressure on the exchange rate may enhance investor profits.

Risk of the Carry Trade The risk of the carry trade is that exchange rates may move opposite to what the investors expected, which would cause a loss. Just as financial leverage can magnify gains from a carry trade, it can also magnify losses from a carry trade when the currency that was borrowed appreciates against the investment currency. This dynamic is illustrated in the following example.

EXAMPLE Assume the same conditions as in the previous example but with one adjustment. Namely, suppose the euro appreciated by 3 percent over the month against both the pound and the dollar; this means that, at the end of the investment period, the euro is worth $1.236 and a pound is worth 1.456 euros. Under these conditions, Hampton's profit from its carry trade is measured below. The changes from the previous example are highlighted below:

At Beginning of Investment Period

1. Hampton invests $100,000 of its own funds into British pounds:
   $100,000/($1.80 per pound) = 55,555 pounds
2. Hampton borrows 600,000 euros and converts them into British pounds:
   600,000 euros/(1.5 euros per pound) = 400,000 pounds
3. Hampton's total investment in pounds:
   55,555 pounds + 400,000 pounds = 455,555 pounds

At End of Investment Period

4. Hampton receives:
   455,555 × 1.01 = 460,110 pounds
5. Hampton repays loan in euros:
   600,000 euros × 1.005 = 603,000 euros
6. Amount of pounds Hampton needs to repay loan in euros:
   603,000 euros/(1.456 euros per pound) = 414,148 pounds
7. Amount of pounds Hampton has after repaying loan:
   460,110 pounds − 414,148 pounds = 45,962 pounds
8. Hampton converts pounds held into U.S. dollars:
   45,962 pounds × $1.80 per pound = $82,731
9. Hampton's profit:
   $82,731 − $100,000 = −$17,268

In this case, Hampton experiences a loss that amounts to nearly 17 percent of its original $100,000 investment. ●

Hampton's loss is due to the euro's appreciation against the pound, which increased the number of pounds that Hampton needed to repay the euro loan. Consequently, Hampton had fewer pounds to convert into dollars at the end of the month. Because of its high financial leverage (its high level of borrowed funds relative to its total investment), Hampton's losses are magnified.

In periods when changing conditions impel carry traders to question their trade positions, many such traders will attempt to *unwind* (reverse) their positions. This activity can have a major impact on the exchange rate.

EXAMPLE Over the last several months, many carry traders have borrowed euros and purchased British pounds. Today, governments in the eurozone announced a new policy that will likely attract much more investment to the eurozone, which in turn will cause the euro's value to appreciate. Because the euro's appreciation against the pound will adversely affect carry trade positions, many traders decide to unwind their positions. They liquidate their investments in British pounds, selling pounds in exchange for euros in the foreign exchange market so that they can repay their loans in euros now (before the euro appreciates even more). Since many carry traders are simultaneously executing the

same types of transactions, there is additional downward pressure on the British pound's value relative to the euro. This can result in major losses to carry traders because it means they will need more British pounds to obtain enough euros to repay their loans. ●

SUMMARY

- Exchange rate movements are commonly measured by the percentage change in their values over a specified period, such as a month or a year. Multinational corporations closely monitor exchange rate movements over the period in which they have cash flows denominated in the foreign currencies of concern.
- The equilibrium exchange rate between two currencies at any time is based on the demand and supply conditions. Changes in the demand for a currency or in the supply of a currency for sale will affect the equilibrium exchange rate.
- The key economic factors that can influence exchange rate movements through their effects on demand and supply conditions are relative inflation rates, interest rates, income levels, and government controls. When these factors lead to a change in international trade or financial flows, they affect the demand for a currency or the supply of currency for sale and thus the equilibrium exchange rate. If a foreign country experiences an increase in interest rates (relative to U.S. interest rates), then: the inflow of U.S. funds to purchase its securities should increase (U.S. demand for its currency increases); the outflow of its funds to purchase U.S. securities should decrease (supply of its currency to be exchanged for U.S. dollars decreases); and there should be upward pressure on its currency's equilibrium value. All relevant factors must be considered simultaneously when attempting to predict the most likely movement in a currency's value.
- There are distinct international trade and financial flows between every pair of countries. These flows dictate the unique supply and demand conditions for the currencies of the two countries, which affect the equilibrium cross exchange rate between their currencies. Movement in the exchange rate between two non-dollar currencies can be inferred from the movement of each currency against the dollar.
- Financial institutions may seek to benefit from the expected appreciation of a currency by purchasing that currency. Analogously, they can benefit from a currency's expected depreciation by borrowing that currency and exchanging it for their home currency.

POINT COUNTER-POINT

How Can Persistently Weak Currencies Be Stabilized?

Point The currencies of some Latin American countries depreciate against the U.S. dollar on a consistent basis. The governments of these countries need to attract more capital flows by raising interest rates and making their currencies more attractive. They also need to insure bank deposits so that foreign investors who invest in large bank deposits do not need to worry about default risk. In addition, they could impose capital restrictions on local investors to prevent capital outflows.

Counter-Point Some Latin American countries have had high inflation, which encourages local firms and consumers to purchase products from the United States instead. Thus, these countries could relieve the downward pressure on their local currencies by reducing inflation. To reduce inflation, a country may have to reduce economic growth temporarily. These countries should not raise their interest rates in order to attract foreign investment because they will still not attract funds if investors fear that there will be large capital outflows upon the first threat of continued depreciation.

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. Briefly describe how various economic factors can affect the equilibrium exchange rate of the Japanese yen's value with respect to that of the dollar.
2. A recent shift in the interest rate differential between the United States and Country A had a large effect on the value of Currency A. However, the same shift in the interest rate differential between the United States and Country B had no effect on the value of Currency B. Explain why the effects may vary.
3. Smart Banking Corp. can borrow $5 million at 6 percent annualized. It can use the proceeds to invest in Canadian dollars at 9 percent annualized over a 6-day period. The Canadian dollar is worth $.95 and is expected to be worth $.94 in 6 days. Based on this information, should Smart Banking Corp. borrow U.S. dollars and invest in Canadian dollars? What would be the gain or loss in U.S. dollars?

QUESTIONS AND APPLICATIONS

1. **Percentage Depreciation** Assume the spot rate of the British pound is $1.73. The expected spot rate 1 year from now is assumed to be $1.66. What percentage depreciation does this reflect?
2. **Inflation Effects on Exchange Rates** Assume that the U.S. inflation rate becomes high relative to Canadian inflation. Other things being equal, how should this affect the (a) U.S. demand for Canadian dollars, (b) supply of Canadian dollars for sale, and (c) equilibrium value of the Canadian dollar?
3. **Interest Rate Effects on Exchange Rates** Assume U.S. interest rates fall relative to British interest rates. Other things being equal, how should this affect the (a) U.S. demand for British pounds, (b) supply of pounds for sale, and (c) equilibrium value of the pound?
4. **Income Effects on Exchange Rates** Assume that the U.S. income level rises at a much higher rate than does the Canadian income level. Other things being equal, how should this affect the (a) U.S. demand for Canadian dollars, (b) supply of Canadian dollars for sale, and (c) equilibrium value of the Canadian dollar?
5. **Trade Restriction Effects on Exchange Rates** Assume that the Japanese government relaxes its controls on imports by Japanese companies. Other things being equal, how should this affect the (a) U.S. demand for Japanese yen, (b) supply of yen for sale, and (c) equilibrium value of the yen?
6. **Effects of Real Interest Rates** What is the expected relationship between the relative real interest rates of two countries and the exchange rate of their currencies?
7. **Speculative Effects on Exchange Rates** Explain why a public forecast by a respected economist about future interest rates could affect the value of the dollar today. Why do some forecasts by well-respected economists have no impact on today's value of the dollar?
8. **Factors Affecting Exchange Rates** What factors affect the future movements in the value of the euro against the dollar?
9. **Interaction of Exchange Rates** Assume that there are substantial capital flows among Canada, the United States, and Japan. If interest rates in Canada decline to a level below the U.S. interest rate, and inflationary expectations remain unchanged, how could this affect the value of the Canadian dollar against the U.S. dollar? How might this decline in Canada's interest rates possibly affect the value of the Canadian dollar against the Japanese yen?
10. **Trade Deficit Effects on Exchange Rates** Every month, the U.S. trade deficit figures are announced. Foreign exchange traders often react to this announcement and even attempt to forecast the figures before they are announced.
    a. Why do you think the trade deficit announcement sometimes has such an impact on foreign exchange trading?
    b. In some periods, foreign exchange traders do not respond to a trade deficit announcement, even when the announced deficit is very large. Offer an explanation for such a lack of response.
11. **Comovements of Exchange Rates** Explain why the value of the British pound against the dollar will not always move in tandem with the value of the euro against the dollar.
12. **Factors Affecting Exchange Rates** In some periods, Brazil's inflation rate was very high. Explain why this places pressure on the Brazilian currency.

13. National Income Effects Analysts commonly attribute the appreciation of a currency to expectations that economic conditions will strengthen. Yet, this chapter suggests that when other factors are held constant, increased national income could increase imports and cause the local currency to weaken. In reality, other factors are not constant. What other factor is likely to be affected by increased economic growth and could place upward pressure on the value of the local currency?

14. Factors Affecting Exchange Rates If Asian countries experience a decline in economic growth (and experience a decline in inflation and interest rates as a result), how will their currency values (relative to the U.S. dollar) be affected?

15. Impact of Crises Why do you think most crises in countries cause the local currency to weaken abruptly? Is it because of trade or capital flows?

16. Economic Impact on Capital Flows How do you think the weaker U.S. economic conditions could affect capital flows? If capital flows are affected, how would this influence the value of the dollar (holding other factors constant)?

Advanced Questions

17. Measuring Effects on Exchange Rates Tarheel Co. plans to determine how changes in U.S. and Mexican real interest rates will affect the value of the U.S. dollar. (See Appendix C for the basics of regression analysis.)

a. Describe a regression model that could be used to achieve this purpose. Also explain the expected sign of the regression coefficient.

b. If Tarheel Co. thinks that the existence of a quota in particular historical periods may have affected exchange rates, how might this be accounted for in the regression model?

18. Factors Affecting Exchange Rates Mexico tends to have much higher inflation than the United States and also much higher interest rates than the United States. Inflation and interest rates are much more volatile in Mexico than in industrialized countries. The value of the Mexican peso is typically more volatile than the currencies of industrialized countries from a U.S. perspective; it has typically depreciated from one year to the next, but the degree of depreciation has varied substantially. The bid/ask spread tends to be wider for the peso than for currencies of industrialized countries.

a. Identify the most obvious economic reason for the persistent depreciation of the peso.

b. High interest rates are commonly expected to strengthen a country's currency because they can encourage foreign investment in securities in that country, which results in the exchange of other currencies for that currency. Yet, the peso's value has declined against the dollar over most years even though Mexican interest rates are typically much higher than U.S. interest rates. Thus, it appears that the high Mexican interest rates do not attract substantial U.S. investment in Mexico's securities. Why do you think U.S. investors do not try to capitalize on the high interest rates in Mexico?

c. Why do you think the bid/ask spread is higher for pesos than for currencies of industrialized countries? How does this affect a U.S. firm that does substantial business in Mexico?

19. Aggregate Effects on Exchange Rates Assume that the United States invests heavily in government and corporate securities of Country K. In addition, residents of Country K invest heavily in the United States. Approximately $10 billion worth of investment transactions occur between these two countries each year. The total dollar value of trade transactions per year is about $8 million. This information is expected to also hold in the future.

Because your firm exports goods to Country K, your job as international cash manager requires you to forecast the value of Country K's currency (the "krank") with respect to the dollar. Explain how each of the following conditions will affect the value of the krank, holding other things equal. Then, aggregate all of these impacts to develop an overall forecast of the krank's movement against the dollar.

a. U.S. inflation has suddenly increased substantially, while Country K's inflation remains low.

b. U.S. interest rates have increased substantially, while Country K's interest rates remain low. Investors of both countries are attracted to high interest rates.

c. The U.S. income level increased substantially, while Country K's income level has remained unchanged.

d. The United States is expected to impose a small tariff on goods imported from Country K.

e. Combine all expected impacts to develop an overall forecast.

20. Speculation Blue Demon Bank expects that the Mexican peso will depreciate against the dollar from its

spot rate of $.15 to $.14 in 10 days. The following interbank lending and borrowing rates exist:

CURRENCY	LENDING RATE	BORROWING RATE
U.S. dollar	8.0%	8.3%
Mexican peso	8.5%	8.7%

Assume that Blue Demon Bank has a borrowing capacity of either $10 million or 70 million pesos in the interbank market, depending on which currency it wants to borrow.

a. How could Blue Demon Bank attempt to capitalize on its expectations without using deposited funds? Estimate the profits that could be generated from this strategy.

b. Assume all the preceding information with this exception: Blue Demon Bank expects the peso to appreciate from its present spot rate of $.15 to $.17 in 30 days. How could it attempt to capitalize on its expectations without using deposited funds? Estimate the profits that could be generated from this strategy.

21. Speculation Diamond Bank expects that the Singapore dollar will depreciate against the U.S. dollar from its spot rate of $.43 to $.42 in 60 days. The following interbank lending and borrowing rates exist:

CURRENCY	LENDING RATE	BORROWING RATE
U.S. dollar	7.0%	7.2%
Singapore dollar	22.0%	24.0%

Diamond Bank considers borrowing 10 million Singapore dollars in the interbank market and investing the funds in U.S. dollars for 60 days. Estimate the profits (or losses) that could be earned from this strategy. Should Diamond Bank pursue this strategy?

22. Relative Importance of Factors Affecting Exchange Rate Risk Assume that the level of capital flows between the United States and the country of Krendo is negligible (close to zero) and will continue to be negligible. There is a substantial amount of trade between the United States and the country of Krendo and no capital flows. How will high inflation and high interest rates affect the value of the kren (Krendo's currency)? Explain.

23. Assessing the Euro's Potential Movements You reside in the United States and are planning to make a 1-year investment in Germany during the next year. Since the investment is denominated in euros, you want to forecast how the euro's value may change against the dollar over the 1-year period. You expect that Germany will experience an inflation rate of 1 percent during the next year, while all other European countries will experience an inflation rate of 8 percent over the next year. You expect that the United States will experience an annual inflation rate of 2 percent during the next year. You believe that the primary factor that affects any exchange rate is the inflation rate. Based on the information provided in this question, will the euro appreciate, depreciate, or stay at about the same level against the dollar over the next year? Explain.

24. Weighing Factors That Affect Exchange Rates Assume that the level of capital flows between the United States and the country of Zeus is negligible (close to zero) and will continue to be negligible. There is a substantial amount of trade between the United States and the country of Zeus. The main import by the United States is basic clothing purchased by U.S. retail stores from Zeus, while the main import by Zeus is special computer chips that are only made in the United States and are needed by many manufacturers in Zeus. Suddenly, the U.S. government decides to impose a 20 percent tax on the clothing imports. The Zeus government immediately retaliates by imposing a 20 percent tax on the computer chip imports. Second, the Zeus government immediately imposes a 60 percent tax on any interest income that would be earned by Zeus investors if they buy U.S. securities. Third, the Zeus central bank raises its local interest rates so that they are now higher than interest rates in the United States. Do you think the currency of Zeus (called the zee) will appreciate or depreciate against the dollar as a result of all the government actions described above? Explain.

25. How Factors Affect Exchange Rates The country of Luta has large capital flows with the United States. It has no trade with the United States and will not have trade with the United States in the future. Its interest rate is 6 percent, the same as the U.S. interest rate. Its rate of inflation is 5 percent, the same as the U.S. inflation rate. You expect that the inflation rate in Luta will rise to 8 percent this coming year, while the U.S. inflation rate will remain at 5 percent. You expect that Luta's interest rate will rise to 9 percent during the next year. You expect that the U.S. interest rate will remain at 6 percent this year. Do you think Luta's currency will appreciate, depreciate, or remain unchanged against the dollar? Briefly explain.

26. Speculation on Expected Exchange Rates Kurnick Co. expects that the pound will depreciate from $1.70 to $1.68 in one year. It has no money to invest, but it could borrow money to invest. A bank allows it to borrow either 1 million dollars or 1 million pounds for one year. It can borrow dollars at 6 percent or British pounds at 5 percent for 1 year. It can invest in a risk-free dollar deposit at 5 percent for 1 year or a risk-free British deposit at 4 percent for 1 year. Determine the expected profit or loss (in dollars) if Kurnick Co. pursues a strategy to capitalize on the expected depreciation of the pound.

27. Assessing Volatility of Exchange Rate Movements Assume you want to determine whether the monthly movements in the Polish zloty against the dollar are more volatile than monthly movements in some other currencies against the dollar. The zloty was valued at $.4602 on May 1, $.4709 on June 1, $.4888 on July 1, $.4406 on August 1, and $.4260 on September 1. Using Excel or another electronic spreadsheet, compute the standard deviation (a measure of volatility) of the zloty's monthly exchange rate movements. Show your spreadsheet.

28. Impact of Economy on Exchange Rates Assume that inflation is zero in the United States and in Europe and will remain at zero. United States interest rates are presently the same as in Europe. Assume that the economic growth for the United States is presently similar to Europe. Assume that international capital flows are much larger than international trade flows. Today, there is news that clearly signals economic conditions in Europe will be weakening in the future, while economic conditions in the United States will remain the same. Explain why and how (which direction) the euro's value would change today based on this information.

29. Movements in Cross Exchange Rates Last year a dollar was equal to 7 Swedish kronor, and a Polish zloty was equal to $.40. Today, the dollar is equal to 8 Swedish kronor, and a Polish zloty is equal to $.44. By what percentage did the cross exchange rate of the Polish zloty in Swedish kronor (that is, the number of kronor that can be purchased with one zloty) change over the last year?

30. Measuring Exchange Rate Volatility Here are exchange rates for the Japanese yen and British pound at the beginning of each of the last 5 years. Your firm wants to determine which currency is more volatile as it assesses its exposure to exchange rate risk. Estimate the volatility of each currency's movements.

BEGINNING OF YEAR	YEN	POUND
1	0.008	1.47
2	0.011	1.46
3	0.008	1.51
4	0.01	1.54
5	0.012	1.52

31. Impact of Economy on Exchange Rate The country of Quinland has large capital flows with the United States. It has no trade with the United States and will not have trade with the United States in the future. Its interest rate is 6 percent, the same as the U.S. interest rate. You expect that the inflation rate in Quinland will be 1 percent this coming year, while the U.S. inflation rate will be 9 percent. You expect that Quinland's interest rate will be 2 percent during the next year, while the U.S. interest rate will rise to 10 percent during the next year. Quinland's currency adjusts in response to market forces. Will Quinland's currency appreciate, depreciate, or remain unchanged against the dollar?

32. Impact of Economy on Exchange Rate The country of Zars has large capital flows with the United States. It has no trade with the United States and will not have trade with the United States in the fut . Its interest rate is 6 percent, the same as the U.S. interest rate. Its rate of inflation is 5 percent, the same as the U.S. inflation rate. You expect that the inflation rate in Zars will rise to 8 percent this coming year, while the U.S. inflation rate will remain at 5 percent. You expect that Zars' interest rate will rise to 9 percent during the next year. You expect that the U.S. interest rate will remain at 6 percent this year. Zars' currency adjusts in response to market forces and is not subject to direct central bank intervention. Will Zars' currency appreciate, depreciate, or remain unchanged against the dollar?

33. Impact of Economy on Exchange Rates The country of Vezot has massive capital flows with the U.S. because it has no restrictions on the movement of investment funds into or out of the country. Vezot's inflation rate just increased substantially, while the U.S. inflation rate remains unchanged. Vezot's interest rate just increased substantially, while the U.S. interest rate remains unchanged. Vezot's income level just increased substantially, which will increase consumption of products within its country. The U.S. income level remains

unchanged. There is negligible international trade between Vezot and the U.S. Vezot can easily obtain all of its imported products from border countries instead of the U.S. The U.S. just imposed very large taxes on U.S. importers that import products from Vezot from today forward. Vezot does not impose restrictions on imports from the U.S. Vezot's currency is freely floating. Based on the information above, do you think Vezot's currency will appreciate, depreciate, or remain unchanged against the dollar? Briefly explain.

34. Foreign Exchange Transactions Assume the country of Neeland has stable and predictable international trade flows with the U.S. Neeland is periodically in the news because its government might have problems repaying its debt owed to local banks. The value of its currency (the "nee") commonly declines on one day, but then jumps back up a few days later. There is much day to day volatility in the value of the nee. Briefly explain what types of transactions are likely causing the shifts in demand for the nee and supply of nee for sale in the foreign exchange market.

35. Weighing the Influence of Factors on Exchange Rates The New Zealand dollar's spot rate was equal to $.60 last month. New Zealand conducts much international trade with the U.S. but that the financial (investment) transactions between the two countries are negligible. Assume the following conditions have occurred in the last year. First, interest rates in New Zealand increased but decreased in the U.S. Second, inflation in New Zealand increased but decreased in the U.S. Third, the New Zealand central bank intervened in the foreign exchange market by exchanging a very small amount of U.S. dollars to purchase a very small amount of New Zealand dollars. How should the New Zealand dollar change over the year based on the information provided here?

Discussion in the Boardroom

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

Running Your Own MNC

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

Blades, Inc. Case

Assessment of Future Exchange Rate Movements

As the chief financial officer of Blades, Inc., Ben Holt is pleased that his current system of exporting "Speedos" to Thailand seems to be working well. Blades' primary customer in Thailand, a retailer called Entertainment Products, has committed itself to purchasing a fixed number of Speedos annually for the next 3 years at a fixed price denominated in baht, Thailand's currency. Furthermore, Blades is using a Thai supplier for some of the components needed to manufacture Speedos. Nevertheless, Holt is concerned about recent developments in Asia. Foreign investors from various countries had invested heavily in Thailand to take advantage of the high interest rates there. As a result of the weak economy in Thailand, however, many foreign investors have lost confidence in Thailand and have withdrawn their funds.

Holt has two major concerns regarding these developments. First, he is wondering how these changes in Thailand's economy could affect the value of the Thai baht and, consequently, Blades. More specifically, he is wondering whether the effects on the Thai baht may affect Blades even though its primary Thai customer is committed to Blades over the next 3 years.

Second, Holt believes that Blades may be able to speculate on the anticipated movement of the baht, but he is uncertain about the procedure needed to accomplish this. To facilitate Holt's understanding of exchange rate speculation, he has asked you, Blades' financial analyst, to provide him with detailed illustrations of two scenarios. In the first, the baht would move from a current level of $.022 to $.020 within the next 30 days. Under the second scenario, the baht would move from its current level to $.025 within the next 30 days.

Based on Holt's needs, he has provided you with the following list of questions to be answered:

1. How are percentage changes in a currency's value measured? Illustrate your answer numerically by assuming a change in the Thai baht's value from a value of $.022 to $.026.
2. What are the basic factors that determine the value of a currency? In equilibrium, what is the relationship between these factors?

