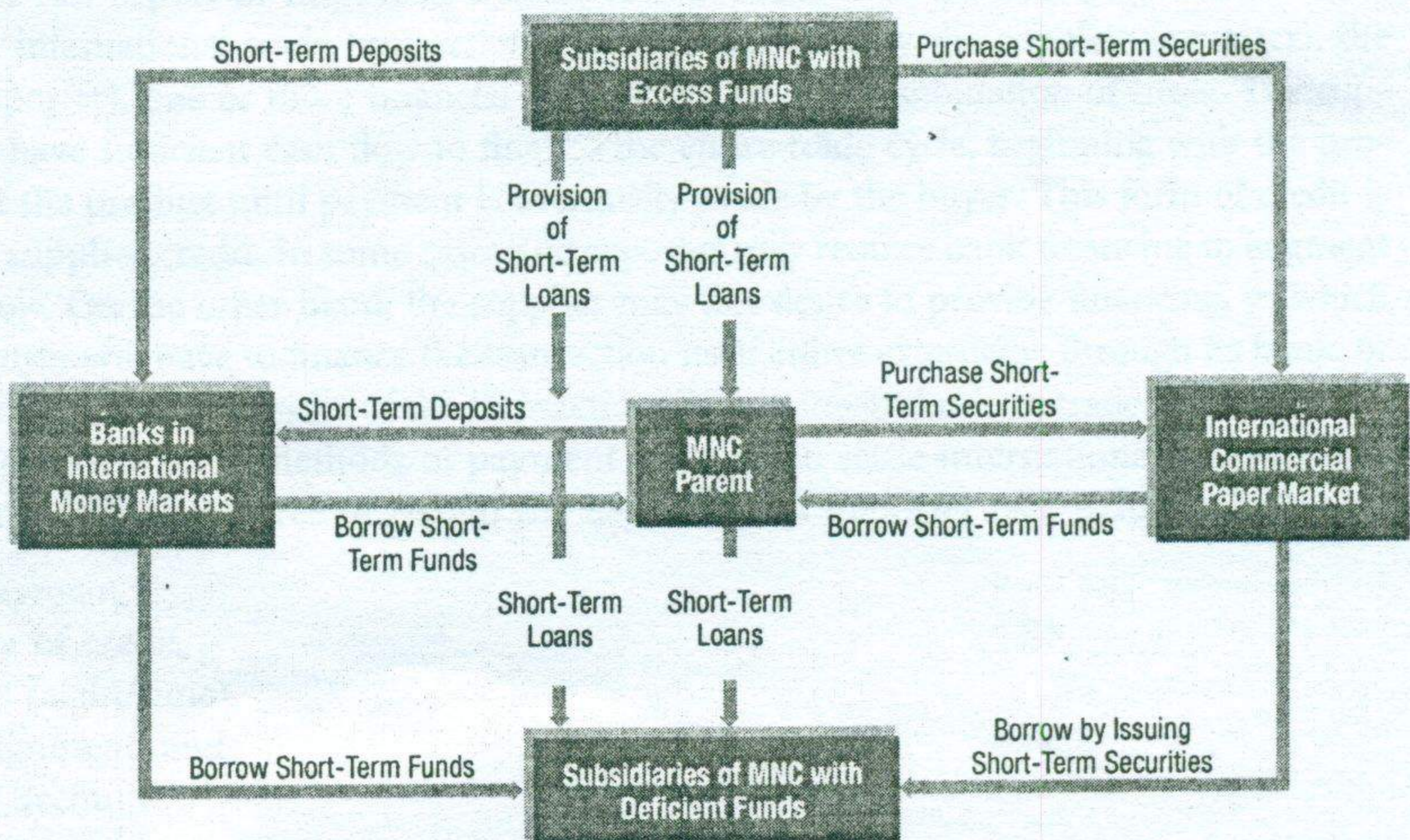# PART 5
Short-Term Asset and Liability Management

Part 5 (Chapters 19 through 21) focuses on the multinational corporation's management of short-term assets and liabilities. Chapter 19 describes methods by which MNCs can finance their international trade. Chapter 20 identifies sources of short-term funds and explains the criteria used by MNCs to make their short-term financing decisions. Chapter 21 describes how MNCs optimize their cash flows and explains the criteria used to make their short-term investment decisions.

19
Financing International Trade

The international trade activities of MNCs have grown in importance over time. This trend is attributable to the increased globalization of the world economies and the availability of trade finance from the international banking community.

19-1 PAYMENT METHODS FOR INTERNATIONAL TRADE

Although banks also finance domestic commercial transactions, their role in financing international trade is more extensive because of the additional complications involved. First, the exporter might question the importer's ability to make payment. Second, even if the importer is creditworthy, its government might impose exchange controls that prevent payment to the exporter. Third, the importer might not trust the exporter to ship the goods ordered. Fourth, even if the exporter does ship the goods, trade barriers or time lags in international transportation might delay arrival time. Financial managers must recognize methods that they can use to finance international trade so that their companies can export or import in a manner that maximizes the MNC's value.

In any international trade transaction, credit is provided by the supplier (exporter), the buyer (importer), one or more financial institutions, or any combination of these. The supplier may have sufficient cash flow to finance the entire trade cycle, beginning with the production of the product until payment is eventually made by the buyer. This form of credit is known as **supplier credit**. In some cases, the exporter may require bank financing to augment its cash flow. On the other hand, the supplier may not desire to provide financing, in which case the buyer will have to finance the transaction itself either externally, through its bank, or internally. Banks on both sides of the transaction play an integral role in trade financing.