3. How might the relatively high levels of inflation and interest rates in Thailand affect the baht's value. (Assume a constant level of U.S. inflation and interest rates.)
4. How do you think the loss of confidence in the Thai baht, evidenced by the withdrawal of funds from Thailand, will affect the baht's value? Would Blades be affected by the change in value, given the primary Thai customer's commitment?
5. Assume that Thailand's central bank wishes to prevent a withdrawal of funds from its country in order to prevent further changes in the currency's value. How could it accomplish this objective using interest rates?
6. Construct a spreadsheet illustrating the steps Blades' treasurer would need to follow in order to speculate on expected movements in the baht's value over the next 30 days. Also show the speculative profit (in dollars) resulting from each scenario. Use both of Holt's examples to illustrate possible speculation. Assume that Blades can borrow either $10 million or the baht equivalent of this amount. Furthermore, assume that the following short-term interest rates (annualized) are available to Blades:

CURRENCY	LENDING RATE	BORROWING RATE
Dollars	8.10%	8.20%
Thai baht	14.80%	15.40%

SMALL BUSINESS DILEMMA

Assessment by the Sports Exports Company of Factors That Affect the British Pound's Value

Because the Sports Exports Company (a U.S. firm) receives payments in British pounds every month and converts those pounds into dollars, it needs to closely monitor the value of the British pound in the future. Jim Logan, owner of the Sports Exports Company, expects that inflation will rise substantially in the United Kingdom, while inflation in the United States will remain low. He also expects that the interest rates in both countries will rise by about the same amount.

1. Given Jim's expectations, forecast whether the pound will appreciate or depreciate against the dollar over time.
2. Given Jim's expectations, will the Sports Exports Company be favorably or unfavorably affected by the future changes in the value of the pound?

INTERNET/EXCEL EXERCISES

The website of the Federal Reserve Board of Governors (www.federalreserve.gov) contains economic data, including exchange rate trends of various currencies.

1. Determine how exchange rates of various currencies have changed in recent months. Note that most of these currencies (except the British pound) may be quoted in units per dollar. In general, have most currencies strengthened or weakened against the dollar over the last three months? Offer one or more reasons to explain the recent general movements in currency values against the dollar.
2. Does it appear that the Asian currencies move in the same direction relative to the dollar? Does it appear that the Latin American currencies move in the same direction against the dollar? Explain.
3. Go to www.oanda.com/convert/fxhistory. Obtain the direct exchange rate (C$ per currency unit) of the Canadian dollar for the beginning of each of the last 12 months. Insert this information in a column on an electronic spreadsheet. (See Appendix C for help on conducting analyses with Excel.) Repeat the process to obtain the direct exchange rate of the euro. Compute the percentage change in the value of the Canadian dollar and the euro each month. Determine the standard deviation of the movements (percentage changes) in the Canadian dollar and in the euro. Compare the standard deviation of the euro's movements to the standard deviation of the Canadian dollar's movements. Which currency is more volatile?

Online Articles with Real-World Examples

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

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

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

1. foreign exchange market
2. change in exchange rate
3. currency speculation
4. impact of inflation on exchange rates
5. impact of interest rates on exchange rates
6. exchange rate equilibrium
7. change in cross exchange rates
8. bank speculation in currencies
9. currency speculation by individuals
10. liquidity of foreign exchange market
11. exchange rate movement

5
Currency Derivatives

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- explain how forward contracts are used to hedge in light of anticipated exchange rate movements,
- describe how currency futures contracts are used to speculate or hedge based on anticipated exchange rate movements, and
- explain how currency options contracts are used to speculate or hedge in light of anticipated exchange rate movements.

A currency derivative is a contract whose price is partially derived from the value of the underlying currency that it represents. Some individuals and financial firms take positions in currency derivatives to speculate on future exchange rate movements. Multinational corporations often take positions in currency derivatives to hedge their exposure to exchange rate risk. Their managers must understand how these derivatives can be used to achieve corporate goals.

5-1 Forward Market

The forward market facilitates the trading of forward contracts on currencies. A **forward contract** is an agreement between a corporation and a financial institution (such as a commercial bank) to exchange a specified amount of a currency at a specified exchange rate (called the **forward rate**) on a specified date in the future. When MNCs anticipate a future need for or the future receipt of some foreign currency, they can set up forward contracts to lock in the rate at which they can purchase or sell that currency. Nearly all large MNCs use forward contracts to some extent. Some MNCs have forward contracts outstanding worth more than $100 million to hedge various positions.

Because forward contracts accommodate large corporations, the forward transaction will often be valued at $1 million or more. Forward contracts normally are not used by consumers or small firms. In cases where a bank does not know a corporation well (or does not fully trust it), the bank may request that the corporation make an initial deposit as assurance of intending to fulfill its obligation. Such a deposit is called a compensating balance and typically does not pay interest.

The most common forward contracts are for 30, 60, 90, 180, and 360 days, although other periods are available. The forward rate of a given currency will usually vary with the length (number of days) of the forward period.

5-1a How MNCs Use Forward Contracts

Multinational corporations use forward contracts to hedge their imports. They can lock in the rate at which they obtain a currency needed to purchase those imports.

EXAMPLE Turz, Inc., is an MNC based in Chicago that will need 1 million Singapore dollars in 90 days to purchase Singapore imports. It can buy this currency for immediate delivery at the spot rate of $.50 per Singapore dollar (S$). At this spot rate, the firm would need $500,000 (calculated as S$1,000,000 × $.50 per Singapore dollar). However, it does not now have the funds to exchange

for Singapore dollars. It could wait 90 days and then exchange U.S. dollars for Singapore dollars at the spot rate existing at that time, but Turz does not know what that rate will be. If the rate rises to $.60 in those 90 days, then Turz will need $600,000 (i.e., S$1,000,000 × $.60 per Singapore dollar), or an additional outlay of $100,000 due solely to the Singapore dollar's appreciation.

To avoid exposure to such exchange rate risk, Turz can lock in the rate it will pay for Singapore dollars 90 days from now without having to exchange U.S. dollars for Singapore dollars immediately. Specifically, Turz can negotiate a forward contract with a bank to purchase S$1,000,000 90 days forward. ●

The ability of a forward contract to lock in an exchange rate can create an opportunity cost in some cases.

EXAMPLE Assume that, in the previous example, Turz negotiated a 90-day forward rate of $.50 to purchase S$1,000,000. If the spot rate in 90 days is $.47, then Turz will have paid $.03 per unit or $30,000 (1,000,000 units × $.03) more for the Singapore dollars than if it did not have a forward contract. ●

Corporations also use the forward market to lock in the rate at which they can sell foreign currencies. This strategy is used to hedge against the possibility of those currencies depreciating over time.

EXAMPLE Scanlon, Inc., which is based in Virginia, exports products to a French firm and will receive payment of €400,000 in four months. It can lock in the amount of dollars to be received from this transaction by selling euros forward. That is, Scanlon can negotiate a forward contract with a bank to sell the €400,000 for U.S. dollars at a specified forward rate today. Assume the prevailing four-month forward rate on euros is $1.10. In four months, Scanlon will exchange its €400,000 for $440,000 (calculated as €400,000 × $1.10 = $440,000). ●

5-1b Bank Quotations on Forward Rates

Just as many large banks serve as intermediaries for spot transactions in the foreign exchange market, they also serve as intermediaries for forward transactions. They accommodate orders by MNCs to purchase a specific amount of a currency at a future time and at a specified (forward) exchange rate. They also accommodate orders by MNCs to sell a specific amount of currency at a future time and at a specified (forward) exchange rate.

Bid/Ask Spread Like spot rates, forward rates have a bid/ask spread. For example, a bank may set up a contract with one firm agreeing to sell the firm Singapore dollars 90 days from now at $.510 per Singapore dollar; this is the ask rate. At the same time, the firm may agree to purchase (bid) Singapore dollars 90 days from now from some other firm at $.505 per Singapore dollar.

The spread can be measured on a percentage basis, as it was for spot rates in Chapter 3. In the previous paragraph, the bid/ask spread is

$$\text{Bid/ask spread of 90-day forward rate of Singapore dollar} = (\$.510 - \$.505)/\$.510 = .98\%.$$

The spread for a particular currency, the spread tends to be wider for forward contracts that have an obligation further into the future. For example, the bid/ask spread on a one-year forward rate is normally higher than on a 90-day contract, and a three-year forward contract will usually have a higher spread than a one-year forward contract. The market for shorter-term forward contracts tends to be more liquid, which means that banks can more easily create offsetting positions for a given forward contract. For instance, a bank that accommodates a 90-day forward purchase request on Singapore dollars may be able to offset that by accommodating a some other MNC's request to sell the same number of Singapore dollars

for U.S. dollars in 90 days. By satisfying these two separate requests, the bank's exposure is offset. However, if the bank accommodates a five-year forward purchase request on Singapore dollars, it may be less capable of finding an MNC that wants to sell the same amount of Singapore dollars five years forward. Hence the bank may quote a higher bid/ask spread for a five-year than for a one-year forward contract, as the five-year contract leaves the bank more exposed to the risk of appreciation in the Singapore dollar.

The spread between the bid and ask prices is wider for forward rates of currencies of developing countries, such as Chile, Mexico, South Korea, Taiwan, and Thailand. Because these markets have relatively few orders for forward contracts, banks are less able to match up willing buyers and sellers. The resulting lack of liquidity causes banks to widen the bid/ask spread when quoting forward contracts. The contracts in these countries are generally available only for short-term horizons.

5-1c Premium or Discount on the Forward Rate

The difference between the forward rate (F) and the spot rate (S) at any given time is measured by the premium:

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

Here p denotes the forward premium, or the percentage by which the forward rate exceeds the spot rate.

EXAMPLE If the euro's spot rate is $1.40 and if its one-year forward rate has a forward premium of 2 percent, then the one-year forward rate is calculated as follows:

$$\begin{aligned} F &= S(1 + p) \\ &= \$1.40(1 + .02) \\ &= \$1.428 \end{aligned}$$

Given quotations for the spot rate and the forward rate at any point in time, the premium can be determined by rearranging the previous equation:

$$\begin{aligned} F &= S(1 + p) \\ F/S &= 1 + p \\ F/S - 1 &= p \end{aligned}$$

●

EXAMPLE If the euro's one-year forward rate is quoted at $1.428 and the euro's spot rate is quoted at $1.40, then the euro's forward premium is

$$\begin{aligned} (F/S) - 1 &= p \\ (\$1.428/\$1.40) - 1 &= p \\ 1.02 - 1 &= .02 \text{ or } 2 \text{ percent} \end{aligned}$$

●

When the forward rate is less than the prevailing spot rate, the forward premium is negative and the forward rate exhibits a discount.

EXAMPLE If the euro's one-year forward rate is quoted at $1.35 and the euro's spot rate is quoted at $1.40, then the euro's forward premium is:

$$\begin{aligned} (F/S) - 1 &= p \\ (\$1.35/\$1.40) - 1 &= p \\ .9643 - 1 &= -.0357 \text{ or } -3.57 \text{ percent} \end{aligned}$$

Since p is negative, the forward rate contains a discount. ●

EXAMPLE Assume that the forward exchange rates of the British pound for various maturities are as shown in the second column of Exhibit 5.1. These forward rates can be used to compute the forward discount on an annualized basis, as shown in the exhibit. ●

Exhibit 5.1 Computation of Forward Rate Premiums or Discounts

TYPE OF EXCHANGE RATE FOR £	VALUE	MATURITY	FORWARD RATE PREMIUM OR DISCOUNT FOR £
Spot rate	$1.681		
30-day forward rate	$1.680	30 days	$\frac{\$1.680 - \$1.681}{\$1.681} \times \frac{360}{30} = -.71\%$
90-day forward rate	$1.677	90 days	$\frac{\$1.677 - \$1.681}{\$1.681} \times \frac{360}{90} = -.95\%$
180-day forward rate	$1.672	180 days	$\frac{\$1.672 - \$1.681}{\$1.681} \times \frac{360}{180} = -1.07\%$

In some situations, a firm may prefer to assess the premium or discount on an unannualized basis. In this case, the value would not incorporate the formula's fraction that represents the number of periods per year.

Arbitrage Forward rates typically differ from the spot rate for any given currency. If the forward rate were the same as the spot rate and if interest rates differed in the two countries, then some investors (under certain assumptions) could use arbitrage to earn higher returns than would be possible domestically and without incurring additional risk (as explained in Chapter 7). For this reason, the forward rate usually contains a premium (or discount) that reflects the difference between the home interest rate and the foreign interest rate.

5-1d Movements in the Forward Rate over Time

If the forward rate's premium were constant, then over time the forward rate would move in tandem with movements in the corresponding spot rate. For instance, if the spot rate of the euro increased by 4 percent from a month ago until today then also the forward rate would have to increase by 4 percent over the same period in order to maintain the same premium. In reality, the forward premium is affected by the interest rate differential between the two countries (as explained in Chapter 7) and can change over time. Most of the movement in a currency's forward rate is due to movements in that currency's spot rate.

5-1e Offsetting a Forward Contract

In some cases, an MNC may desire to offset a forward contract that it previously created.

EXAMPLE On March 10, Green Bay, Inc., hired a Canadian construction company to expand its office and agreed to pay C$200,000 for the work on September 10. It negotiated a six-month forward contract to obtain C$200,000 at $.70 per unit, which would be used to pay the Canadian firm in six months. On April 10, the construction company informed Green Bay that it would not be able to perform the work as promised. Therefore, Green Bay offset its existing contract by negotiating a forward contract to sell C$200,000 for the date of September 10. However, the spot rate of the Canadian dollar had decreased over the last month, and the prevailing forward contract price for September 10 is $.66. Green Bay now has a forward contract to sell C$200,000 on September 10, which offsets the other contract it has to buy C$200,000 on September 10. The forward rate was $.04 per unit less on its sale than on its purchase, resulting in a cost of $8,000 (C$200,000 × $.04). ●

If Green Bay, Inc., negotiates the forward sale with the same bank with which it negotiated the forward purchase, then it may be able to request that its initial forward contract

simply be offset. The bank will charge a fee for this service, which will reflect the difference between the forward rate at the time of the forward purchase and the forward rate at the time of the offset. Thus the MNC cannot ignore its original obligation; rather, it must pay a fee to offset that obligation.

5-1f Using Forward Contracts for Swap Transactions

A swap transaction involves a spot transaction along with a corresponding forward contract that will ultimately reverse the spot transaction. Many forward contracts are negotiated for this purpose.

EXAMPLE Soho, Inc., needs to invest 1 million Chilean pesos in its Chilean subsidiary for the production of additional products. It wants the subsidiary to repay the pesos in one year. Soho wants to lock in the rate at which the pesos can be converted back into dollars in one year, and it uses a one-year forward contract for this purpose. Soho contacts its bank and requests the following swap transaction.

1. *Today*. The bank should withdraw dollars from Soho's U.S. account, convert the dollars to 1 million pesos in the spot market, and transmit the pesos to the subsidiary's account.
2. *In one year*. The bank should withdraw 1 million pesos from the subsidiary's account, convert them to dollars at today's forward rate, and transmit them to Soho's U.S. account.

These transactions do not expose Soho to exchange rate movements because it has locked in the rate at which the pesos will be converted back to dollars. However, if the one-year forward rate exhibits a discount then Soho will receive fewer dollars later than it invested in the subsidiary today. Even so, the firm may still be willing to engage in the swap transaction so that it can be certain about how many dollars it will receive in one year. ●

5-1g Non-Deliverable Forward Contracts

A **non-deliverable forward contract** (NDF) is often used for currencies in emerging markets. Like a regular forward contract, an NDF is an agreement regarding a position in a specified amount of a specified currency, a specified exchange rate, and a specified future settlement date. However, an NDF does not result in an actual exchange of the currencies at the future date; that is, there is no delivery. Instead, one party to the agreement makes a payment to the other party based on the exchange rate at the future date.

EXAMPLE Jackson, Inc., an MNC based in Wyoming, determines as of April 1 that it will need 100 million Chilean pesos to purchase supplies on July 1. It can negotiate an NDF with a local bank as follows. The NDF will specify the currency (Chilean peso); the settlement date (90 days from now); and a *reference rate*, which identifies the type of exchange rate that will be marked to market at the settlement. Specifically, the NDF will contain the following information.

- Buy 100 million Chilean pesos.
- Settlement date: July 1.
- Reference index: Chilean peso's closing exchange rate (in dollars) quoted by Chile's central bank in 90 days.

Assume that the Chilean peso (which is the reference index) is currently valued at $.0020, so the dollar amount of the position is $200,000 at the time of the agreement. At the time of the settlement date (July 1), the value of the reference index is determined and then a payment is made from one party to another in settlement. For example, if the peso value increases to $.0023 by July 1, the value of the position specified in the NDF will be $230,000 ($.0023 × 100 million pesos). Since the value of Jackson's NDF position is $30,000 higher than when the agreement was created, Jackson will receive a payment of $30,000 from the bank.

Recall that Jackson needs 100 million pesos to buy imports. Since the peso's spot rate rose from April 1 to July 1, the company will need to pay $30,000 more for the imports than if it had paid for them on April 1. At the same time, however, Jackson will have received a payment of $30,000 due to its NDF. Thus, the NDF hedged the exchange rate risk.

Suppose that, instead of rising, the Chilean peso had depreciated to $.0018. Then Jackson's position in its NDF would have been valued at $180,000 (100 million pesos × $.0018) at the settlement date, which is $20,000 less than the value when the agreement was created. In this case, Jackson would have owed the bank $20,000 at that time. Yet the decline in the spot rate of the peso means that Jackson would also pay $20,000 less for the imports than if it had paid for them on April 1. Thus, an offsetting effect occurs in this example as well. ●

WEB

www.futuresmag.com
Various aspects of derivatives trading such as new products, strategies, and market analyses.

WEB

www.cmegroup.com
Time series on financial futures and option prices. The site also enables one to generate charts of historical prices.

The preceding examples demonstrate that, even though an NDF does not involve delivery, it can effectively hedge the future foreign currency payments anticipated by an MNC.

Because an NDF can specify that any payments between the two parties be in dollars or some other available currency, firms can also use NDFs to hedge existing positions of foreign currencies that are not convertible. Consider an MNC that expects to receive payment in a foreign currency that cannot be converted into dollars. The MNC may use this currency to make purchases in the local country, but it may nonetheless desire to hedge against a decline in the value of that currency over the period before it receives payment. Hence the MNC takes a sell position in an NDF and uses the closing exchange rate of that currency (as of the settlement date) as the reference index. If the currency depreciates against the dollar over time, then the firm will receive the difference between the dollar value of the position when the NDF contract was created and the dollar value of the position as of the settlement date. It will therefore receive a payment in dollars from the NDF to offset any depreciation in the currency over the period of concern.

5-2 Currency Futures Market

Currency futures contracts are contracts specifying a standard volume of a particular currency to be exchanged on a specific settlement date. Thus currency futures contracts are similar to forward contracts in terms of their obligation, but they differ from forward contracts in how they are traded. These contracts are frequently used by MNCs to hedge their foreign currency positions. In addition, they are traded by speculators who hope to capitalize on their expectations of exchange rate movements. A buyer of a currency futures contract locks in the exchange rate to be paid for a foreign currency at a future time. Alternatively, a seller of a currency futures contract locks in the exchange rate at which a foreign currency can be exchanged for the home currency. In the United States, currency futures contracts are purchased to lock in the amount of dollars needed to obtain a specified amount of a particular foreign currency; they are sold to lock in the amount of dollars to be received from selling a specified amount of a particular foreign currency.

5-2a Contract Specifications

Most currency futures are traded at the Chicago Mercantile Exchange (CME), which is part of CME Group. Currency futures are available for 19 currencies at the CME. Each contract specifies a standardized number of units, as shown in Exhibit 5.2. Standardized contracts allow for more frequent trading per contract and hence for greater liquidity. There are some currencies for which the CME offers "E-mini" futures contracts, which specify half the number of units of a typical standardized contract. The CME also offers futures contracts on cross exchange rates (between two non-dollar currencies). Trades through the CME are normally executed by the Globex platform.

Exhibit 5.2 Currency Futures Contracts Traded on the Chicago Mercantile Exchange

CURRENCY	UNITS PER CONTRACT
Australian dollar	100,000
Brazilian real	100,000
British pound	62,500
Canadian dollar	100,000
Chinese yuan	1,000,000
Czech koruna	4,000,000
Euro	125,000
Hungarian forint	30,000,000
Israeli shekel	1,000,000
Japanese yen	12,500,000
Korean won	125,000,000
Mexican peso	500,000
New Zealand dollar	100,000
Norwegian krone	2,000,000
Polish zloty	500,000
Russian ruble	2,500,000
South African rand	500,000
Swedish krona	2,000,000
Swiss franc	125,000

The typical currency futures contract is based on a currency value in terms of U.S. dollars. However, futures contracts are also available on some cross rates, such as the exchange rate between the Australian dollar and the Canadian dollar. Thus, speculators who expect that the Australian dollar will move substantially against the Canadian dollar can take a futures position to capitalize on their expectations. In addition, Australian firms that have exposure in Canadian dollars or Canadian firms that have exposure in Australian dollars may use this type of futures contract to hedge their exposure. See www.cmegroup.com for more information about futures on cross exchange rates.

Currency futures contracts usually specify the third Wednesday in March, June, September, or December as the settlement date. There is also an over-the-counter currency futures market, where financial intermediaries facilitate the trading of currency futures contracts with specific settlement dates.

5-2b Trading Currency Futures

Firms or individuals can execute orders for currency futures contracts by calling brokerage firms that serve as intermediaries. The order to buy or sell a currency futures contract for a specific currency and a specific settlement date is communicated to the brokerage firm, which in turn communicates the order to the CME.

For example, some U.S. firms purchase futures contracts on Mexican pesos with a December settlement date in order to hedge their future payables. At the same time, other U.S. firms sell futures contracts on Mexican pesos with a December settlement date in order to hedge their future receivables.

The vast majority of the futures contract orders submitted to the CME are executed by Globex, a computerized platform that matches buy and sell orders for each

standardized contract. Globex operates 23 hours of each weekday (it is closed from 4 p.m. to 5 p.m.).

EXAMPLE Assume that, as of February 10, a futures contract on 62,500 British pounds with a March settlement date is priced at $1.50 per pound. The buyer of this currency futures contract will receive £62,500 on the March settlement date and will pay $93,750 for the pounds (computed as £62,500 × $1.50 per pound plus a commission paid to the broker). The seller of this contract is obligated to sell £62,500 at a price of $1.50 per pound and therefore will receive $93,750 on the settlement date, minus the commission that it owes the broker. ●

Trading Platforms for Currency Futures There are electronic trading platforms that facilitate the trading of currency futures. These platforms serve as a broker because they execute the trades desired. The platform typically sets quotes for currency futures based on an ask price at which one can buy a specified currency for a specified settlement date and a bid price at which one can sell a specified currency. Users of the platforms incur a fee in the form of a difference between the bid and ask prices.

5-2c Comparing Futures to Forward Contracts

Currency futures contracts are similar to forward contracts in that they allow a customer to lock in the exchange rate at which a specific currency is purchased or sold for a specific date in the future. Nevertheless, there are some differences between these contract types, which are summarized in Exhibit 5.3. Currency futures contracts are sold on an exchange, whereas each forward contract is negotiated between a firm and a commercial bank over a telecommunications network. Since currency futures contracts are standardized, they are not as easily tailored to the firm's particular needs.

Corporations that have established relationships with large banks tend to use forward contracts rather than futures contracts because forward contracts are tailored to the precise amount of currency to be purchased (or sold) and the preferred forward date. In contrast, small firms and individuals who do not have established relationships

Exhibit 5.3 Comparison of the Forward and Futures Markets

	FORWARD	FUTURES
Size of contract	Tailored to individual needs.	Standardized.
Delivery date	Tailored to individual needs.	Standardized.
Participants	Banks, brokers, and multinational companies. Public speculation not encouraged.	Banks, brokers, and multinational companies. Qualified public speculation encouraged.
Security deposit	None as such, but compensating bank balances or lines of credit required.	Small security deposit required.
Clearing operation	Handling contingent on individual banks and brokers. No separate clearinghouse function.	Handled by exchange clearinghouse. Daily settlements to the market price.
Marketplace	Telecommunications network.	Central exchange floor with worldwide communications.
Regulation	Self-regulating.	Commodity Futures Trading Commission; National Futures Association.
Liquidation	Most settled by actual delivery; some by offset, but at a cost.	Most by offset; very few by delivery.
Transaction costs	Set by the spread between bank's buy and sell prices.	Negotiated brokerage fees.

Source: *Chicago Mercantile Exchange.*

with large banks (or who prefer to trade in smaller amounts) tend to use currency futures contracts.

Pricing Currency Futures The price of currency futures is normally similar to the forward rate for a given currency and settlement date. This relationship is enforced by the potential arbitrage activity that would occur if there were significant discrepancies.

EXAMPLE Assume that the currency futures price on the British pound is $1.50 and that forward contracts for a similar period are available for $1.48. Firms may attempt to purchase forward contracts and simultaneously sell currency futures contracts. If they can exactly match the settlement dates of the two contracts, they can generate guaranteed profits of $.02 per unit. These actions will place downward pressure on the currency futures price. The futures contract and forward contracts of a given currency and settlement date should have the same price, or else guaranteed profits are possible (assuming no transaction costs). ●

The currency futures price differs from the spot rate for the same reasons that a forward rate differs from the spot rate. If a currency's spot and futures prices were the same and if the currency's interest rate were higher than the U.S. rate, then U.S. speculators could lock in a higher return than they would receive on U.S. investments. They could purchase the foreign currency at the spot rate, invest the funds at the attractive interest rate, and simultaneously sell currency futures to lock in the exchange rate at which they could reconvert the currency back to dollars. If the spot and futures rates were the same, then there could be neither a gain nor a loss on the currency conversion. Therefore, the higher foreign interest rate would yield a higher return with this type of investment. The actions of investors to capitalize on this opportunity would place upward pressure on the spot rate and downward pressure on the currency futures price, causing the futures price to fall below the spot rate.

5-2d Credit Risk of Currency Futures Contracts

Each currency futures contract represents an agreement between a client and the exchange clearinghouse, even though the exchange has not taken a position. To illustrate, assume you call a broker to request the purchase of a British pound futures contract with a March settlement date. Meanwhile, another person unrelated to you calls a broker to request the sale of a similar futures contract. Neither party needs to worry about the credit risk of the counterparty. The exchange clearinghouse assures that you will receive whatever is owed to you as a result of your currency futures position.

To minimize its risk in such a guarantee, the CME imposes margin requirements to cover fluctuations in the value of a contract. In other words, participants must make a deposit with their respective brokerage firms when taking a position. The initial margin requirement is typically between $1,000 and $2,000 per currency futures contract. When the value of the futures contract declines over time, however, the buyer may be asked to maintain an additional margin called the "maintenance margin." Margin requirements are not always required for forward contracts owing to the more personal nature of the agreement; the bank knows the firm it is dealing with and may trust it to fulfill its obligation.

5-2e How Firms Use Currency Futures

Corporations that have open positions in foreign currencies can consider purchasing or selling futures contracts to offset their positions.

Purchasing Futures to Hedge Payables The purchase of futures contracts locks in the price at which a firm can purchase a currency.

EXAMPLE Teton Co. orders Canadian goods and upon delivery will need to send C$500,000 to the Canadian exporter. So Teton purchases Canadian dollar futures contracts today, thereby locking in the price to be paid for Canadian dollars at a future settlement date. By holding futures contracts, Teton does not have to worry about changes in the spot rate of the Canadian dollar over time. ●

Selling Futures to Hedge Receivables The sale of futures contracts locks in the price at which a firm can sell a currency.

EXAMPLE Karla Co. sells futures contracts when its exports are paid for in a currency that it will not need (Karla accepts a foreign currency at the importer's request). By selling a futures contract, Karla Co. locks in the price at which it will be able to sell this currency on the settlement date. This action is especially appropriate if Karla expects the foreign currency to depreciate against its home currency. ●

The use of futures contracts to cover, or hedge, a firm's currency positions is described more thoroughly in Chapter 11.

Closing Out a Futures Position If a firm that buys a currency futures contract decides before the settlement date that it no longer wants to maintain its position, it can close out the position by selling an identical futures contract. The gain or loss to the firm from its previous futures position will depend on the price of purchasing futures versus selling futures.

The price of a futures contract changes over time in accordance with movements in the spot rate and also with changing expectations about what the spot rate's value will be on the settlement date. If the spot rate of a currency increases substantially over a one-month period, then the futures price is likely to increase by about the same amount; in this case, the purchase and subsequent sale of a futures contract would be profitable. Conversely, a substantial decline in the spot rate should lead to a decline in the currency futures price, which means that the purchase and subsequent sale of a futures contract would result in a loss. Although purchasers of such a futures contract could decide not to close out their position under these conditions, the losses from that position could increase over time.

EXAMPLE On January 10, Tacoma Co. anticipates that it will need Australian dollars (A$) in March when it orders supplies from an Australian supplier. Tacoma therefore purchases a futures contract specifying A$100,000 and a March settlement date (which is March 19 for this contract). On January 10, the futures contract is priced at $.53 per A$. On February 15, Tacoma realizes that it will not need to order supplies because it has reduced its production levels. Therefore, it has no need for A$ in March. It sells a futures contract on A$ with the March settlement date to offset the contract it purchased in January. At this time, the futures contract is priced at $.50 per A$. On March 19 (the settlement date), Tacoma has offsetting positions in futures contracts. However, the price when the futures contract was purchased was higher than the price when an identical contract was sold, so Tacoma incurs a loss from these positions. Tacoma's transactions are summarized in Exhibit 5.4.

Exhibit 5.4 Closing Out a Futures Contract

January 10	February 15	March 19 (Settlement Date)
Step 1: Contract to Buy $.53 per A$ × A$100,000 = $53,000 at the settlement date	**Step 2: Contract to Sell** $.50 per A$ × A$100,000 = $50,000 at the settlement date	**Step 3: Settle Contracts** − $53,000 (Contract 1) + $50,000 (Contract 2) = $3,000 loss

WEB

www.cmegroup.com
Provides the open price, high and low prices for the day, closing (last) price, and trading volume.

Move from left to right along the time line to review the transactions. The example does not incorporate margin requirements. ●

Sellers of futures contracts can close out their positions by purchasing currency futures contracts with similar settlement dates. Most currency futures contracts are closed out before the settlement date.

5-2f Speculation with Currency Futures

Currency futures contracts are sometimes purchased by speculators who are simply attempting to capitalize on their expectation of a currency's future movement.

Suppose that speculators expect the British pound to appreciate in the future. They can purchase a futures contract that will lock in the price at which they buy pounds at a specified settlement date. On that date, the speculators can purchase their pounds at the rate specified by the futures contract and then sell these pounds at the spot rate. If the spot rate has appreciated by this time in accordance with their expectations, then this strategy will be profitable.

Currency futures are also sold by speculators who expect that the spot rate of a currency will be less than the rate at which they would be obligated to sell it.

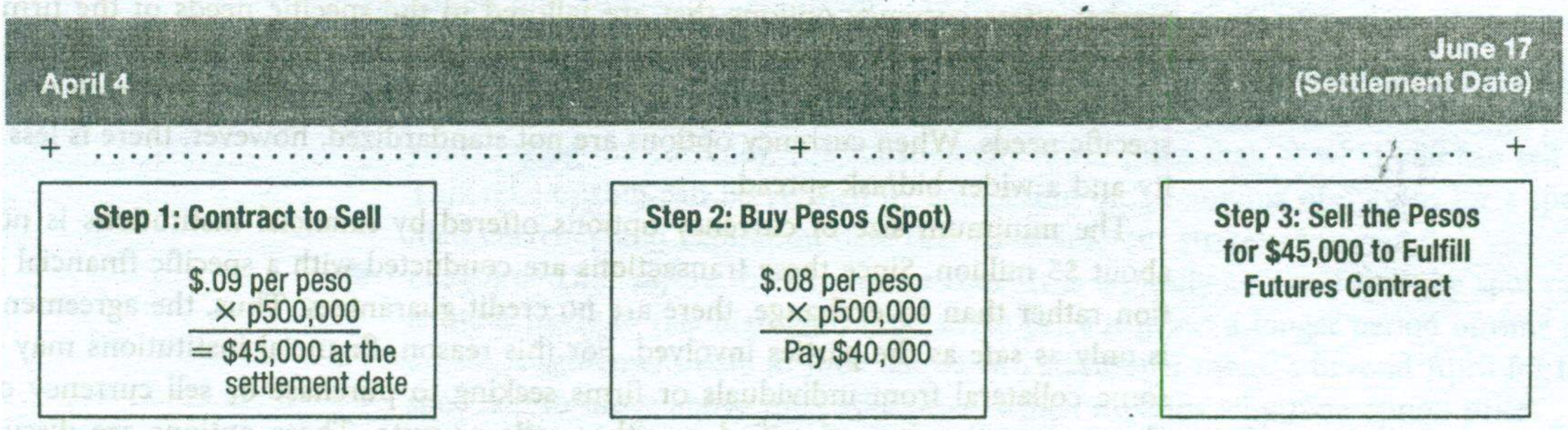
EXAMPLE

Suppose that, as of April 4, a futures contract specifying 500,000 Mexican pesos and a June settlement date is priced at $.09. On April 4, speculators who expect the peso to decline sell futures contracts on pesos. Assume that, on June 17 (the settlement date), the spot rate of the peso is $.08. The transactions are shown in Exhibit 5.5 (once again, the margin deposited by the speculators is not considered). The gain on the futures position is $5,000, which represents the difference between the amount received ($45,000) when selling the pesos in accordance with the futures contract versus the amount paid ($40,000) for those pesos in the spot market. ●

Of course, expectations are often incorrect. It is because of different expectations that, at any point in time, there will be some speculators wanting to purchase futures contracts and other speculators wanting to sell those same contracts.

Efficiency of the Currency Futures Market If the currency futures market is efficient, then at any time the futures price for a currency should reflect all available information. That is, the price should represent an unbiased estimate of the currency's spot rate on the settlement date. For this reason, the continual use of a particular strategy to take positions in currency futures contracts should not lead to abnormal profits. Some positions will likely result in gains while others will result in losses, and the gains and losses should roughly offset over time. Research has found that in some years, the futures price has been consistently higher than the corresponding price at the settlement date

Exhibit 5.5 Source of Gains from Buying Currency Futures



whereas in other years, the futures price has been consistently lower. This suggests that the currency futures market may be inefficient. Because these unexpected patterns are seldom observable until after they occur, it is practically impossible to consistently generate abnormal profits from speculating in currency futures.

5-3 Currency Options Market

Currency options provide the right to purchase or sell currencies at specified prices. They are available for many currencies, including the Australian dollar, British pound, Brazilian real, Canadian dollar, euro, Japanese yen, Mexican peso, New Zealand dollar, Russian ruble, South African rand, and Swiss franc.

5-3a Option Exchanges

In late 1982, exchanges in Amsterdam, Montreal, and Philadelphia were the first to allow trading in standardized foreign currency options. Since that time, options have been offered on the Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT). Currency options are traded through the Globex system at the CME, even after the trading floor is closed. Thus, currency options are traded virtually around the clock.

In July 2007, the CME and CBOT merged to form CME Group, which serves international markets for derivative products. The CME and CBOT trading floors were consolidated into a single trading floor at the CBOT. In addition, products of the CME and CBOT were consolidated on a single electronic platform, which reduced operating and maintenance expenses. Furthermore, the CME Group established a plan of continual innovation of new derivative products in the international marketplace that would be executed by the CME Group's single electronic platform.

The options exchanges in the United States are regulated by the Securities and Exchange Commission. Options can be purchased or sold through brokers for a commission. The commission per transaction is commonly $30 to $60 for a single currency option, but it can be much lower per contract when the transaction involves multiple contracts. Brokers require that a margin be maintained during the life of the contract. The margin is increased for clients whose option positions have deteriorated. This protects against possible losses if the clients do not fulfill their obligations.

5-3b Over-the-Counter Market

In addition to the exchanges where currency options are available, there is an over-the-counter market where currency options are offered by commercial banks and brokerage firms. Unlike the currency options traded on an exchange, the over-the-counter market offers currency options that are tailored to the specific needs of the firm. Since these options are not standardized, all the terms must be specified in the contracts. The number of units, desired strike price, and expiration date can be set to match the client's specific needs. When currency options are not standardized, however, there is less liquidity and a wider bid/ask spread.

The minimum size of currency options offered by financial institutions is normally about $5 million. Since these transactions are conducted with a specific financial institution rather than an exchange, there are no credit guarantees. Thus, the agreement made is only as safe as the parties involved. For this reason, financial institutions may require some collateral from individuals or firms seeking to purchase or sell currency options. Currency options are classified as either **calls** or **puts**. These options are discussed in the next two section sections, respectively.

5-4 Currency Call Options

A **currency call option** grants the right to buy a specific currency at a designated price within a specific period of time. The price at which the owner is allowed to buy that currency is known as the **exercise price** or **strike price**, and there are monthly expiration dates for each option.

Call options are desirable when one wishes to lock in a maximum price to be paid for a currency in the future. If the spot rate of the currency rises above the strike price, owners of call options can "exercise" their options by purchasing the currency at the strike price, which will be cheaper than the prevailing spot rate. This strategy is similar to that used by purchasers of futures contracts, but the futures contract entails an obligation whereas the currency option does not. That is, the owner can choose to let the option expire on the expiration date without ever exercising it. Owners of expired call options will have lost the premium they initially paid, but that is the most they can lose.

The buyer of a currency call option pays a *premium*, which reflects the price in order to own the option. The seller of a currency call option receives the premium paid by the buyer. In return, the seller is obligated to accommodate the buyer in accordance with the rights of the currency call option.

Currency options quotations are summarized each day in various financial newspapers. Although currency options typically expire near the middle of the specified month, some of them expire at the end of the month and are designated as EOM. Some options are listed as "European style," which means that they can be exercised only upon expiration.

A currency call option is said to be *in the money* when the present exchange rate exceeds the strike price, *at the money* when the present exchange rate equals the strike price, and *out of the money* when the present exchange rate is less than the strike price. For a given currency and expiration date, an in-the-money call option will require a higher premium than options that are at the money or out of the money.

5-4a Factors Affecting Currency Call Option Premiums

The premium on a call option represents the cost of having the right to buy the underlying currency at a specified price. For MNCs that use currency call options to hedge, the premium reflects a cost of insurance or protection.

The call option premium (denoted C) is primarily influenced by three factors:

$$C = f(S - X, T, \sigma)$$
$$\qquad\quad + \quad + \quad +$$

Here $S - X$ is the difference between the spot exchange rate (S) and the strike or exercise price (X), T denotes the time to maturity, and σ (sigma) captures the currency's volatility as measured by the standard deviation of its movements. The relationships between the call option premium and these factors can be summarized as follows.

- *Spot Price Relative to Strike Price.* The higher the spot rate relative to the strike price, the higher the option price will be. The increase is due to the greater probability of your buying the currency at a substantially lower price than at what you can sell it. This relationship can be verified by comparing the premiums of options for a specified currency and expiration date that have different strike prices.
- *Length of Time before the Expiration Date.* It is typically assumed that the spot rate is more likely to rise high above the strike price if it has a longer period of time to do so. A settlement date in June allows two additional months beyond April for the spot rate to move above the strike price, which explains why June option prices exceed April option prices for a specific strike price. This relationship can be verified

by comparing premiums of options for a specified currency and strike price that have different expiration dates.

- *Volatility of the Currency.* The greater the variability in the currency's price, the greater the likelihood of the spot rate rising above the strike price. This is why less volatile currencies have lower call option prices. For example, the Canadian dollar is more stable than most other currencies; if all other factors are similar, then Canadian call options should be less expensive than call options on other foreign currencies.

A currency's volatility can itself vary over time, which can affect the premiums paid on the options for that currency. When the credit crisis intensified in the fall of 2008, speculators were quickly moving their money into and out of various currencies. These actions led to increased volatility in the foreign exchange markets and also caused concerns about future volatility. As a result, option premiums increased.

5-4b How Firms Use Currency Call Options

Corporations with open positions in foreign currencies can sometimes use currency call options to cover these positions.

Using Call Options to Hedge Payables MNCs can purchase call options on a currency to hedge future payables.

EXAMPLE

When Pike Co. of Seattle orders Australian goods, it makes a payment in Australian dollars to the Australian exporter upon delivery. An Australian dollar call option locks in a maximum rate at which Pike can exchange dollars for Australian dollars. This exchange of currencies at the specified strike price on the call option contract can be executed at any time before the expiration date. In essence, the call option contract specifies the maximum price that Pike must pay to obtain these Australian imports. If the Australian dollar's value remains below the strike price, then Pike can purchase Australian dollars at the prevailing spot rate to pay for its imports and simply let the call option expire. ●

Options may be more appropriate than futures or forward contracts in some situations. Intel Corp. uses options to hedge its order backlog in semiconductors. If an order is cancelled, then Intel has the flexibility to let the option contract expire. With a forward contract, the company would be obligated to fulfill its obligation even though the order was cancelled.

Using Call Options to Hedge Project Bidding When a U.S.-based MNC bids on foreign projects, it may purchase call options to lock in the dollar cost of the potential expenses.

EXAMPLE

Kelly Co. is an MNC based in Fort Lauderdale that has bid on a project sponsored by the Canadian government. If the bid is accepted then Kelly will need approximately C$500,000 to purchase Canadian materials and services, but it will not know whether the bid is accepted until three months from now. In this situation, Kelly will want to purchase call options with a three-month expiration date; ten call option contracts will cover the entire amount of potential exposure. If the bid is accepted, Kelly can use the options to purchase the Canadian dollars needed. If the Canadian dollar has depreciated over the three-month period, Kelly will likely let the options expire.

Assume that the exercise price on Canadian dollars is $.70 and that the call option premium is $.02 per unit. Kelly will pay $1,000 per option (since there are 50,000 units per Canadian dollar option), or $10,000 for the ten option contracts. With the options, the maximum amount necessary to purchase the C$500,000 is $350,000 (computed as $.70 per Canadian dollar × C$500,000). Fewer U.S. dollars would be needed if the Canadian dollar's spot rate were below the exercise price at the time the Canadian dollars were purchased.

Even if Kelly's bid is rejected, it will exercise the currency call option (selling the C$ in the spot market) if the Canadian dollar's spot rate exceeds the exercise price before the option expires. Any gain from this exercising may partially or even fully offset the premium paid for the options. ●

Using Call Options to Hedge Target Bidding Firms can also use call options to hedge a possible acquisition.

EXAMPLE Morrison Co. is attempting to acquire a French firm and has submitted its bid in euros. Morrison has purchased call options on the euro because it will need euros to purchase the French company's stock. The call options hedge the U.S. firm against possible appreciation of the euro by the time the acquisition occurs. If the acquisition does not occur and the spot rate of the euro remains below the strike price, then Morrison Co. will let the call options expire. If the acquisition does not occur and the spot rate of the euro exceeds the strike price, then Morrison Co. can either exercise the options (and sell the euros in the spot market) or sell the call options it is holding. Either of these actions may offset part or all of the premium paid for the options. ●

5-4c Speculating with Currency Call Options

Because this text focuses on multinational financial management, the corporate use of currency options is more important than the speculative use. The use of options for hedging is discussed in detail in Chapter 11. Speculative trading is discussed here in order to provide more of a background on the currency options market.

Individuals may speculate in the currency options market based on their expectation of the future movements in a particular currency. Speculators who expect that a foreign currency will appreciate can purchase call options on that currency. If the spot rate of that currency does appreciate, then these speculators can exercise their options by purchasing that currency at the strike price and then selling it at the prevailing spot rate.

Just as with currency futures, for every buyer of a currency call option there must be a seller. A seller (sometimes called a **writer**) of a call option is obligated to sell a specified currency at a specified price (the strike price) up to a specified expiration date. Speculators may want to sell their call options on a currency they expect to depreciate in the future. The only way a currency call option will be exercised is if the spot rate is higher than the strike price. Thus, the seller of a currency call option receives the premium when the option is purchased and can keep the entire amount if the option is not exercised. When it appears that an option will be exercised, there will still be sellers of options. However, such options will sell for high premiums due to the high risk that the option will be exercised at some point.

The net profit to a speculator from trading call options on a currency is based on a comparison of the selling price of the currency versus the exercise price paid for the currency and the premium paid for the call option.

EXAMPLE Jim is a speculator who buys a British pound call option with a strike price of $1.40 and a December settlement date. The current spot price as of that date is about $1.39. Jim pays a premium of $.012 per unit for the call option. Assume there are no brokerage fees. Just before the expiration date, the spot rate of the British pound reaches $1.41. At this time, Jim exercises the call option and then immediately sells the pounds (to a bank) at the spot rate. In order to determine Jim's profit or loss, first compute his revenues from selling the currency. Then, from this amount subtract not only the purchase price of pounds when exercising the option but also the purchase price of the option. The computations are summarized in the following table; assume that one option contract specifies 31,250 units.

	PER UNIT	PER CONTRACT
Selling price of £	$1.41	$44,063 ($1.41 × 31,250 units)
– Purchase price of £	–1.40	–43,750 ($1.40 × 31,250 units)
– Premium paid for option	–.012	–375 ($.012 × 31,250 units)
= Net profit	–$.002	–$62 (–$.002 × 31,250 units)

Suppose that Linda was the seller of the call option purchased by Jim. Suppose also that Linda would purchase British pounds only if the option is exercised, at which time she must provide the pounds at the exercise price of $1.40. Using the information in this example, Linda's net profit from selling the call option is derived as follows.

	PER UNIT	PER CONTRACT
Selling price of £	$1.40	$43,750 ($1.40 × 31,250 units)
− Purchase price of £	−1.41	−44,063 ($1.41 × 31,250 units)
+ Premium received	+.012	+375 ($.012 × 31,250 units)
= Net profit	$.002	$62 ($.002 × 31,250 units)

As a second example, assume the following information.

- Call option premium on Canadian dollars (C$) = $.01 per unit.
- Strike price = $.70.
- One Canadian dollar option contract represents C$50,000.

A speculator who had purchased this call option decided to exercise the option shortly before the expiration date, when the spot rate reached $.74. The speculator then immediately sold the Canadian dollars in the spot market. Given this information, the net profit to the speculator is calculated as follows.

	PER UNIT	PER CONTRACT
Selling price of C$	$.74	$37,000 ($.74 × 50,000 units)
− Purchase price of C$	−.70	−35,000 ($.70 × 50,000 units)
− Premium paid for option	−.01	−500 ($.01 × 50,000 units)
= Net profit	$.03	$1,500 ($.03 × 50,000 units)

However, if the seller of the call option did not obtain Canadian dollars until the option was about to be exercised, the net profit to the seller of this call option was

	PER UNIT	PER CONTRACT
Selling price of C$	$.70	$35,000 ($.70 × 50,000 units)
− Purchase price of C$	−.74	−37,000 ($.74 × 50,000 units)
+ Premium received	+.01	+500 ($.01 × 50,000 units)
= Net profit	−$.03	−$1,500 (−$.03 × 50,000 units)

When brokerage fees are ignored, the currency call purchaser's gain will be the seller's loss. The currency call purchaser's expenses represent the seller's revenues, and the purchaser's revenues represent the seller's expenses. Yet because it is possible for purchasers and sellers of options to close out their positions, the relationship described here will not hold unless both parties establish and close out their positions at the same time.

An owner of a currency option may simply sell the option to someone else (before the expiration date) rather than exercising it. The owner could still earn a profit because the option premium changes over time to reflect the probability that the option will be exercised and the potential profit from exercising it.

Break-Even Point from Speculation The purchaser of a call option will break even if the revenue from selling the currency equals the payments made for the currency (at the strike price) plus the option premium. In other words, regardless of how many units a contract is for, a purchaser will break even if the spot rate at which the currency is sold is equal to the strike price plus the option premium.

EXAMPLE Based on the information in the previous example, the strike price is $.70 and the option premium is $.01. Thus, for the purchaser to break even, the spot rate at the time the call is exercised must be $.71 (i.e., $.70 + $.01). Of course, speculators will not purchase a call option if they think the spot rate will not surpass the break-even point before the option's expiration date. Nevertheless, calculating the break-even point is useful exercise for any speculator deciding whether or not to purchase a particular currency call option. ●

Speculation by MNCs Some financial institutions may have a division that uses currency options (and other currency derivatives) to speculate on future exchange rate movements. However, most MNCs use currency derivatives for hedging and not for speculation. Multinational corporations should use shareholder and creditor funds to pursue their goal of being market leader in some product or service; it would be irresponsible if the firm instead used those funds to speculate in currency derivatives. An MNC's board of directors attempts to ensure that the MNC's operations are consistent with its goals.

5-5 Currency Put Options

The owner of a **currency put option** has the right to sell a currency at a specified price (the strike price) within a specified period of time. As with currency call options, the owner of a put option is not obligated to exercise the option. Therefore, the maximum potential loss to the owner of the put option is the price (or premium) paid for the option contract.

The premium of a currency put option reflects the price of the option. The seller of a currency put option receives the premium paid by the buyer (owner). In return, the seller is obligated to accommodate the buyer in accordance with the rights of the currency put option.

A currency put option is said to be *in the money* when the present exchange rate is less than the strike price, *at the money* when the present exchange rate equals the strike price, and *out of the money* when the present exchange rate exceeds the strike price. For a given currency and expiration date, an in-the-money put option will require a higher premium than options that are at the money or out of the money.

5-5a Factors Affecting Currency Put Option Premiums

The put option premium (denoted P) is primarily influenced by three factors, as the following equation shows:

$$P = f(S - X, T, \sigma)$$
$$+ \quad + \quad +$$

As before, $S - X$ is the difference between the spot exchange rate and the strike or exercise price, T is time to maturity, and σ is the standard deviation of movements in the currency. The relationships between the put option premium and these factors, which also influence call option premiums as described previously, are summarized next.

First, the spot rate of a currency relative to the strike price is important. The lower the spot rate relative to the strike price, the more valuable the put option will be because there is a greater probability that the option will be exercised. Recall that just the opposite relationship held for call options. A second factor influencing the put option premium is the length of time until the expiration date. As with currency call options, the longer the time to expiration, the greater the put option premium will be. A longer period is associated with a greater likelihood that the currency will move into a range where it will be feasible to exercise the option. These relationships can be verified by assessing the quotations of put option premiums for a specified currency. A third factor

that influences the put option premium is the currency's volatility. As with currency call options, greater variability increases the put option's premium, again reflecting a higher probability that the option may be exercised.

5-5b Hedging with Currency Put Options

Corporations with open positions in foreign currencies can sometimes use currency put options to cover these positions.

EXAMPLE Assume Duluth Co. has exported products to Canada and invoiced the products in Canadian dollars (at the request of the Canadian importers). Duluth is concerned that the Canadian dollars it receives will depreciate over time. To insulate itself against such depreciation, Duluth purchases Canadian dollar put options that entitle the company to sell Canadian dollars at the specified strike price. In essence, Duluth locks in the minimum rate at which it can exchange Canadian dollars for U.S. dollars over a specified period of time. If the Canadian dollar appreciates over this period, then Duluth can let the put options expire and simply sell the Canadian dollars it receives at the prevailing spot rate. ●

At any time, some put options are deep out of the money; this means that the prevailing exchange rate is high above the exercise price. These options are cheaper (have a lower premium) because their low price makes it unlikely they will be exercised. Analogously, the exercise price of other put options is currently far above the prevailing exchange rate and so they are much more likely to be exercised; hence these options are more expensive.

EXAMPLE Cisco Systems faces a trade-off when using put options to hedge the remittance of earnings from Europe to the United States. It can create a hedge that is cheap, but then the options can be exercised only if the currency's spot rate declines substantially. Alternatively, Cisco can create a hedge that can be exercised at a more favorable exchange rate, but then the options' premium will be higher. If Cisco's goal in using put options is simply to prevent a major loss if the currency weakens substantially, then it may prefer the inexpensive put option (low exercise price, low premium). However, if its goal is to ensure that the currency can be exchanged at a more favorable exchange rate, then Cisco should use a more expensive put option (high exercise price, high premium). By selecting currency options with an exercise price and premium that fits their objectives, Cisco and other MNCs can increase their value. ●

5-5c Speculating with Currency Put Options

Individuals may speculate with currency put options based on their expectations of the future movements in a particular currency. For example, speculators who expect that the British pound will depreciate can purchase British pound put options, which will entitle them to sell British pounds at a specified strike price. If the pound's spot rate depreciates as expected, then speculators can purchase pounds at the spot rate and exercise their put options by selling these pounds at the strike price.

Speculators can also attempt to profit from selling currency put options. The seller of such options is obligated to purchase the specified currency at the strike price from the owner who exercises the put option. Speculators who believe the currency will appreciate (or at least will not depreciate) may sell a currency put option. If the currency appreciates over the entire period, the option will not be exercised. This is an ideal situation for put option sellers because they keep the premiums received when the options were sold yet bear no cost.

The net profit to a speculator from trading put options on a currency is based on a comparison of the exercise price at which the currency can be sold versus the purchase price of the currency and the premium paid for the put option.

EXAMPLE A put option contract on British pounds specifies the following information.

- Put option premium on British pound (£) = $.04 per unit.
- Strike price = $1.40.
- One option contract represents £31,250.

A speculator who had purchased this put option decided to exercise the option shortly before the expiration date, when the spot rate of the pound was $1.30. The speculator purchased the pounds in the spot market at that time. Given this information, the net profit to the purchaser of the put option is calculated as follows.

	PER UNIT	PER CONTRACT
Selling price of £	$1.40	$43,750 ($1.40 × 31,250 units)
− Purchase price of £	−1.30	−40,625 ($1.30 × 31,250 units)
− Premium paid for option	−.04	−1,250 ($.04 × 31,250 units)
= Net profit	$.06	$1,875 ($.06 × 31,250 units)

Assuming that the seller of the put option sold the pounds received immediately after the option was exercised, the net profit to the seller of the put option is as follows.

	PER UNIT	PER CONTRACT
Selling price of £	$1.30	$40,625 ($1.30 × 31,250 units)
− Purchase price of £	−1.40	−43,750 ($1.40 × 31,250 units)
+ Premium received	+.04	+1,250 ($.04 × 31,250 units)
= Net profit	−$.06	−$1,875 (−$.06 × 31,250 units)

The seller of the put options could simply refrain from selling the pounds (after being forced to buy them at $1.40 per pound) until the spot rate of the pound rises. However, there is no guarantee that the pound will reverse its direction and begin to appreciate. Unless the pounds are sold immediately, the seller's net loss would be still greater if the pound's spot rate continued to fall.

Whatever an owner of a put option gains, the seller loses (and vice versa). This relationship would hold in the absence of brokerage costs and if the buyer and seller of options entered and closed their positions at the same time. Of course, there are brokerage fees for currency options; these fees are similar in magnitude to those for currency futures contracts.

Speculating with Combined Put and Call Options For volatile currencies, one speculative strategy is to create a **straddle**, which uses both a put option and a call option at the same exercise price. This may seem unusual, given that owning a put option is appropriate when the currency is expected to depreciate while owning a call option is appropriate when that the currency is expected to appreciate. However, it is possible that the currency will depreciate (at which time the put is exercised) and then reverse direction and appreciate (allowing for profits when exercising the call).

Also, a speculator might anticipate that a currency will be substantially affected by current economic events yet be uncertain of the effect's direction. By purchasing both a put option and a call option, the speculator will gain if the currency moves substantially in either direction. Although two options are purchased and only one is exercised, the gains could more than offset the costs.

Efficiency of the Currency Options Market If the currency options market is efficient, then the premiums on currency options properly reflect all available information.

Under such conditions, it may be difficult for speculators to consistently generate abnormal profits when speculating in this market. Research has found that, when transaction costs are controlled for, the currency options market is efficient. Although some trading strategies could have generated abnormal gains in specific periods, the same strategies would have incurred large losses if implemented in other periods. It is always difficult to predict which strategy will generate abnormal profits in future periods.

5-5d Contingency Graph for the Purchaser of a Call Option

A **contingency graph** for the purchaser of a call option compares the price paid for that option to the payoffs received under various exchange rate scenarios.

EXAMPLE A British pound call option is available with a strike price of $1.50 and a call premium of $.02. A speculator plans to exercise the option on the expiration date (if appropriate at that time) and then immediately sell the pounds received in the spot market. Under these conditions, a contingency graph can be created to measure the profit or loss per unit (see the upper left diagram in Exhibit 5.6). Observe that if the future spot rate is $1.50 or less then the net gain per unit is −$.02 (ignoring transaction costs). This represents the loss of the premium per unit paid for the option, since the option would not be exercised. At a future spot rate of $1.51, the speculator would earn $.01 per unit by exercising the option; considering the $.02 premium paid, however, the net gain would be −$.01.

At a future spot rate of $1.52, the speculator would earn $.02 per unit by exercising the option, which would offset the $.02 premium per unit. This is the break-even point. At any rate above this point, the gain from exercising the option would more than offset the premium, resulting in a positive net gain. The maximum loss to the speculator in this example is the premium paid for the option. ●

5-5e Contingency Graph for the Seller of a Call Option

A contingency graph for the seller of a call option compares the premium received from selling that option to the payoffs made to the option's buyer under various exchange rate scenarios.

EXAMPLE The lower left diagram in Exhibit 5.6 plots the contingency graph for a speculator who sold the call option described in the previous example; it assumes that this seller would purchase the pounds in the spot market just as the option was exercised (ignoring transaction costs). At future spot rates of less than $1.50, the net gain to the seller would be the premium of $.02 per unit (since the option would not have been exercised). If the future spot rate is $1.51, then the seller would lose $.01 per unit on the option transaction (paying $1.51 for pounds in the spot market and selling pounds for $1.50 to fulfill the exercise request). Yet this loss would be more than offset by the premium of $.02 per unit received, resulting in a net gain of $.01 per unit.

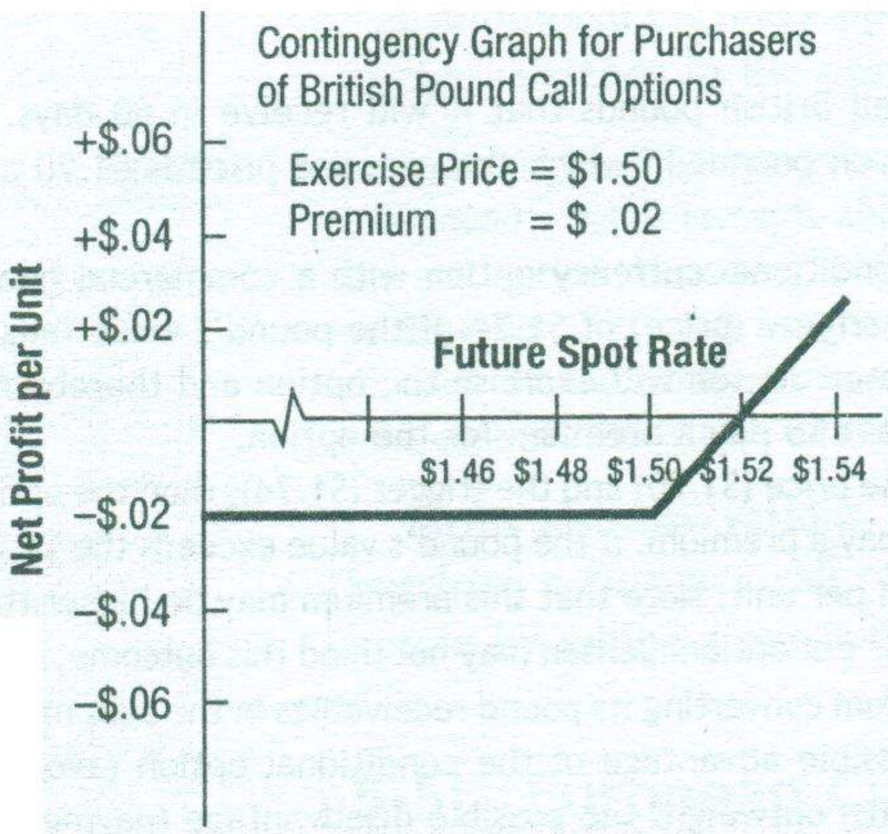
The break-even price is therefore $1.52, and the net gain to the seller of a call option becomes negative at all higher future spot rates. Notice that the contingency graphs for the buyer and seller of this call option are mirror images of one another. ●

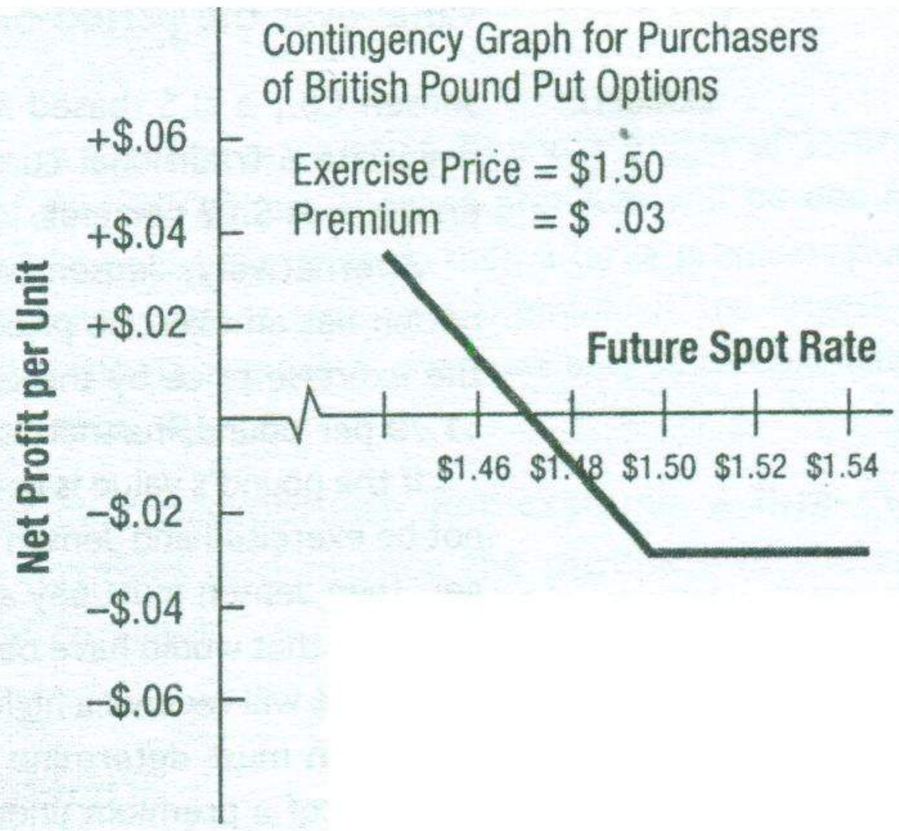
5-5f Contingency Graph for the Buyer of a Put Option

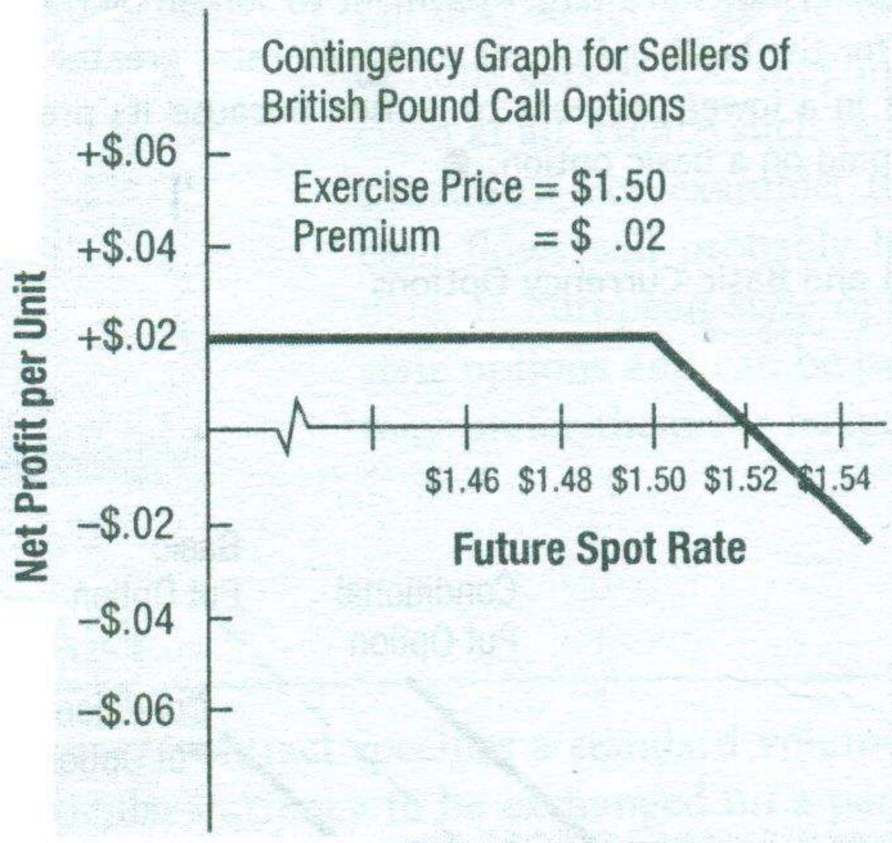
A contingency graph for the buyer of a put option compares the premium paid for that to the payoffs received under various exchange rate scenarios.

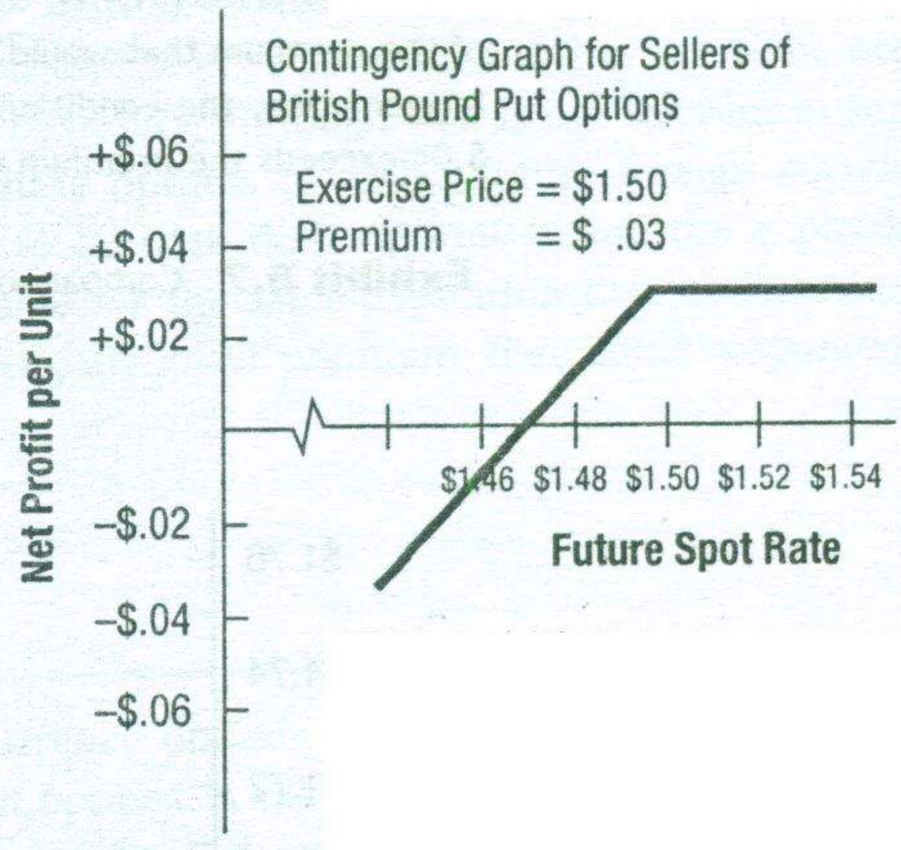
EXAMPLE The upper right diagram in Exhibit 5.6 shows the net gains to a buyer of a British pound put option with an exercise price of $1.50 and a premium of $.03 per unit. If the future spot rate is above $1.50 then the option will not be exercised. At a future spot rate of $1.48, the put option will be exercised. In that case, however, the premium of $.03 per unit entails a net loss of $.01 per unit. The break-even point in this example is $1.47, since this is the future spot rate that will generate $.03 per unit from exercising the option to offset the $.03 premium. At any future spot rates lower than $1.47, the buyer of the put option will earn a positive net gain. ●

Exhibit 5.6 Contingency Graphs for Currency Options









5-5g Contingency Graph for the Seller of a Put Option

A contingency graph for the seller of a put option compares the premium received from selling that option to the payoffs made to the option's buyer under various exchange rate scenarios. The graph is shown as the lower right graph in Exhibit 5.6 and is the mirror image of the contingency graph for the buyer of a put option.

For various reasons, an option buyer's net gain will not always represent an option seller's net loss. The buyer may be using call options to hedge a foreign currency rather than to speculate. In that case, the buyer does not evaluate the options position taken by measuring a net gain or loss; the option is used simply for protection. In addition, sellers of call options on a currency in which they currently maintain a position will not need to purchase that currency when an option is exercised; they can simply liquidate their position in order to provide the currency to the party exercising the option.

5-5h Conditional Currency Options

A currency option can be structured with a *conditional premium.* This means that the premium paid for the option is conditioned on the actual movement in the currency's value over the period of concern.

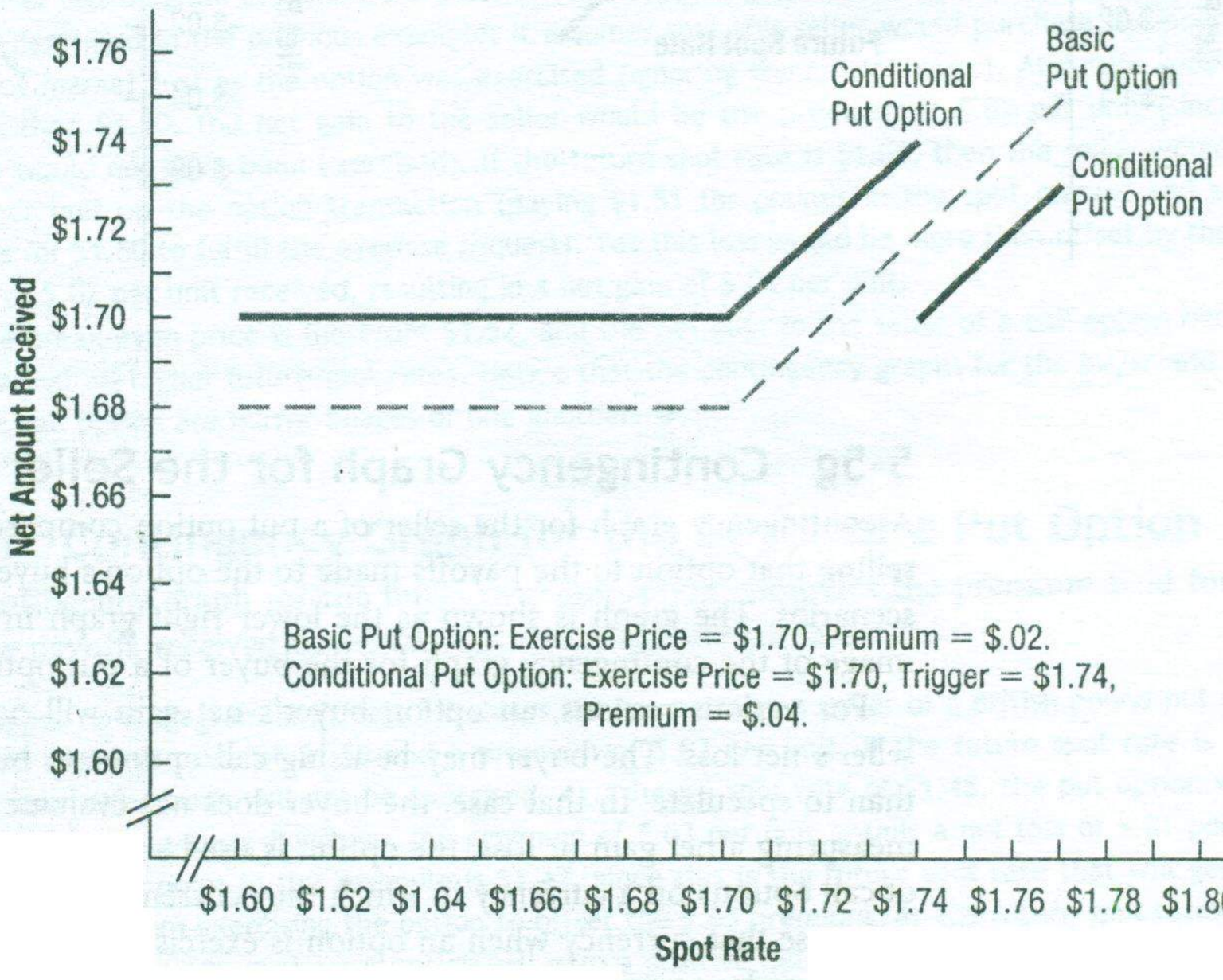
EXAMPLE Jensen Co., a U.S.-based MNC, needs to sell British pounds that it will receive in 60 days. It can negotiate a traditional currency put option on pounds in which the exercise price is $1.70 and the premium is $.02 per unit.

Alternatively, Jensen can negotiate a conditional currency option with a commercial bank; this option has an exercise price of $1.70 and a *trigger* (price) of $1.74. If the pound's value falls below the exercise price by the expiration date, then Jensen will exercise the option and thereby receive $1.70 per pound; furthermore, it will not have to pay a premium for the option.

If the pound's value is between the exercise price ($1.70) and the trigger ($1.74), then the option will not be exercised and Jensen will not have to pay a premium. If the pound's value exceeds the $1.74 trigger, then Jensen must pay a premium of $.04 per unit. Note that this premium may be higher than the premium that would have been paid for a basic put option. Jensen may not mind this outcome, however, because it will receive a high dollar amount from converting its pound receivables in the spot market.

Jensen must determine whether the possible advantage of the conditional option (avoiding the payment of a premium under some conditions) outweighs the possible disadvantage (paying a higher premium than would be needed for a traditional put option on British pounds). The potential advantage and disadvantage are both illustrated in Exhibit 5.7. At exchange rates less than or equal to the trigger price ($1.74), the conditional option results in a larger payment to Jensen by the amount of the premium that would have been paid for the basic option. At exchange rates greater than the trigger price, the conditional option results in a lower payment to Jensen because its premium of $.04 exceeds the premium of $.02 per unit paid on a basic option. ●

Exhibit 5.7 Comparison of Conditional and Basic Currency Options



The choice of a basic versus a conditional option depends on expectations about the currency's exchange rate over the period of concern. In the previous example, if a is confident that the pound's value will not exceed $1.74 then it should prefer the conditional currency option.

Conditional currency options are also available for U.S. firms that need to purchase a foreign currency in the near future.

EXAMPLE A conditional call option on pounds may specify an exercise price of $1.70 and a trigger of $1.67 If the pound's value remains above the trigger of the call option, then no premium will be due for the call option. However, if the pound's value falls below the trigger, then a large premium (such as $.04 per unit) will be charged. Some conditional options require a premium if the trigger is reached at any time before the expiration date; others require a premium only if the exchange rate exceeds the trigger on the actual expiration date. ●

Firms also use various combinations of currency options. For example, a firm may purchase a currency call option to hedge payables and finance the purchase of the call option by selling a put option on the same currency.

5-5i European Currency Options

The discussion of currency options up to this point has dealt solely with so-called American-style options. European-style currency options are also available for speculating and hedging in the foreign exchange market. These are similar to American-style options except that they must be exercised on the expiration date if they are to be exercised at all. Hence such options offer less flexibility, although that is not relevant in some situations. For example, firms that purchase options to hedge future foreign currency cash flows will probably have no desire to exercise their options before the expiration date. If European-style options are available for the same expiration date as American-style options and can be purchased for a slightly lower premium, then some corporations may prefer them for hedging.

SUMMARY

- A forward contract specifies a standard volume of a particular currency to be exchanged on a particular date. Such a contract can be either purchased by a firm to hedge payables or sold by a firm to hedge receivables. A currency futures contract can be purchased by speculators who expect the currency to appreciate; it can also be sold by speculators who expect that currency to depreciate. If the currency depreciates then the value of the futures contract declines, allowing those speculators to benefit when they close out their positions.
- Futures contracts on a particular currency can be purchased by corporations that have payables in that currency and wish to hedge against its possible appreciation. Conversely, these contracts can be sold by corporations that have receivables in that currency and wish to hedge against its possible depreciation.
- Currency options are classified as call options or put options. A call options gives its owner the right to purchase a specified currency at a specified exchange rate by a specified expiration date. Likewise, put options give the right to sell a specified currency at a specified exchange rate by a specified expiration date.

  Call options on a specific currency can be purchased by speculators who expect that currency to appreciate. Put options on a specific currency can be purchased by speculators who expect that currency to depreciate.
- Currency call options are often purchased by corporations that have payables in a currency that is expected to appreciate. Currency put options are frequently purchased by corporations that have receivables in a currency that is expected to depreciate.

POINT COUNTER-POINT

Should Speculators Use Currency Futures or Options?

Point Speculators should use currency futures because they can avoid a substantial premium. To the extent that they are willing to speculate, they must have confidence in their expectations. If they have sufficient confidence in their expectations, they should bet on their expectations without having to pay a large premium to cover themselves if they are wrong. If they do not have confidence in their expectations, they should not speculate at all.

Counter-Point Speculators should use currency options to fit the degree of their confidence. For example, if they are very confident that a currency will appreciate substantially, but want to limit their investment, they can buy deep out-of-the-money options. These options have a high exercise price but a low premium and therefore require a small investment. Alternatively, they can buy options that have a lower exercise price (higher premium), which will likely generate a greater return if the currency appreciates. Speculation involves risk. Speculators must recognize that their expectations may be wrong. While options require a premium, the premium is worthwhile to limit the potential downside risk. Options enable speculators to select the degree of downside risk that they are willing to tolerate.

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. A call option on Canadian dollars with a strike price of $.60 is purchased by a speculator for a premium of $.06 per unit. Assume there are 50,000 units in this option contract. If the Canadian dollar's spot rate is $.65 at the time the option is exercised, what is the net profit per unit and for one contract to the speculator? What would the spot rate need to be at the time the option is exercised for the speculator to break even? What is the net profit per unit to the seller of this option?

2. A put option on Australian dollars with a strike price of $.80 is purchased by a speculator for a premium of $.02. If the Australian dollar's spot rate is $.74 on the expiration date, should the speculator exercise the option on this date or let the option expire? What is the net profit per unit to the speculator? What is the net profit per unit to the seller of this put option?

3. Longer-term currency options are becoming more popular for hedging exchange rate risk. Why do you think some firms decide to hedge by using other techniques instead of purchasing long-term currency options?

4. The spot rate of the New Zealand dollar is $.70. A call option on New Zealand dollars with a 1-year expiration date has an exercise price of $.71 and a premium of $.02. A put option on New Zealand dollars at the money with a 1-year expiration date has a premium of $.03. You expect that the New Zealand dollar's spot rate will rise over time and will be $.75 in 1 year.

a. Today, Jarrod purchased call options on New Zealand dollars with a 1-year expiration date. Estimate the profit or loss per unit for Jarrod at the end of 1 year. [Assume that the options would be exercised on the expiration date or not at all.]

b. Today, Laurie sold put options on New Zealand dollars at the money with a 1-year expiration date. Estimate the profit or loss per unit for Laurie at the end of 1 year. [Assume that the options would be exercised on the expiration date or not at all.]

5. You often take speculative positions in options on euros. One month ago, the spot rate of the euro was $1.49, and the 1-month forward rate was $1.50. At that time, you sold call options on euros at the money. The premium on that option was $.02. Today is when the option will be exercised if it is feasible to do so.

a. Determine your profit or loss per unit on your option position if the spot rate of the euro is $1.55 today.

b. Repeat question a, but assume that the spot rate of the euro today is $1.48.

QUESTIONS AND APPLICATIONS

1. Forward versus Futures Contracts Compare and contrast forward and futures contracts.

2. Using Currency Futures

a. How can currency futures be used by corporations?

b. How can currency futures be used by speculators?

3. Currency Options Differentiate between a currency call option and a currency put option.

4. Forward Premium Compute the forward discount or premium for the Mexican peso whose 90-day forward rate is $.102 and spot rate is $.10. State whether your answer is a discount or premium.

5. Effects of a Forward Contract How can a forward contract backfire?

6. Hedging with Currency Options When would a U.S. firm consider purchasing a call option on euros for hedging? When would a U.S. firm consider purchasing a put option on euros for hedging?

7. Speculating with Currency Options When should a speculator purchase a call option on Australian dollars? When should a speculator purchase a put option on Australian dollars?

8. Currency Call Option Premiums List the factors that affect currency call option premiums and briefly explain the relationship that exists for each. Do you think an at-the-money call option in euros has a higher or lower premium than an at-the-money call option in Mexican pesos (assuming the expiration date and the total dollar value represented by each option are the same for both options)?

9. Currency Put Option Premiums List the factors that affect currency put option premiums and briefly explain the relationship that exists for each.

10. Speculating with Currency Call Options Randy Rudecki purchased a call option on British pounds for $.02 per unit. The strike price was $1.45, and the spot rate at the time the option was exercised was $1.46. Assume there are 31,250 units in a British pound option. What was Randy's net profit on this option?

11. Speculating with Currency Put Options Alice Duever purchased a put option on British pounds for $.04 per unit. The strike price was $1.80, and the spot rate at the time the pound option was exercised was $1.59. Assume there are 31,250 units in a British pound option. What was Alice's net profit on the option?

12. Selling Currency Call Options Mike Suerth sold a call option on Canadian dollars for $.01 per unit. The strike price was $.76, and the spot rate at the time the option was exercised was $.82. Assume Mike did not obtain Canadian dollars until the option was exercised. Also assume that there are 50,000 units in a Canadian dollar option. What was Mike's net profit on the call option?

13. Selling Currency Put Options Brian Tull sold a put option on Canadian dollars for $.03 per unit. The strike price was $.75, and the spot rate at the time the option was exercised was $.72. Assume Brian immediately sold off the Canadian dollars received when the option was exercised. Also assume that there are 50,000 units in a Canadian dollar option. What was Brian's net profit on the put option?

14. Forward versus Currency Option Contracts What are the advantages and disadvantages to a U.S. corporation that uses currency options on euros rather than a forward contract on euros to hedge its exposure in euros? Explain why an MNC may use forward contracts to hedge committed transactions and use currency options to hedge contracts that are anticipated but not committed. Why might forward contracts be advantageous for committed transactions, and currency options be advantageous for anticipated transactions?

15. Speculating with Currency Futures Assume that the euro's spot rate has moved in cycles over time. How might you try to use futures contracts on euros to capitalize on this tendency? How could you determine whether such a strategy would have been profitable in previous periods?

16. Hedging with Currency Derivatives Assume that the transactions listed in the first column of the table below are anticipated by U.S. firms that have no other foreign transactions. Place an "X" in the table wherever you see possible ways to hedge each of the transactions.

	FORWARD CONTRACT		FUTURES CONTRACT		OPTIONS CONTRACT	
	FORWARD PURCHASE	FORWARD SALE	BUY FUTURES	SELL FUTURES	PURCHASE A CALL	PURCHASE A PUT
a. Georgetown Co. plans to purchase Japanese goods denominated in yen.						
b. Harvard, Inc., will sell goods to Japan, denominated in yen.						
c. Yale Corp. has a subsidiary in Australia that will be remitting funds to the U.S. parent.						
d. Brown, Inc., needs to pay off existing loans that are denominated in Canadian dollars.						
e. Princeton Co. may purchase a company in Japan in the near future (but the deal may not go through).						

17. Price Movements of Currency Futures Assume that on November 1, the spot rate of the British pound was $1.58 and the price on a December futures contract was $1.59. Assume that the pound depreciated during November so that by November 30 it was worth $1.51.

a. What do you think happened to the futures price over the month of November? Why?

b. If you had known that this would occur, would you have purchased or sold a December futures contract in pounds on November 1? Explain.

18. Speculating with Currency Futures Assume that a March futures contract on Mexican pesos was available in January for $.09 per unit. Also assume that forward contracts were available for the same settlement date at a price of $.092 per peso. How could speculators capitalize on this situation, assuming zero transaction costs? How would such speculative activity affect the difference between the forward contract price and the futures price?

19. Speculating with Currency Call Options LSU Corp. purchased Canadian dollar call options for **speculative** purposes. If these options are exercised, LSU will immediately sell the Canadian dollars in the spot market. Each option was purchased for a premium of $.03 per unit, with an exercise price of $.75. LSU plans to wait until the expiration date before deciding whether to exercise the options. Of course, LSU will exercise the options at that time only if it is feasible to do so. In the following table, fill in the net profit (or loss) per unit to LSU Corp. based on the listed possible spot rates of the Canadian dollar on the expiration date.

POSSIBLE SPOT RATE OF CANADIAN DOLLAR ON EXPIRATION DATE	NET PROFIT (LOSS) PER UNIT TO LSU CORP.
$.76	
.78	
.80	
.82	
.85	
.87	

20. Speculating with Currency Put Options Auburn Co. has purchased Canadian dollar put options for speculative purposes. Each option was purchased for a premium of $.02 per unit, with an **exercise** price of $.86 per unit. Auburn Co. will purchase the Canadian dollars just before it exercises the options

(if it is feasible to exercise the options). It plans to wait until the expiration date before deciding whether to exercise the options. In the following table, fill in the net profit (or loss) per unit to Auburn Co. based on the listed possible spot rates of the Canadian dollar on the expiration date.

POSSIBLE SPOT RATE OF CANADIAN DOLLAR ON EXPIRATION DATE	NET PROFIT (LOSS) PER UNIT TO AUBURN CO.
$.76	
.79	
.84	
.87	
.89	
.91	

21. Speculating with Currency Call Options Bama Corp. has sold British pound call options for speculative purposes. The option premium was $.06 per unit, and the exercise price was $1.58. Bama will purchase the pounds on the day the options are exercised (if the options are exercised) in order to fulfill its obligation. In the following table, fill in the net profit (or loss) to Bama Corp. if the listed spot rate exists at the time the purchaser of the call options considers exercising them.

POSSIBLE SPOT RATE AT THE TIME PURCHASER OF CALL OPTIONS CONSIDERS EXERCISING THEM	NET PROFIT (LOSS) PER UNIT TO BAMA CORP.
$1.53	
1.55	
1.57	
1.60	
1.62	
1.64	
1.68	

22. Speculating with Currency Put Options Bulldog, Inc., has sold Australian dollar put options at a premium of $.01 per unit, and an exercise price of $.76 per unit. It has forecasted the Australian dollar's lowest level over the period of concern as shown in the following table. Determine the net profit (or loss) per unit to Bulldog, Inc., if each level occurs and the put options are exercised at that time.

NET PROFIT (LOSS) TO BULLDOG, INC. IF VALUE OCCURS	
$.72	
.73	
.74	
.75	
.76	

23. Hedging with Currency Derivatives A U.S. professional football team plans to play an exhibition game in the United Kingdom next year. Assume that all expenses will be paid by the British government, and that the team will receive a check for 1 million pounds. The team anticipates that the pound will depreciate substantially by the scheduled date of the game. In addition, the National Football League must approve the deal, and approval (or disapproval) will not occur for 3 months. How can the team hedge its position? What is there to lose by waiting 3 months to see if the exhibition game is approved before hedging?

Advanced Questions

24. Risk of Currency Futures Currency futures markets are commonly used as a means of capitalizing on shifts in currency values, because the value of a futures contract tends to move in line with the change in the corresponding currency value. Recently, many currencies appreciated against the dollar. Most speculators anticipated that these currencies would continue to strengthen and took large buy positions in currency futures. However, the Fed intervened in the foreign exchange market by immediately selling foreign currencies in exchange for dollars, causing an abrupt decline in the values of foreign currencies (as the dollar strengthened). Participants that had purchased currency futures contracts incurred large losses. One floor broker responded to the effects of the Fed's intervention by immediately selling 300 futures contracts on British pounds (with a value of about $30 million). Such actions caused even more panic in the futures market.

a. Explain why the central bank's intervention caused such panic among currency futures traders with buy positions.

b. Explain why the floor broker's willingness to sell 300 pound futures contracts at the going market rate aroused such concern. What might this action signal to other brokers?

c. Explain why speculators with short (sell) positions could benefit as a result of the central bank's intervention.

d. Some traders with buy positions may have responded immediately to the central bank's intervention by selling futures contracts. Why would some speculators with buy positions leave their positions unchanged or even increase their positions by purchasing more futures contracts in response to the central bank's intervention?

25. Estimating Profits from Currency Futures and Options One year ago, you sold a put option on 100,000 euros with an expiration date of 1 year. You received a premium on the put option of $.04 per unit. The exercise price was $1.22. Assume that 1 year ago, the spot rate of the euro was $1.20, the 1-year forward rate exhibited a discount of 2 percent, and the 1-year futures price was the same as the 1-year forward rate. From 1 year ago to today, the euro depreciated against the dollar by 4 percent. Today the put option will be exercised (if it is feasible for the buyer to do so).

a. Determine the total dollar amount of your profit or loss from your position in the put option.

b. Now assume that instead of taking a position in the put option 1 year ago, you sold a futures contract on 100,000 euros with a settlement date of 1 year. Determine the total dollar amount of your profit or loss.

26. Impact of Information on Currency Futures and Options Prices Myrtle Beach Co. purchases imports that have a price of 400,000 Singapore dollars, and it has to pay for the imports in 90 days. It can purchase a 90-day forward contract on Singapore dollars at $.50 or purchase a call option contract on Singapore dollars with an exercise price of $.50. This morning, the spot rate of the Singapore dollar was $.50. At noon, the central bank of Singapore raised interest rates, while there was no change in interest rates in the United States. These actions immediately increased the degree of uncertainty surrounding the future value of the Singapore dollar over the next 3 months. The Singapore dollar's spot rate remained at $.50 throughout the day.

a. Myrtle Beach Co. is convinced that the Singapore dollar will definitely appreciate substantially over the next 90 days. Would a call option hedge or forward hedge be more appropriate given its opinion?

b. Assume that Myrtle Beach Co. uses a currency options contract to hedge rather than a forward contract. If Myrtle Beach Co. purchased a currency call option contract at the money on Singapore dollars this afternoon, would its total U.S. dollar cash outflows be more than, less than, or the same as the total U.S. dollar cash outflows if it had purchased a currency call option contract at the money this morning? Explain.

27. Currency Straddles Reska, Inc., has constructed a long euro straddle. A call option on euros with an exercise price of $1.10 has a premium of $.025 per unit. A euro put option has a premium of $.017 per unit. Some possible euro values at option expiration are shown in the following table. (See Appendix B in this chapter.)

	VALUE OF EURO AT OPTION EXPIRATION			
	$.90	$1.05	$1.50	$2.00
Call				
Put				
Net				

a. Complete the worksheet and determine the net profit per unit to Reska, Inc., for each possible future spot rate.

b. Determine the break-even point(s) of the long straddle. What are the break-even points of a short straddle using these options?

28. Currency Straddles Refer to the previous question, but assume that the call and put option premiums are $.02 per unit and $.015 per unit, respectively. (See Appendix B in this chapter.)

a. Construct a contingency graph for a long euro straddle.

b. Construct a contingency graph for a short euro straddle.

29. Currency Option Contingency Graphs (See Appendix B in this chapter.) The current spot rate of the Singapore dollar (S$) is $.50. The following option information is available:

- Call option premium on Singapore dollar (S$) = $.015.
- Put option premium on Singapore dollar (S$) = $.009.
- Call and put option strike price = $.55.
- One option contract represents S$70,000.

Construct a contingency graph for a short straddle using these options.

30. Speculating with Currency Straddles Maggie Hawthorne is a currency speculator. She has noticed that recently the euro has appreciated substantially against

the U.S. dollar. The current exchange rate of the euro is $1.15. After reading a variety of articles on the subject, she believes that the euro will continue to fluctuate substantially in the months to come. Although most forecasters believe that the euro will depreciate against the dollar in the near future, Maggie thinks that there is also a good possibility of further appreciation. Currently, a call option on euros is available with an exercise price of $1.17 and a premium of $.04. A euro put option with an exercise price of $1.17 and a premium of $.03 is also available. (See Appendix B in this chapter.)

a. Describe how Maggie could use straddles to speculate on the euro's value.

b. At option expiration, the value of the euro is $1.30. What is Maggie's total profit or loss from a long straddle position?

c. What is Maggie's total profit or loss from a long straddle position if the value of the euro is $1.05 at option expiration?

d. What is Maggie's total profit or loss from a long straddle position if the value of the euro at option expiration is still $1.15?

e. Given your answers to the questions above, when is it advantageous for a speculator to engage in a long straddle? When is it advantageous to engage in a short straddle?

31. Currency Strangles (See Appendix B in this chapter.) Assume the following options are currently available for British pounds (£):

- Call option premium on British pounds = $.04 per unit.
- Put option premium on British pounds = $.03 per unit.
- Call option strike price = $1.56.
- Put option strike price = $1.53.
- One option contract represents £31,250.

a. Construct a worksheet for a long strangle using these options.

b. Determine the break-even point(s) for a strangle.

c. If the spot price of the pound at option expiration is $1.55, what is the total profit or loss to the strangle buyer?

d. If the spot price of the pound at option expiration is $1.50, what is the total profit or loss to the strangle writer?

32. Currency Strangles Refer to the previous question, but assume that the call and put option premiums are $.035 per unit and $.025 per unit, respectively. (See Appendix B in this chapter.)

a. Construct a contingency graph for a long pound strangle.

b. Construct a contingency graph for a short pound strangle.

33. Currency Strangles The following information is currently available for Canadian dollar (C$) options (see Appendix B in this chapter):

- Put option exercise price = $.75.
- Put option premium = $.014 per unit.
- Call option exercise price = $.76.
- Call option premium = $.01 per unit.
- One option contract represents C$50,000.

a. What is the maximum possible gain the purchaser of a strangle can achieve using these options?

b. What is the maximum possible loss the writer of a strangle can incur?

c. Locate the break-even point(s) of the strangle.

34. Currency Strangles For the following options available on Australian dollars (A$), construct a worksheet and contingency graph for a long strangle. Locate the break-even points for this strangle. (See Appendix B in this chapter.)

- Put option strike price = $.67
- Call option strike price = $.65.
- Put option premium = $.01 per unit.
- Call option premium = $.02 per unit.

35. Speculating with Currency Options Barry Egan is a currency speculator. Barry believes that the Japanese yen will fluctuate widely against the U.S. dollar in the coming month. Currently, 1-month call options on Japanese yen (¥) are available with a strike price of $.0085 and a premium of $.0007 per unit. One-month put options on Japanese yen are available with a strike price of $.0084 and a premium of $.0005 per unit. One option contract on Japanese yen contains ¥6.25 million. (See Appendix B in this chapter.)

a. Describe how Barry Egan could utilize these options to speculate on the movement of the Japanese yen.

b. Assume Barry decides to construct a long strangle in yen. What are the break-even points of this strangle?

c. What is Barry's total profit or loss if the value of the yen in 1 month is $.0070?

d. What is Barry's total profit or loss if the value of the yen in 1 month is $.0090?

36. Currency Bull Spreads and Bear Spreads A call option on British pounds (£) exists with a strike price of $1.56 and a premium of $.08 per unit. Another call option on British pounds has a strike price of $1.59

and a premium of $.06 per unit. (See Appendix B in this chapter.)

a. Complete the worksheet for a bull spread below.

	VALUE OF BRITISH POUND AT OPTION EXPIRATION			
	$1.50	$1.56	$1.59	$1.65
Call @ $1.56				
Call @ $1.59				
Net				

b. What is the break-even point for this bull spread?

c. What is the maximum profit of this bull spread? What is the maximum loss?

d. If the British pound spot rate is $1.58 at option expiration, what is the total profit or loss for the bull spread?

e. If the British pound spot rate is $1.55 at option expiration, what is the total profit or loss for a bear spread?

37. Bull Spreads and Bear Spreads Two British pound (£) put options are available with exercise prices of $1.60 and $1.62. The premiums associated with these options are $.03 and $.04 per unit, respectively. (See Appendix B in this chapter.)

a. Describe how a bull spread can be constructed using these put options. What is the difference between using put options versus call options to construct a bull spread?

b. Complete the following worksheet.

	VALUE OF BRITISH POUND AT OPTION EXPIRATION			
	$1.55	$1.60	$1.62	$1.67
Put @ $1.60				
Put @ $1.62				
Net				

c. At option expiration, the spot rate of the pound is $1.60. What is the bull spreader's total gain or loss?

d. At option expiration, the spot rate of the pound is $1.58. What is the bear spreader's total gain or loss?

38. Profits from Using Currency Options and Futures On July 2, the 2-month futures rate of the Mexican peso contained a 2 percent discount (unannualized). There was a call option on pesos with an exercise price that was equal to the spot rate. There was also a put option on pesos with an exercise price equal to the spot rate. The premium on each of these options was 3 percent of the spot rate at that time. On September 2, the option expired. Go to www.oanda.com (or any website that has foreign exchange rate quotations) and determine the direct quote of the Mexican peso. You exercised the option on this date if it was feasible to do so.

a. What was your net profit per unit if you had purchased the call option?

b. What was your net profit per unit if you had purchased the put option?

c. What was your net profit per unit if you had purchased a futures contract on July 2 that had a settlement date of September 2?

d. What was your net profit per unit if you sold a futures contract on July 2 that had a settlement date of September 2?

39. Uncertainty and Option Premiums This morning, a Canadian dollar call option contract has a $.71 strike price, a premium of $.02, and expiration date of 1 month from now. This afternoon, news about international economic conditions increased the level of uncertainty surrounding the Canadian dollar. However, the spot rate of the Canadian dollar was still $.71. Would the premium of the call option contract be higher than, lower than, or equal to $.02 this afternoon? Explain.

40. Uncertainty and Option Premiums At 10:30 a.m., the media reported news that the Mexican government's political problems were reduced, which reduced the expected volatility of the Mexican peso against the dollar over the next month. The spot rate of the Mexican peso was $.13 as of 10 a.m. and remained at that level all morning. At 10 a.m., Hilton Head Co. purchased a call option at the money on 1 million Mexican pesos with an expiration date 1 month from now. At 11:00 a.m., Rhode Island Co. purchased a call option at the money on 1 million pesos with a December expiration date 1 month from now. Did Hilton Head Co. pay more, less, or the same as Rhode Island Co. for the options? Briefly explain.

41. Speculating with Currency Futures Assume that 1 year ago, the spot rate of the British pound was $1.70. One year ago, the 1-year futures contract of the British pound exhibited a discount of 6 percent. At that time, you sold futures contracts on pounds, representing a total of £1,000,000. From 1 year ago to today, the pound's value depreciated against the dollar by 4 percent. Determine the total dollar amount of your profit or loss from your futures contract.

42. Speculating with Currency Options The spot rate of the New Zealand dollar is $.77. A call option on New Zealand dollars with a 1-year expiration date has an exercise price of $.78 and a premium of $.04. A put option on New Zealand dollars at the money with a 1-year expiration date has a premium of $.03. You expect that the New Zealand dollar's spot rate will decline over time and will be $.71 in 1 year.

a. Today, Dawn purchased call options on New Zealand dollars with a 1-year expiration date. Estimate the profit or loss per unit at the end of 1 year. [Assume that the options would be exercised on the expiration date or not at all.]

b. Today, Mark sold put options on New Zealand dollars at the money with a 1-year expiration date. Estimate the profit or loss per unit for Mark at the end of 1 year. [Assume that the options would be exercised on the expiration date or not at all.]

43. Impact of Expected Volatility on Currency Option Premiums Assume that Australia's central bank announced plans to stabilize the Australian dollar (A$) in the foreign exchange markets. In response to this announcement, the expected volatility of the A$ declined immediately. However, the spot rate of the A$ remained at $.89 on this day, and was not affected by the announcement. The one-year forward rate of the A$ remained at $.89 on this day and was not affected by the announcement. Do you think the premium charged on a one-year A$ currency option increased, decreased, or remained the same on this day in response to the announcement? Briefly explain.

Discussion in the Boardroom

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

Running Your Own MNC

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

Blades, Inc. Case

Use of Currency Derivative Instruments

Blades, Inc., needs to order supplies 2 months ahead of the delivery date. It is considering an order from a Japanese supplier that requires a payment of 12.5 million yen payable as of the delivery date. Blades has two choices:

- Purchase two call options contracts (since each option contract represents 6,250,000 yen).
- Purchase one futures contract (which represents 12.5 million yen).

The futures price on yen has historically exhibited a slight discount from the existing spot rate. However, the firm would like to use currency options to hedge payables in Japanese yen for transactions 2 months in advance. Blades would prefer hedging its yen payable position because it is uncomfortable leaving the position open given the historical volatility of the yen. Nevertheless, the firm would be willing to remain unhedged if the yen becomes more stable someday.

Ben Holt, Blades' chief financial officer (CFO), prefers the flexibility that options offer over forward contracts or futures contracts because he can let the options expire if the yen depreciates. He would like to use an exercise price that is about 5 percent above the existing spot rate to ensure that Blades will have to pay no more than 5 percent above the existing spot rate for a transaction 2 months beyond its order date, as long as the option premium is no more than 1.6 percent of the price it would have to pay per unit when exercising the option.

In general, options on the yen have required a premium of about 1.5 percent of the total transaction amount that would be paid if the option is exercised. For example, recently the yen spot rate was $.0072, and the firm purchased a call option with an exercise price of $.00756, which is 5 percent above the existing spot rate. The premium for this option was $.0001134, which is 1.5 percent of the price to be paid per yen if the option is exercised.

A recent event caused more uncertainty about the yen's future value, although it did not affect the spot rate or the forward or futures rate of the yen. Specifically, the yen's spot rate was still $.0072, but the option premium for a call option with an exercise price of $.00756 was now $.0001512.

An alternative call option is available with an expiration date of 2 months from now; it has a premium of $.0001134 (which is the size of the premium that would have existed for the option desired before the event), but it is for a call option with an exercise price of $.00792.

The table below summarizes the option and futures information available to Blades:

	BEFORE EVENT	AFTER EVENT	
Spot rate	$.0072	$.0072	$.0072
Option Information			
Exercise price ($)	$.00756	$.00756	$.00792
Exercise price (% above spot)	5%	5%	10%
Option premium per yen ($)	$.0001134	$.0001512	$.0001134
Option premium (% of exercise price)	1.5%	2.0%	1.5%
Total premium ($)	$1,417.50	$1,890.00	$1,417.50
Amount paid for yen if option is exercised (not including premium)	$94,500	$94,500	$99,000
Futures Contract Information			
Futures price	$.006912	$.006912	

As an analyst for Blades, you have been asked to offer insight on how to hedge. Use a spreadsheet to support your analysis of questions 4 and 6.

1. If Blades uses call options to hedge its yen payables, should it use the call option with the exercise price of $.00756 or the call option with the exercise price of $.00792? Describe the tradeoff.

2. Should Blades allow its yen position to be unhedged? Describe the tradeoff.

3. Assume there are speculators who attempt to capitalize on their expectation of the yen's movement over the 2 months between the order and delivery dates by either buying or selling yen futures now and buying or selling yen at the future spot rate. Given this information, what is the expectation on the order date of the yen spot rate by the delivery date? (Your answer should consist of one number.)

4. Assume that the firm shares the market consensus of the future yen spot rate. Given this expectation and given that the firm makes a decision (i.e., option, futures contract, remain unhedged) purely on a cost basis, what would be its optimal choice?

5. Will the choice you made as to the optimal hedging strategy in question 4 definitely turn out to be the lowest-cost alternative in terms of actual costs incurred? Why or why not?

6. Now assume that you have determined that the historical standard deviation of the yen is about $.0005. Based on your assessment, you believe it is highly unlikely that the future spot rate will be more than two standard deviations above the expected spot rate by the delivery date. Also assume that the futures price remains at its current level of $.006912. Based on this expectation of the future spot rate, what is the optimal hedge for the firm?

Small Business Dilemma

Use of Currency Futures and Options by the Sports Exports Company

The Sports Exports Company receives British pounds each month as payment for the footballs that it exports. It anticipates that the pound will depreciate over time against the U.S. dollar.

1. How can the Sports Exports Company use currency futures contracts to hedge against exchange rate risk? Are there any limitations of using currency futures contracts that would prevent the Sports Exports Company from locking in a specific exchange rate at which it can sell all the pounds it expects to receive in each of the upcoming months?

2. How can the Sports Exports Company use currency options to hedge against exchange rate risk? Are there any limitations of using currency options contracts that would prevent the Sports Exports Company from locking in a specific exchange rate at which it can sell all the pounds it expects to receive in each of the upcoming months?

3. Are there any limitations of using currency options contracts that would prevent the Sports Exports Company from locking in a specific exchange rate at which it can sell all the pounds it expects to receive in each of the upcoming months?

4. Jim Logan, owner of the Sports Exports Company, is concerned that the pound may depreciate substantially over the next month, but he also believes that the pound could appreciate substantially if specific situations occur. Should Logan use currency futures or currency options to hedge the exchange rate risk? Is there any disadvantage of selecting this method for hedging?

INTERNET/EXCEL EXERCISES

The website of the Chicago Mercantile Exchange (www.cmegroup.com) provides information about currency futures and options.

1. Use this website to review the prevailing prices of currency futures contracts. Do today's futures prices (for contracts with the closest settlement date) generally reflect an increase or decrease from the day before? Is there any news today that might explain the change in the futures prices?
2. Does it appear that futures prices among currencies (for the closest settlement date) are changing in the same direction? Explain.
3. If you purchase a British pound futures contract with the closest settlement date, what is the futures price? Given that a contract is based on £62,500, what is the dollar amount you will need at the settlement date to fulfill the contract?
4. Go to www.phlx.com/products and obtain the money currency option quotations for the Canadian dollar (the symbol is XCD) and the euro (symbol is XEU) for a similar expiration date. Which currency option has a larger premium? Explain your results.

ONLINE ARTICLES WITH REAL-WORLD EXAMPLES

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

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

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

1. company AND forward contract
2. Inc. AND forward contract
3. company AND currency futures
4. Inc. AND currency futures
5. company AND currency options
6. Inc. AND currency options
7. forward market
8. currency futures market
9. currency options market
10. currency derivatives

APPENDIX 5A
Currency Option Pricing

The premiums paid for currency options depend on various factors that must be monitored when anticipating future movements in currency option premiums. Since participants in the currency options market typically take positions based on their expectations of how the premiums will change over time, they can benefit from understanding how options are priced.

Boundary Conditions

The first step in pricing currency options is to recognize boundary conditions that force the option premium to be within lower and upper bounds.

Lower Bounds

The call option premium (C) has a lower bound of at least zero or the spread between the underlying spot exchange rate (S) and the exercise price (X), whichever is greater, as shown below:

$$C = \text{MAX}\,(0, S - X)$$

This floor is enforced by arbitrage restrictions. For example, assume that the premium on a British pound call option is $.01, while the spot rate of the pound is $1.62 and the exercise price is $1.60. In this example, the spread (S − X) exceeds the call premium, which would allow for arbitrage. One could purchase the call option for $.01 per unit, immediately exercise the option at $1.60 per pound, and then sell the pounds in the spot market for $1.62 per unit. This would generate an immediate profit of $.01 per unit. Arbitrage would continue until the market forces realigned the spread (S − X) to be less than or equal to the call premium.

The put option premium (P) has a lower bound of zero or the spread between the exercise price (X) and the underlying spot exchange rate (S), whichever is greater, as shown below:

$$P = \text{MAX}\,(0, X - S)$$

This floor is also enforced by arbitrage restrictions. For example, assume that the premium on a British pound put option is $.02, while the spot rate of the pound is $1.60 and the exercise price is $1.63. One could purchase the pound put option for $.02 per unit, purchase pounds in the spot market at $1.60, and immediately exercise the option

by selling the pounds at $1.63 per unit. This would generate an immediate profit of $.01 per unit. Arbitrage would continue until the market forces realigned the spread (X − S) to be less than or equal to the put premium.

Upper Bounds

The upper bound for a call option premium is equal to the spot exchange rate (S):

$$C = S$$

If the call option premium ever exceeds the spot exchange rate, one could engage in arbitrage by selling call options for a higher price per unit than the cost of purchasing the underlying currency. Even if those call options are exercised, one could provide the currency that was purchased earlier (the call option was covered). The arbitrage profit in this example is the difference between the amount received when selling the premium and the cost of purchasing the currency in the spot market. Arbitrage would occur until the call option's premium was less than or equal to the spot rate.

The upper bound for a put option is equal to the option's exercise price (X):

$$P = X$$

If the put option premium ever exceeds the exercise price, one could engage in arbitrage by selling put options. Even if the put options are exercised, the proceeds received from selling the put options exceed the price paid (which is the exercise price) at the time of exercise.

Given these boundaries that are enforced by arbitrage, option premiums lie within these boundaries.

WEB

www.ozforex.com.au/cgi-bin/currency-option-pricing-tool.asp
Estimates the price of currency options based on input provided.

Application of Pricing Models

Although boundary conditions can be used to determine the possible range for a currency option's premium, they do not precisely indicate the appropriate premium for the option. However, pricing models have been developed to price currency options. Based on information about an option (such as the exercise price and time to maturity) and about the currency (such as its spot rate, standard deviation, and interest rate), pricing models can derive the premium on a currency option. The currency option pricing model of Biger and Hull[1] is shown below:

$$C = e^{-r^*T} S \cdot N(d_1) - e^{-rT} X \cdot N(d_1 - \sigma\sqrt{T})$$

$$d_1 = \{\ln(S/X) + [r - r^* + (\sigma^2/2)]T\}/\sigma\sqrt{T}$$

C = price of the currency call option
S = underlying spot exchange rate
X = exercise price
r = U.S. riskless rate of interest
r^* = foreign riskless rate of interest
σ = instantaneous standard deviation of the return on a holding of foreign currency
T = option's time to maturity expressed as a fraction of a year
$N(\cdot)$ = standard normal cumulative distribution function

[1]Nahum Biger and John Hull, "The Valuation of Currency Options," *Financial Management* (Spring 1983): 24–28.

This equation is based on the stock option pricing model (OPM) when allowing for continuous dividends. Since the interest gained on holding a foreign security (r^*) is equivalent to a continuously paid dividend on a stock share, this version of the OPM holds completely. The key transformation in adapting the stock OPM to value currency options is the substitution of exchange rates for stock prices. Thus, the percentage change of exchange rates is assumed to follow a diffusion process with constant mean and variance.

Bodurtha and Courtadon[2] have tested the predictive ability of the currency option pricing model. They computed pricing errors from the model using 3,326 call options. The model's average percentage pricing error for call options was −6.90 percent, which is smaller than the corresponding error reported for the dividend-adjusted Black-Scholes stock OPM. Hence, the currency option pricing model has been more accurate than the counterpart stock OPM.

The model developed by Biger and Hull is sometimes referred to as the European model because it does not account for early exercise. European currency options do not allow for early exercise (before the expiration date), while American currency options do allow for early exercise. The extra flexibility of American currency options may justify a higher premium on American currency options than on European currency options with similar characteristics. However, there is not a closed-form model for pricing American currency options. Although various techniques are used to price American currency options, the European model is commonly applied to price American currency options because it can be just as accurate.

Bodurtha and Courtadon found that the application of an American currency options pricing model does not improve predictive accuracy. Their average percentage pricing error was −7.07 percent for all sample call options when using the American model.

Given all other parameters, the currency option pricing model can be used to impute the standard deviation σ. This implied parameter represents the option's market assessment of currency volatility over the life of the option.

Pricing Currency Put Options According to Put-Call Parity

Given the premium of a European call option (called C), the premium for a European put option (called P) on the same currency and same exercise price (X) can be derived from put-call parity, as shown below:

$$P = C + Xe^{-rt} - Se^{-r^*T}$$

where

r = U.S riskless rate of interest
r^* = foreign riskless rate of interest
T = option's time to maturity expressed as a fraction of the year

If the actual put option premium is less than what is suggested by the put-call parity equation above, arbitrage can be conducted. Specifically, one could (1) buy the put option, (2) sell the call option, and (3) buy the underlying currency. The purchases are financed with the proceeds from selling the call option and from borrowing at the rate r. Meanwhile, the foreign currency that was purchased can be deposited to earn the foreign rate r*. Regardless of the scenario for the path of the currency's exchange rate movement over the life of the option, the arbitrage will result in a profit. First, if the exchange rate is

[2]James Bodurtha and Georges Courtadon, "Tests of an American Option Pricing Model on the Foreign Currency Options Market," *Journal of Financial and Quantitative Analysis* (June 1987): 153–168.

equal to the exercise price such that each option expires worthless, the foreign currency can be converted in the spot market to dollars, and this amount will exceed the amount required to repay the loan. Second, if the foreign currency appreciates and therefore exceeds the exercise price, there will be a loss from the call option being exercised.

Although the put option will expire, the foreign currency will be converted in the spot market to dollars, and this amount will exceed the amount required to repay the loan and the amount of the loss on the call option. Third, if the foreign currency depreciates and therefore is below the exercise price, the amount received from exercising the put option plus the amount received from converting the foreign currency to dollars will exceed the amount required to repay the loan. Since the arbitrage generates a profit under any exchange rate scenario, it will force an adjustment in the option premiums so that put-call parity is no longer violated.

If the actual put option premium is more than what is suggested by put-call parity, arbitrage would again be possible. The arbitrage strategy would be the reverse of that used when the actual put option premium was less than what is suggested by put-call parity (as just described). The arbitrage would force an adjustment in option premiums so that put-call parity is no longer violated. The arbitrage that can be applied when there is a violation of put-call parity on American currency options differs slightly from the arbitrage applicable to European currency options. Nevertheless, the concept still holds that the premium of a currency put option can be determined according to the premium of a call option on the same currency and the same exercise price.

APPENDIX 5B

Currency Option Combinations

In addition to the basic call and put options just discussed, a variety of currency option combinations are available to the currency speculator and hedger. A **currency option combination** uses simultaneous call and put option positions to construct a unique position to suit the hedger's or speculator's needs. A currency option combination may include both long and short positions and will itself be either long or short. Typically, a currency option combination will result in a unique contingency graph.

Currency option combinations can be used both to hedge cash inflows and outflows denominated in a foreign currency and to speculate on the future movement of a foreign currency. More specifically, both MNCs and individual speculators can construct a currency option combination to accommodate expectations of either appreciating or depreciating foreign currencies.

In this appendix, two of the most popular currency option combinations are discussed. These are **straddles** and **strangles**. For each of these combinations, the following topics will be discussed:

- The composition of the combination
- The worksheet and contingency graph for the long combination
- The worksheet and contingency graph for the short combination
- Uses of the combination to speculate on the movement of a foreign currency

The two main types of currency option combinations are discussed next.

Currency Straddles

Long Currency Straddle

To construct a long straddle in a foreign currency, an MNC or individual would buy (take a long position in) both a call option and a put option for that currency; the call and the put option have the same expiration date and striking price.

When constructing a long straddle, the buyer purchases both the right to buy the foreign currency and the right to sell the foreign currency. Since the call option will become profitable if the foreign currency appreciates, and the put option will become profitable if the foreign currency depreciates, a long straddle becomes profitable when the foreign currency *either* appreciates or depreciates. Obviously, this is a huge advantage for the individual or entity that constructs a long straddle, since it appears that it would benefit from the position as long as the foreign currency exchange rate does not remain

constant. The disadvantage of a long straddle position is that it is expensive to construct, because it involves the purchase of two separate options, each of which requires payment of the option premium. Therefore, a long straddle becomes profitable only if the foreign currency appreciates or depreciates substantially.

Long Currency Straddle Worksheet To determine the profit or loss associated with a long straddle (or any combination), it is easiest to first construct a profit or loss worksheet for several possible currency values at option expiration. The worksheet can be set up to show each individual option position and the net position. The worksheet will also help in constructing a contingency graph for the combination.

EXAMPLE Put and call options are available for euros (€) with the following information:

- Call option premium on euro = $.03 per unit.
- Put option premium on euro = $.02 per unit.
- Strike price = $1.05.
- One option contract represents €62,500.

To construct a long straddle, the buyer would purchase both a euro call and a euro put option, paying $.03 + $.02 = $.05 per unit. If the value of the euro at option expiration is above the strike price of $1.05, the call option is in the money, but the put option is out of the money. Conversely, if the value of the euro at option expiration is below $1.05, the put option is in the money, but the call option is out of the money.

A possible worksheet for the long straddle that illustrates the profitability of the individual components is shown below:

	VALUE OF EURO AT OPTION EXPIRATION					
	$.95	$1.00	$1.05	$1.10	$1.15	$1.20
Own a call	−$.03	−$.03	−$.03	+$.02	+$.07	+$.12
Own a put	+$.08	+$.03	−$.02	−$.02	−$.02	−$.02
Net	+$.05	$.00	−$.05	$.00	+$.05	+$.10

Long Currency Straddle Contingency Graph A contingency graph for the long currency straddle is shown in Exhibit 5B.1. This graph includes more extreme possible outcomes than are shown in the table. Either the call or put option on the foreign currency will be in the money at option expiration as long as the foreign currency value at option expiration differs from the strike price.

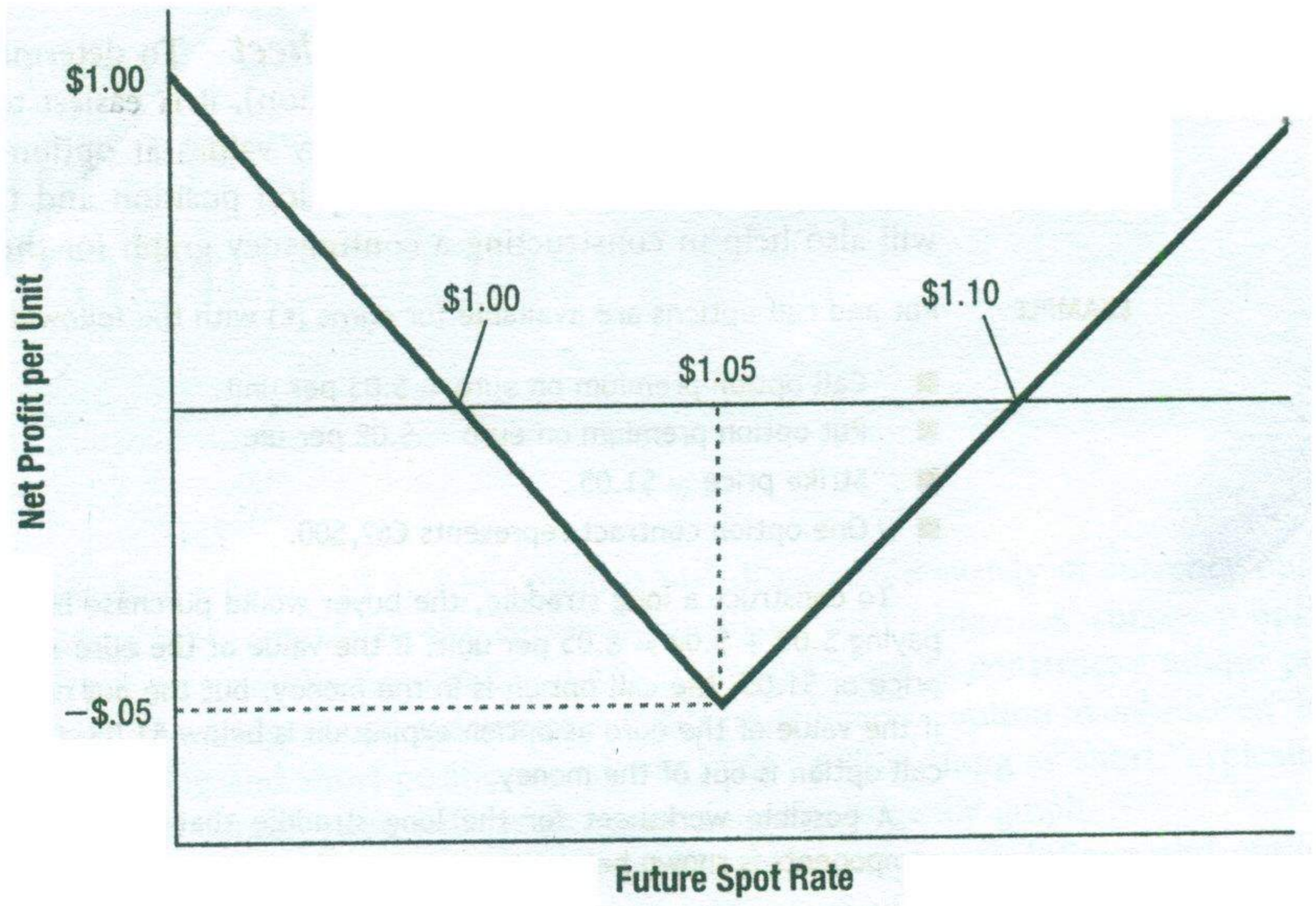
There are two break-even points for a long straddle position—one below the strike price and one above the strike price. The lower break-even point is equal to the strike price less both premiums; the higher break-even point is equal to the strike price plus both premiums. Thus, for the above example, the two break-even points are located at $1.00 = $1.05 − $.05 and at $1.10 = $1.05 + $.05.

The maximum loss for the long straddle in the example occurs at a euro value at option expiration equal to the strike price, when both options are at the money. At that point, the straddle buyer would lose both option premiums. The maximum loss for the straddle buyer is thus equal to $.05 = $.03 + $.02.

Short Currency Straddle

Constructing a short straddle in a foreign currency involves selling (taking a short position in) both a call option and a put option for that currency. As in a long straddle, the call and put option have the same expiration date and strike price.

Exhibit 5B.1 Contingency Graph for a Long Currency Straddle



The advantage of a short straddle is that it provides the option writer with income from two separate options. The disadvantage is the possibility of substantial losses if the underlying currency moves substantially away from the strike price.

Short Currency Straddle Worksheet and Contingency Graph A short straddle results in a worksheet and a contingency graph that are exactly opposite to those of a long straddle.

EXAMPLE Assuming the same information as in the previous example, a short straddle would involve writing both a call option on euros and a put option on euros. A possible worksheet for the resulting short straddle is shown below:

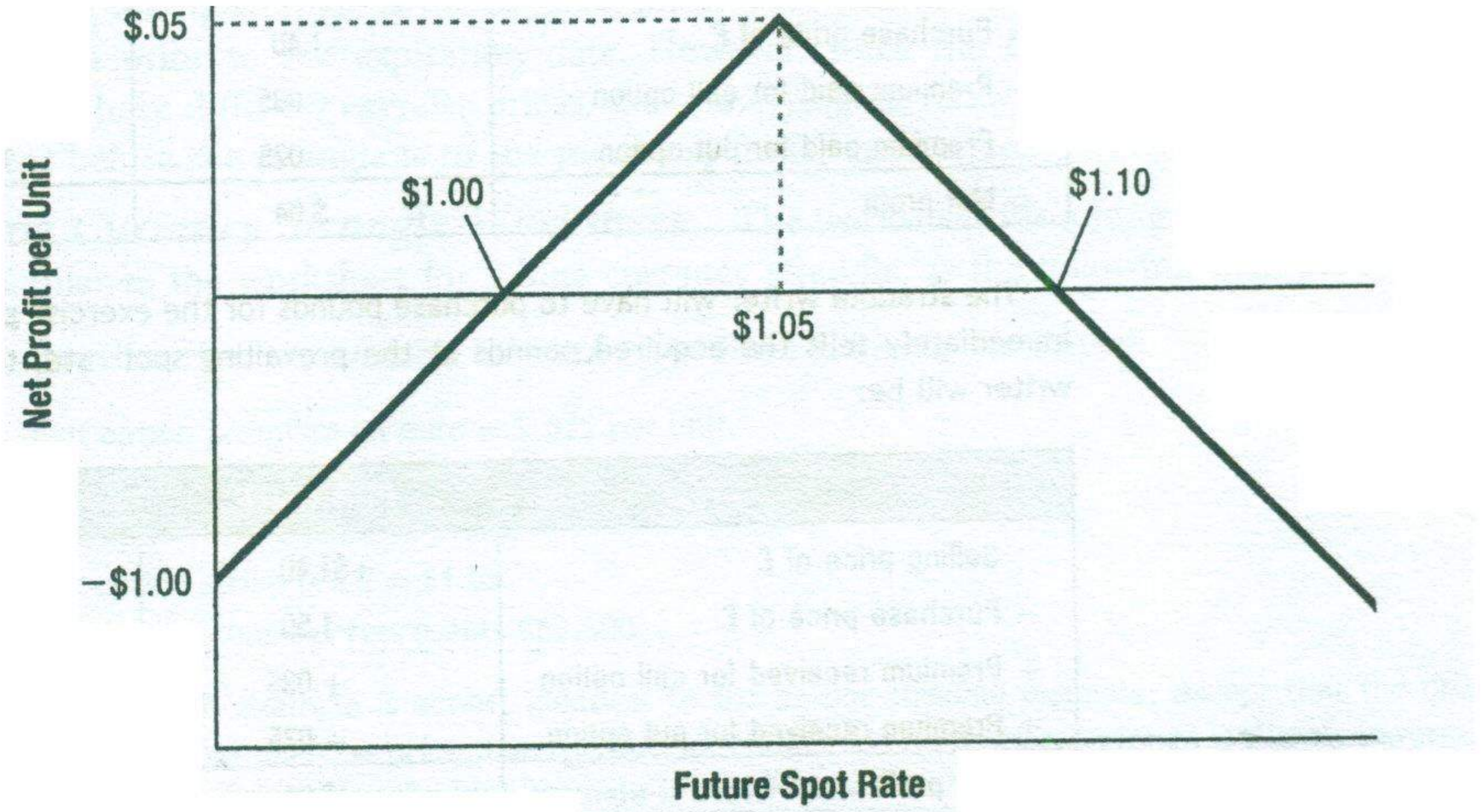
	VALUE OF EURO AT OPTION EXPIRATION					
	$.95	$1.00	$1.05	$1.10	$1.15	$1.20
Sell a call	+$.03	+$.03	+$.03	–$.02	–$.07	–$.12
Sell a put	–$.08	–$.03	+$.02	+$.02	+$.02	+$.02
Net	–$.05	$.00	+$.05	$.00	–$.05	–$.10

The worksheet also illustrates that there are two break-even points for a short straddle position—one below the strike price and one above the strike price. The lower break-even point is equal to the strike price less both premiums; the higher break-even point is equal to the strike price plus both premiums. Thus, the two break-even points are located at $1.00 = $1.05 − $.05 and at $1.10 = $1.05 + $.05. This is the same relationship as for the long straddle position.

The maximum gain occurs at a euro value at option expiration equal to the strike price of $1.05 and is equal to the sum of the two option premiums ($.03 + $.02 = $.05).

The resulting contingency graph is shown in Exhibit 5B.2. ●

Exhibit 5B.2 Contingency Graph for a Short Currency Straddle



Speculating with Currency Straddles

Individuals can speculate using currency straddles based on their expectations of the future movement in a particular foreign currency. For example, speculators who expect that the British pound will appreciate or depreciate substantially can buy a straddle. If the pound appreciates substantially, the speculator will let the put option expire and exercise the call option. If the pound depreciates substantially, the speculator will let the call option expire and exercise the put option.

Speculators may also profit from short straddles. The writer of a short straddle believes that the value of the underlying currency will remain close to the exercise price until option expiration. If the value of the underlying currency is equal to the strike price at option expiration, the straddle writer would collect premiums from both options. However, this is a rather risky position; if the currency appreciates or depreciates substantially, the straddle writer will lose money. If the currency appreciates substantially, the straddle writer will have to sell the currency for the strike price, since the call option will be exercised. If the currency depreciates substantially, the straddle writer has to buy the currency for the strike price, since the put option will be exercised.

EXAMPLE Call and put option contracts on British pounds (£) are available with the following information:

- Call option premium on British pounds = $.035.
- Put option premium on British pounds = $.025.
- Strike price = $1.50.
- One option contract represents £31,250.

At expiration, the spot rate of the pound is $1.40. A speculator who had bought a straddle will therefore exercise the put option but let the call option expire. Therefore, the speculator will buy pounds at the prevailing spot rate and sell them for the exercise price. Given this information, the net profit to the straddle buyer is calculated as follows:

	PER UNIT	PER CONTRACT
Selling price of £	+$1.50	$46,875 ($1.50 × 31,250 units)
− Purchase price of £	−1.40	−43,750 ($1.40 × 31,250 units)
− Premium paid for call option	−.035	−1,093.75 ($.035 × 31,250 units)
− Premium paid for put option	−.025	−781.25 ($.025 × 31,250 units)
= Net profit	$.04	$1,250 ($.04 × 31,250 units)

The straddle writer will have to purchase pounds for the exercise price. Assuming the speculator immediately sells the acquired pounds at the prevailing spot rate, the net profit to the straddle writer will be:

	PER UNIT	PER CONTRACT
Selling price of £	+$1.40	$43,750 ($1.40 × 31,250 units)
− Purchase price of £	−1.50	−46,875 ($1.50 × 31,250 units)
+ Premium received for call option	+.035	1,093.75 ($.035 × 31,250 units)
+ Premium received for put option	+.025	781.25 ($.025 × 31,250 units)
= Net profit	−$.04	−$1,250 ($.04 × 31,250 units)

As with an individual short put position, the seller of the straddle could simply refrain from selling the pounds (after being forced to buy them at the exercise price of $1.50) until the spot rate of the pound rises. However, there is no guarantee that the pound will appreciate in the near future. ●

Note from the above example and discussion that the straddle writer gains what the straddle buyer loses, and vice versa. Consequently, the straddle writer's gain or loss is the straddle buyer's loss or gain. Thus, the same relationship that applies to individual call and put options also applies to option combinations.

Currency Strangles

Currency strangles are very similar to currency straddles, with one important difference: The call and put options of the underlying foreign currency have different exercise prices. Nevertheless, the underlying security and the expiration date for the call and put options are identical.

Long Currency Strangle

Since the call and put options used in a strangle can have different exercise prices, a long strangle can be constructed in a variety of ways. For example, a strangle could be constructed in which the call option has a higher exercise price than the put option and vice versa. The most common type of strangle, and the focus of this section, is a strangle that involves buying a put option with a lower strike price than the call option that is purchased. To construct a long strangle in a foreign currency, an MNC or individual would thus take a long position in a call option and a long position in a put option for that currency. The call option has the higher exercise price.

An advantage of a long strangle relative to a comparable long straddle is that it is cheaper to construct. From previous sections, recall that there is an inverse relationship

between the spot price of the currency relative to the strike price and the call option premium: the lower the spot price relative to the strike price, the lower the option premium will be. Therefore, if a long strangle involves purchasing a call option with a relatively high exercise price, it should be cheaper to construct than a comparable straddle, everything else being equal.

The disadvantage of a strangle relative to a straddle is that the underlying currency has to fluctuate more prior to expiration. As with a long straddle, the reason for constructing a long strangle is the expectation of a substantial currency fluctuation in either direction prior to the expiration date. However, since the two options involved in a strangle have different exercise prices, the underlying currency has to fluctuate to a larger extent before the strangle is in the money at future spot prices.

Long Currency Strangle Worksheet The worksheet for a long currency strangle is similar to the worksheet for a long currency straddle, as the following example shows.

EXAMPLE Put and call options are available for euros (€) with the following information:

- Call option premium on euro = $.025 per unit.
- Put option premium on euro = $.02 per unit.
- Call option strike price = $1.15.
- Put option strike price = $1.05.
- One option contract represents €62,500.

Note that this example is almost identical to the earlier straddle example, except that the call option has a higher exercise price than the put option and the call option premium is slightly lower.

A possible worksheet for the long strangle is shown here:

	VALUE OF EURO AT OPTION EXPIRATION					
	$.95	$1.00	$1.05	$1.10	$1.15	$1.20
Own a call	–$.025	–$.025	–$.025	–$.025	–$.025	+$.025
Own a put	+$.08	+$.03	–$.02	–$.02	–$.02	–$.02
Net	+$.055	+$.005	–$.045	–$.045	–$.045	+$.005

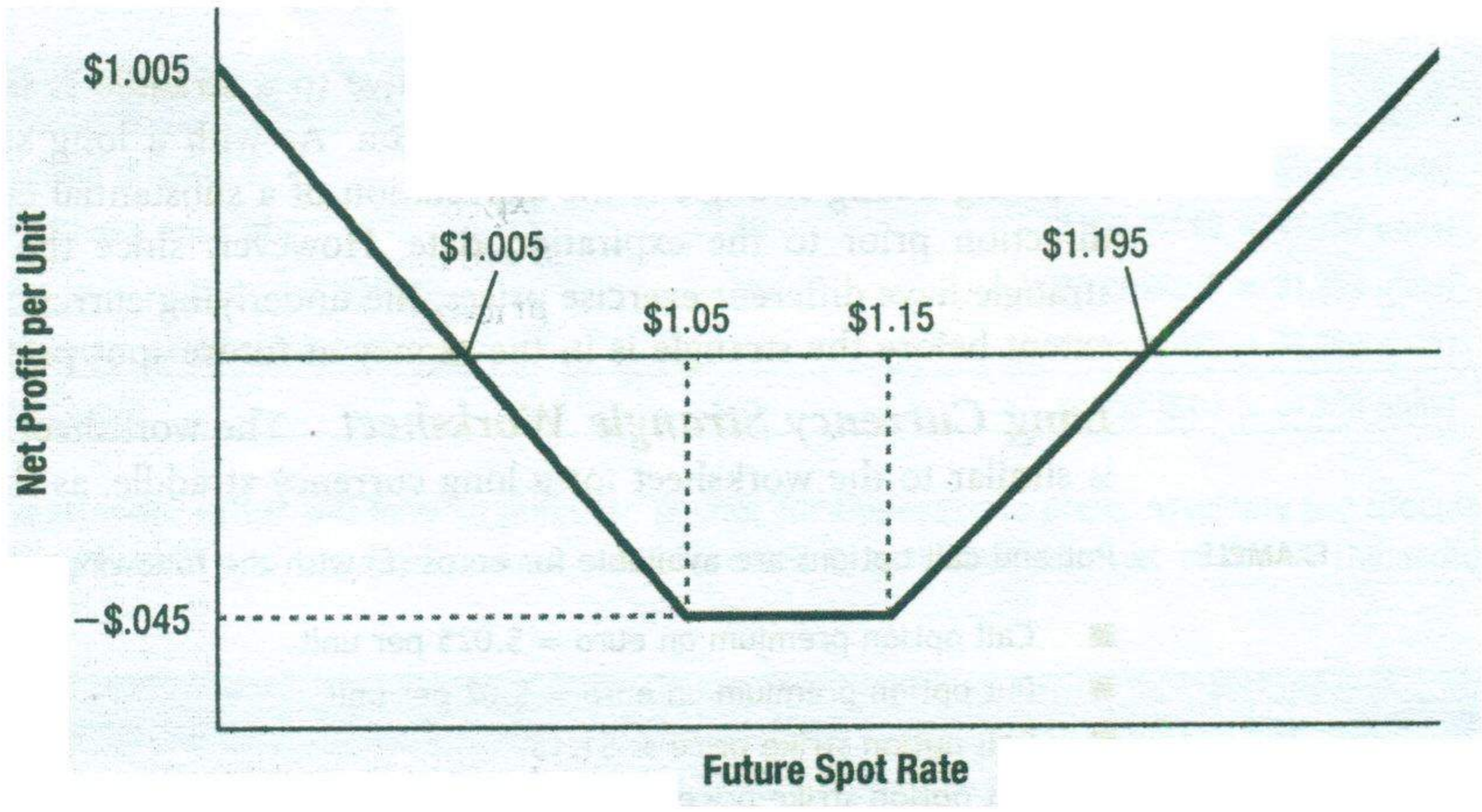
Long Currency Strangle Contingency Graph Exhibit 5B.3 shows a contingency graph for the long currency strangle. Again, the graph includes more extreme values than are shown in the worksheet. The call option will be in the money when the foreign currency value is higher than its strike price at option expiration, and the put option will be in the money when the foreign currency value is below the put option strike price at option expiration. Thus, the long call position is in the money at euro values above the $1.15 call option exercise price at option expiration. Conversely, the put option is in the money at euro values below the put option exercise price of $1.05.

The two break-even points for a long strangle position are located below the put option premium and above the call option premium. The lower break-even point is equal to the put option strike price less both premiums ($1.005 = $1.05 − $.045); the higher break-even point is equal to the call option strike price plus both premiums ($1.195 = $1.15 + $.045).

The maximum loss for a long strangle occurs at euro values at option expiration between the two strike prices. At any future spot price between the two exercise prices, the straddle buyer would lose both option premiums (−$.045 = −$.025 − $.02).

The contingency graph for the long strangle illustrates that the euro must fluctuate more widely than with a straddle before the position becomes profitable. However, the maximum loss is only $.045 per unit, whereas it was $.05 per unit for the long straddle.

Exhibit 5B.3 Contingency Graph for a Long Currency Strangle



Short Currency Strangle

Analogous to a short currency straddle, a short strangle involves taking a short position in both a call option and a put option for that currency. As with a short straddle, the call and put options have the same expiration date. However, the call option has the higher exercise price in a short strangle.

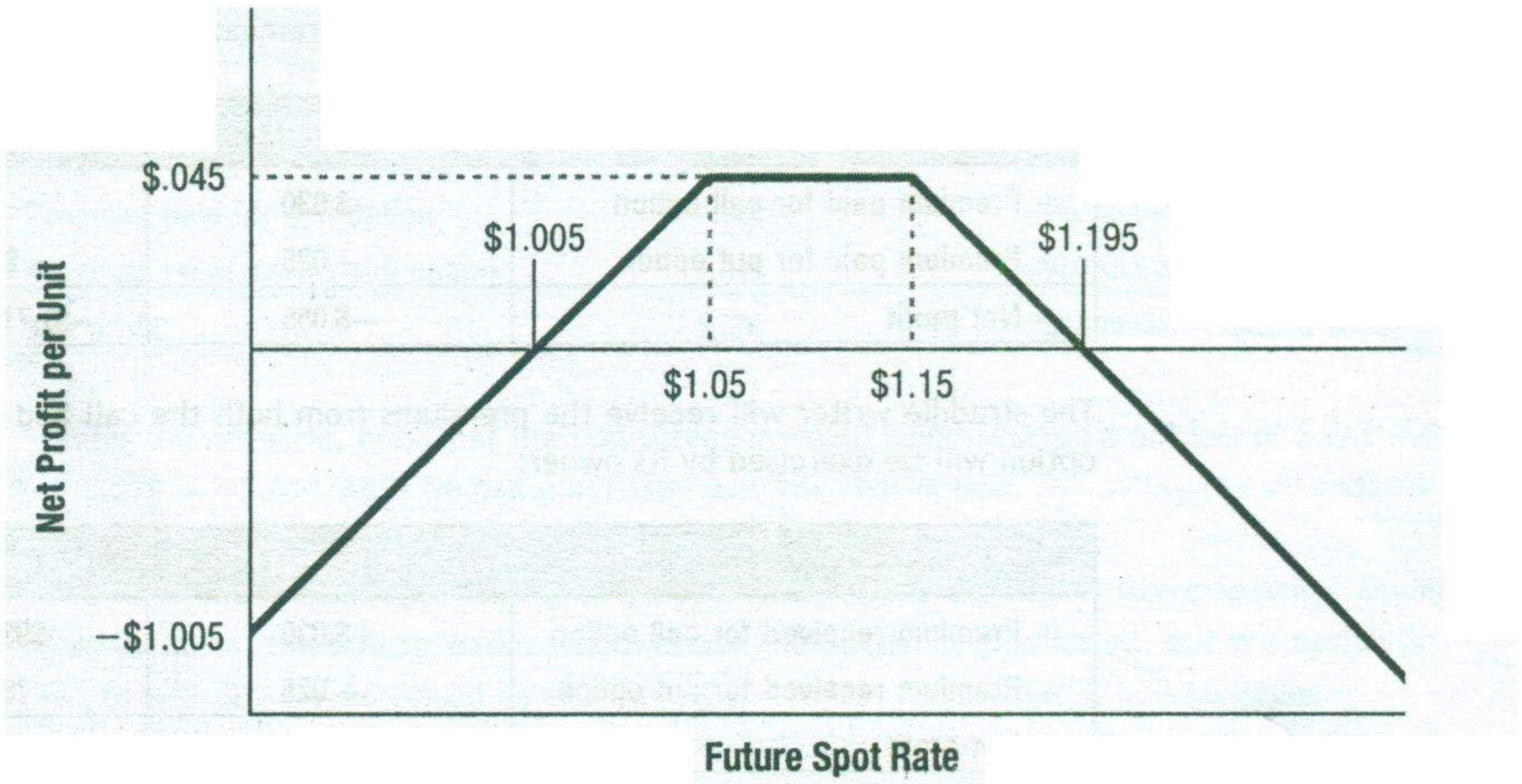
Relative to a short straddle, the disadvantage of a short strangle is that it provides less income, since the call option premium will be lower, everything else being equal. However, the advantage of a short strangle relative to a short straddle is that the underlying currency has to fluctuate more before the strangle writer is in danger of losing money.

Short Currency Strangle Worksheet and Contingency Graph The euro example is next used to show that the worksheet and contingency graph for the short strangle are exactly opposite to those of a long strangle.

EXAMPLE Continuing with the information in the preceding example, a short strangle can be constructed by writing a call option on euros and a put option on euros. The resulting worksheet is shown below:

	VALUE OF EURO AT OPTION EXPIRATION					
	$.95	$1.00	$1.05	$1.10	$1.15	$1.20
Sell a call	+$.025	+$.025	+$.025	+$.025	+$.025	−$.025
Sell a put	−$.08	−$.03	+$.02	+$.02	+$.02	+$.02
Net	−$.055	−$.005	+$.045	+$.045	+$.045	−$.005

Exhibit 5B.4 Contingency Graph for a Short Currency Strangle



The table shows that there are two break-even points for the short strangle. The lower break-even point is equal to the put option strike price less both premiums; the higher break-even point is equal to the call option strike price plus both premiums. The two break-even points are thus located at $1.005 = $1.05 − $.045 and at $1.195 = $1.15 + $.045. These break-even points are identical to the break-even points for the long strangle position.

The maximum gain for a short strangle ($.045 = $.025 + $.02) occurs at a value of the euro at option expiration between the two exercise prices.

The short strangle contingency graph is shown in Exhibit 5B.4. ●

As with straddles, individuals can speculate using currency strangles based on their expectations of the future movement in a particular foreign currency. For instance, speculators who expect that the Swiss franc will appreciate or depreciate substantially can construct a long strangle. Speculators can benefit from short strangles if the future spot price of the underlying currency is between the two exercise prices.

Compared to a straddle, the speculator who buys a strangle believes that the underlying currency will fluctuate even more widely prior to expiration. In return, the speculator pays less to construct the long strangle. A speculator who writes a strangle will receive both option premiums as long as the future spot price is between the two exercise prices. Compared to a straddle, the total amount received from writing the two options is less. However, the range of future spot prices between which no option is exercised is much wider for a short strangle.

EXAMPLE Call and put option contracts on British pounds (£) are available with the following information:

- Call option premium on British pounds = $.030.
- Put option premium on British pounds = $.025.
- Call option strike price = $1.60.

- Put option strike price = $1.50.
- One option contract represents £31,250.

The spot rate of the pound on the expiration date is $1.52. With a long strangle, the speculator will let both options expire, since both the call and the put option are out of the money. Consequently, the strangle buyer will lose both option premiums:

	PER UNIT	PER CONTRACT
− Premium paid for call option	−$.030	−781.25 ($.025 × 31,250 units)
− Premium paid for put option	−.025	−$937.50 ($.030 × 31,250 units)
= Net profit	−$.055	−$1,718.75 (−$.055 × 31,250 units)

The straddle writer will receive the premiums from both the call and the put option, since neither option will be exercised by its owner:

	PER UNIT	PER CONTRACT
+ Premium received for call option	+$.030	$937.50 ($.030 × 31,250 units)
+ Premium received for put option	+.025	+781.25 ($.025 × 31,250 units)
= Net profit	$.055	$1,718.75 ($.055 × 31,250 units)

As with individual call or put positions and with a straddle, the strangle writer's gain or loss is the strangle buyer's loss or gain. ●

Currency Spreads

A variety of currency spreads exist that can be used by both MNCs and individuals to hedge cash inflows or outflows or to profit from an anticipated movement in a foreign currency. This section covers two of the most popular types of spreads: bull spreads and bear spreads. Bull spreads are profitable when a foreign currency appreciates, whereas bear spreads are profitable when a foreign currency depreciates.

Currency Bull Spreads with Call Options

A currency bull spread is constructed by buying a call option for a particular underlying currency and simultaneously writing a call option for the same currency with a higher exercise price. A bull spread can also be constructed using currency put options, as will be discussed shortly.

With a bull spread, the spreader believes that the underlying currency will appreciate modestly, but not substantially.

EXAMPLE Assume two call options on Australian dollars (A$) are currently available. The first option has a strike price of $.64 and a premium of $.019. The second option has a strike price of $.65 and a premium of $.015. The bull spreader buys the $.64 option and sells the $.65 option. An option contract on Australian dollars consists of 50,000 units.

Consider the following scenarios:

1. The Australian dollar appreciates to $.645, a spot price between the two exercise prices. The bull spreader will exercise the option he bought. Assuming the bull spreader immediately sells the Australian dollars for the $.645 spot rate after purchasing them for the

$.64 exercise price, he will gain the difference. The bull spreader will also collect the premium on the second option he wrote, but that option will not be exercised by the (unknown) buyer:

	PER UNIT	PER CONTRACT
Selling price of A$	+$.645	$32,250 ($.645 × 50,000 units)
− Purchase price of A$	−.64	−32,000 ($.64 × 50,000 units)
− Premium paid for call option	−.019	−950 ($.019 × 50,000 units)
+ Premium received for call option	+.015	+750 ($.015 × 50,000 units)
= Net profit	$.001	$50 ($.001 × 50,000 units)

Under this scenario, note that the bull spreader would have incurred a net loss of $.645 − $.64 − $.019 = −$.014/A$ if he had purchased only the first option. By writing the second call option, the spreader increased his net profit by $.015/A$.

2. The Australian dollar appreciates to $.70, a value above the higher exercise price. Under this scenario, the bull spreader will exercise the option he purchased, but the option he wrote will also be exercised by the (unknown) buyer. Assuming the bull spreader immediately sells the Australian dollars purchased with the first option and buys the Australian dollars he has to sell to the second option buyer for the spot rate, he will incur the following cash flows:

	PER UNIT	PER CONTRACT
Selling price of A$	+$.70	$35,000 ($.70 × 50,000 units)
Purchase price of A$	−.64	−32,000 ($.64 × 50,000 units)
− Premium paid for call option	−.019	−950 ($.019 × 50,000 units)
+ Selling price of A$	+.65	+32,500 ($.65 × 50,000 units)
− Purchase price of A$	−.70	−35,000 ($.70 × 50,000 units)
+ Premium received for call option	+.015	+750 ($.015 × 50,000 units)
= Net profit	$.006	$300 ($.006 × 50,000 units)

The important point to understand here is that the net profit to the bull spreader will remain $.006/A$ no matter how much more the Australian dollar appreciates. This is because the bull spreader will always sell the Australian dollars he purchased with the first option for the spot price and purchase the Australian dollars needed to meet his obligation for the second option. The two effects always cancel out, so the bull spreader will net the difference in the two strike prices less the difference in the two premiums ($.65 − $.64 − $.019 + $.015 = $.006). Therefore, the net profit to the bull spreader will be $.006 per unit at any future spot price above $.65.

Equally important to understand is the tradeoff involved in constructing a bull spread. The bull spreader in effect forgoes the benefit from a large currency appreciation by collecting the premium from writing a currency option with a higher exercise price and ensuring a constant profit at future spot prices above the higher exercise price; if he had not written the second option with the higher exercise price, he would have benefited substantially under this scenario, netting $.70 − $.64 − $.019 = $.041/A$ as a result of exercising the call option with the $.64 strike price. This is the reason the bull spreader expects that the underlying currency will appreciate modestly so that he gains from the option he buys and collects the premium from the option he sells without incurring any opportunity costs.

3. The Australian dollar depreciates to $.62, a value below the lower exercise price. If the future spot price is below the lower exercise price, neither call option will be exercised, as they are both out of the money. Consequently, the net profit to the bull spreader is the difference between the two option premiums:

	PER UNIT	PER CONTRACT
− Premium paid for call option	−$.019	−$950 ($.019 × 50,000 units)
+ Premium received for call option	+.015	+750 ($.015 × 50,000 units)
= Net profit	−$.004	−$200 ($.004 × 50,000 units)

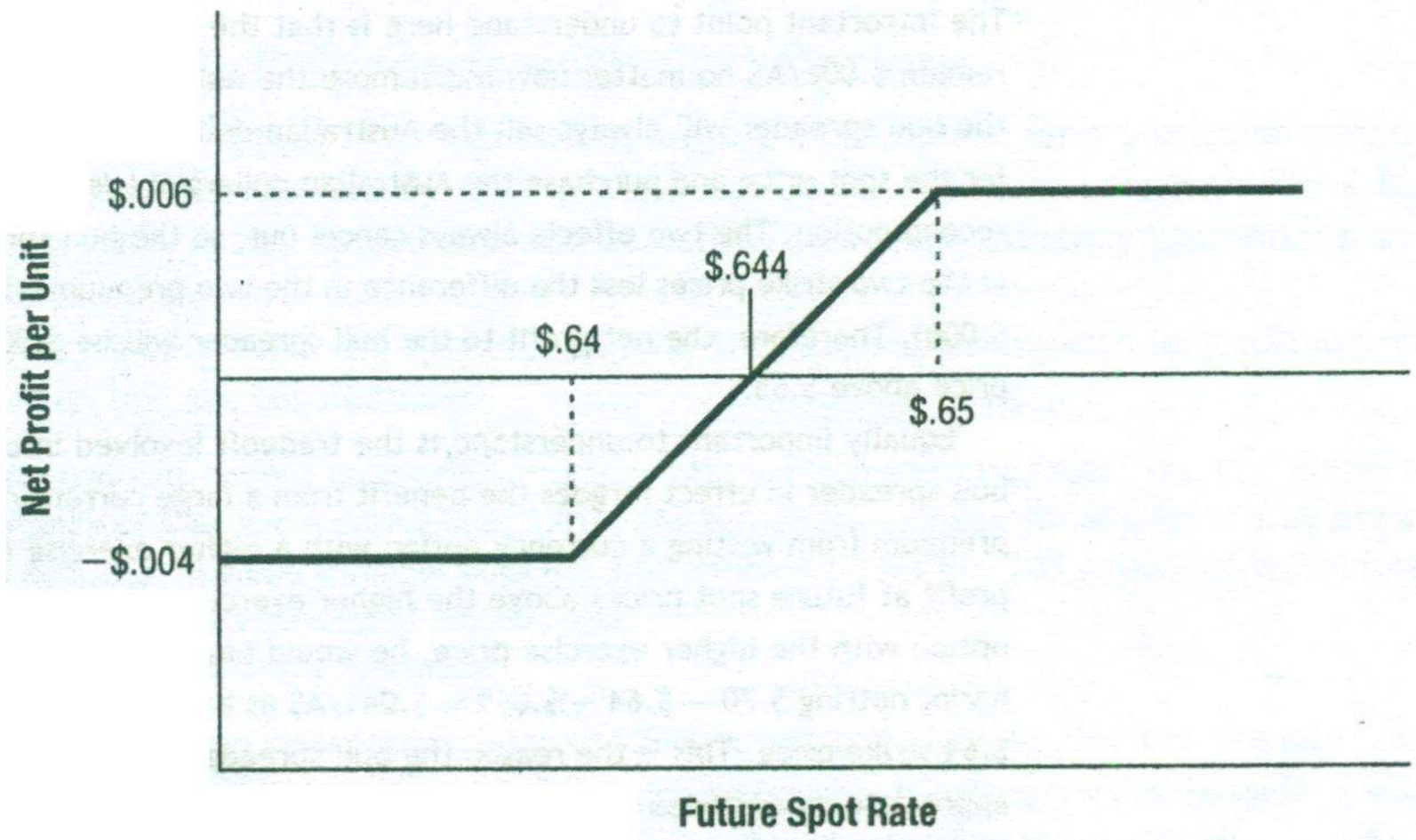
Similar to the scenario where the Australian dollar appreciates modestly between the two exercise prices, the bull spreader's loss in this case is reduced by the premium received from writing the call option with the higher exercise price. ●

Currency Bull Spread Worksheet and Contingency Graph For the Australian dollar example above, a worksheet and contingency graph can be constructed. One possible worksheet is as follows:

	VALUE OF AUSTRALIAN DOLLAR AT OPTION EXPIRATION				
	$.60	$.64	$.645	$.65	$.70
Buy a call	−$.019	−$.019	−$.014	−$.009	+$.041
Sell a call	+$.015	+$.015	+$.015	+$.015	−$.035
Net	−$.004	−$.004	+$.001	+$.006	+$.006

Exhibit 5B.5 shows the corresponding contingency graph.

Exhibit 5B.5 Contingency Graph for a Currency Bull Spread



The worksheet and contingency graph show that the maximum loss for the bull spreader is limited to the difference between the two option premiums of −$.004 = −$.019 + $.015. This maximum loss occurs at future spot prices equal to the lower strike price or below.

Also note that for a bull spread the gain is limited to the difference between the strike prices less the difference in the option premiums and is equal to $.006 = $.65 − $.64 − $.004. This maximum gain occurs at future spot prices equal to the higher exercise price or above.

The break-even point for the bull spread is located at the lower exercise price plus the difference in the two option premiums and is equal to $.644 = $.64 + $.004.

Currency Bull Spreads with Put Options

As mentioned previously, currency bull spreads can be constructed just as easily with put options as with call options. To construct a put bull spread, the spreader would again buy a put option with a lower exercise price and write a put option with a higher exercise price. The basic arithmetic involved in constructing a put bull spread is thus essentially the same as for a call bull spread, with one important difference, as discussed next.

Recall that there is a positive relationship between the level of the existing spot price relative to the strike price and the call option premium. Consequently, the option with the higher exercise price that is written in a call bull spread will have the lower option premium, everything else being equal. Thus, buying the call option with the lower exercise price and writing the call option with the higher exercise price involves a cash outflow for the bull spreader. For this reason, call bull spreads fall into a broader category of spreads called "debt spreads."

Also recall that the lower the spot rate relative to the strike price, the higher the put option premium will be. Consequently, the option with the higher strike price that is written in a put bull spread will have the higher option premium, everything else being equal. Thus, buying the put option with the lower exercise price and writing the put option with the higher exercise price in a put bull spread results in a cash inflow for the bull spreader. For this reason, put bull spreads fall into a broader category of spreads called "credit spreads."

Speculating with Currency Bull Spreads

The speculator who constructs a currency bull spread trades profit potential for a reduced cost of establishing the position. Ideally, the underlying currency will appreciate to the higher exercise price but not far above it. Although the speculator would still realize the maximum gain of the bull spread in this case, he or she would incur significant opportunity costs if the underlying currency appreciates much above the higher exercise price. Speculating with currency bull spreads is appropriate for currencies that are expected to appreciate slightly until the expiration date. Since the bull spread involves both buying and writing options for the underlying currency, bull spreads can be relatively cheap to construct and will not result in large losses if the currency depreciates. Conversely, bull spreads are useful tools to generate additional income for speculators.

Currency Bear Spreads

The easiest way to think about a currency bear spread is as a short bull spread. That is, a currency bear spread involves taking exactly the opposite positions involved in a bull spread. The bear spreader writes a call option for a particular underlying currency and

simultaneously buys a call option for the same currency with a higher exercise price. Consequently, the bear spreader anticipates a modest depreciation in the foreign currency.

Currency Bear Spread Worksheet and Contingency Graph For the Australian dollar example above, the bear spreader writes the $.64 option and buys the $.65 option. A worksheet and contingency graph can be constructed. One possible worksheet is shown below:

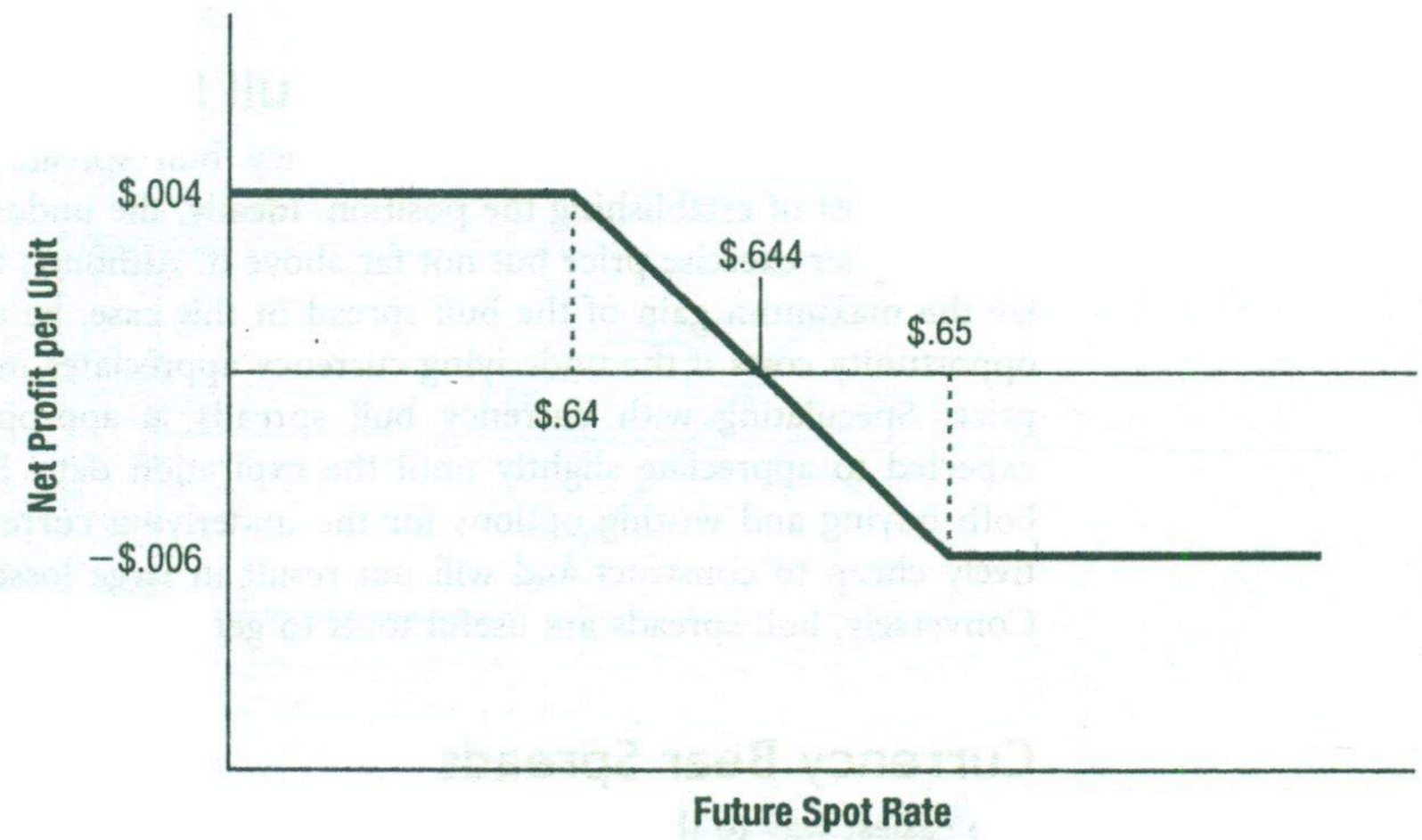
	VALUE OF AUSTRALIAN DOLLAR AT OPTION EXPIRATION				
	$.60	$.64	$.645	$.65	$.70
Sell a call	+$.019	+$.019	+$.014	+$.009	−$.041
Buy a call	−$.015	−$.015	−$.015	−$.015	+$.035
Net	+$.004	+$.004	−$.001	−$.006	−$.006

The corresponding contingency graph is shown in Exhibit 5B.6.

Notice that the worksheet and contingency graph for the bear spread are the mirror image of the worksheet and contingency graph for the bull spread. Consequently, the maximum gain for the bear spreader is limited to the difference between the two exercise prices of $.004 = $.019 − $.015, and the maximum loss for a bear spread (−$.006 = −$.65 + $.64 + $.004) occurs when the Australian dollar's value is equal to or above the exercise price at option expiration.

Also, the break-even point is located at the lower exercise price plus the difference in the two option premiums and is equal to $.644 = $.64 + $.004, which is the same break-even point as for the bull spread.

Exhibit 5B.6 Contingency Graph for a Currency Bear Spread



It is evident from the above illustration that the bear spreader hopes for a currency depreciation. An alternative way to profit from a depreciation would be to buy a put option for the currency. A bear spread, however, is typically cheaper to construct, since it involves buying one call option and writing another call option. The disadvantage of the bear spread compared to a long put position is that opportunity costs can be significant if the currency depreciates dramatically. Consequently, the bear spreader hopes for a modest currency depreciation.



PART 1 INTEGRATIVE PROBLEM

The International Financial Environment

Mesa Co. specializes in the production of small fancy picture frames, which are exported from the United States to the United Kingdom. Mesa invoices the exports in pounds and converts the pounds to dollars when they are received. The British demand for these frames is positively related to economic conditions in the United Kingdom. Assume that British inflation and interest rates are similar to the rates in the United States. Mesa believes that the U.S. balance-of-trade deficit from trade between the United States and the United Kingdom will adjust to changing prices between the two countries, while capital flows will adjust to interest rate differentials. Mesa believes that the value of the pound is very sensitive to changing international capital flows and is moderately sensitive to changing international trade flows. Mesa is considering the following information:

- The U.K. inflation rate is expected to decline, while the U.S. inflation rate is expected to rise.
- British interest rates are expected to decline, while U.S. interest rates are expected to increase.

Questions

1. Explain how the international trade flows should initially adjust in response to the changes in inflation (holding exchange rates constant). Explain how the international capital flows should adjust in response to the changes in interest rates (holding exchange rates constant).
2. Using the information provided, will Mesa expect the pound to appreciate or depreciate in the future? Explain.
3. Mesa believes international capital flows shift in response to changing interest rate differentials. Is there any reason why the changing interest rate differentials in this example will not necessarily cause international capital flows to change significantly? Explain.
4. Based on your answer to question 2, how would Mesa's cash flows be affected by the expected exchange rate movements? Explain.
5. Based on your answer to question 4, should Mesa consider hedging its exchange rate risk? If so, explain how it could hedge using forward contracts, futures contracts, and currency options.