In general, five basic methods of payment are used to settle international transactions, each with a different degree of risk to the exporter and importer (see Exhibit 19.1):

■ prepayment,
■ letters of credit,
■ drafts (sight/time),
■ consignment, and
■ open account.

19-1a Prepayment

Under the **prepayment** method, the exporter will not ship the goods until the buyer has remitted payment to the exporter. Payment is usually made in the form of an international wire transfer to the exporter's bank account or a foreign bank draft. As technology

Exhibit 19.1 Comparison of Payment Methods

METHOD	USUAL TIME OF PAYMENT	GOODS AVAILABLE TO BUYERS	RISK TO EXPORTER	RISK TO IMPORTER
Prepayment	Before shipment	After payment	None	Relies completely on exporter to ship goods as ordered
Letter of credit	When shipment is made	After payment	Very little or none, depending on credit terms	Is assured that shipment has been made, but relies on exporter to ship goods described in documents
Sight draft; documents against payment	On presentation of draft to buyer	After payment	If draft unpaid, must dispose of goods	Same as above unless importer can inspect goods before payment
Time draft; documents against acceptance	On maturity of drafts	Before payment	Relies on buyer to pay drafts	Same as above
Consignment	At time of sale by buyer	Before payment	Allows importer to sell inventory before paying exporter	None; improves cash flow of buyer
Open account	As agreed	Before payment	Relies completely on buyer to pay account as agreed	None

progresses, electronic commerce will allow firms engaged in international trade to make electronic credits and debits through an intermediary bank. This method affords the supplier the greatest degree of protection, and it is normally requested of first-time buyers whose creditworthiness is unknown or whose countries are in financial difficulty. Most buyers, however, are not willing to bear all the risk by prepaying an order.

19-1b Letters of Credit

A **letter of credit** (L/C) is an instrument issued by a bank on behalf of the importer (buyer) promising to pay the exporter (beneficiary) upon presentation of shipping documents in compliance with the terms stipulated therein. In effect, the bank is substituting its credit for that of the buyer. This method is a compromise between seller and buyer because it affords certain advantages to both parties. The exporter is assured of receiving payment from the issuing bank as long as it presents documents in accordance with the L/C. An important feature of an L/C is that the issuing bank is obligated to honor drawings under the L/C regardless of the buyer's ability or willingness to pay. On the other hand, the importer does not have to pay for the goods until shipment has been made and the documents are presented in good order. However, the importer must still rely upon the exporter to ship the goods as described in the documents because the L/C does not guarantee that the goods purchased will be those invoiced and shipped. Letters of credit will be described in greater detail later in this chapter.

19-1c Drafts

A **draft** (or **bill of exchange**) is an unconditional promise drawn by one party, usually the exporter, instructing the buyer to pay the face amount of the draft upon presentation. The draft represents the exporter's formal demand for payment from the buyer. A draft affords the exporter less protection than an L/C because the banks are not obligated to honor payments on the buyer's behalf.

Most trade transactions handled on a draft basis are processed through banking channels. These transactions are known as **documentary collections**, whereby banks on both ends act as intermediaries in the processing of shipping documents and the collection of payment. If shipment is made under a *sight draft*, the exporter is paid once shipment has been made and the draft is presented to the buyer for payment. This is known as **documents against payment**. It provides the exporter with some protection because the banks will release the shipping documents only according to the exporter's instructions. The buyer needs the shipping documents to pick up the merchandise. The buyer does not have to pay for the merchandise until the draft has been presented.

If a shipment is made under a *time draft*, then the exporter instructs the buyer's bank to release the shipping documents against acceptance (signing) of the draft. This method of payment is sometimes referred to as **documents against acceptance**. By accepting the draft, the buyer is promising to pay the exporter at the specified future date. This accepted draft is also known as a **trade acceptance**, which is different from a banker's acceptance (discussed later in the chapter).

In this type of transaction, the buyer is able to obtain the merchandise prior to paying for it. The exporter provides the financing and relies on the buyer's financial integrity to pay the draft at maturity. Shipping on a time draft basis provides some added comfort in that banks at both ends are used as collection agents. In addition, a draft serves as a binding financial obligation in case the exporter wishes to pursue litigation on uncollected receivables. The added risk is that if the buyer fails to pay the draft at maturity, the bank is not obligated to honor payment. The exporter is assuming all the risk and must analyze the buyer accordingly.

19-1d Consignment

Under a **consignment** arrangement, the exporter ships the goods to the importer while still retaining actual title to the merchandise. The importer has access to the inventory but does not have to pay for the goods until they have been sold to a third party. The exporter trusts the importer to remit payment for the goods sold at that time. If the importer fails to pay, then the exporter has limited recourse because no draft is involved and the goods have already been sold. As a result of the high risk, consignments are seldom used except by affiliated and subsidiary companies trading with the parent company. Some equipment suppliers allow importers to hold some equipment on the sales floor as demonstrator models. Once the models are sold or after a specified period, payment is sent to the supplier.

19-1e Open Account

The opposite of prepayment is the **open account transaction**, in which the exporter ships the merchandise and expects the buyer to remit payment according to the agreed-upon terms. The exporter is relying fully upon the financial creditworthiness, integrity, and reputation of the buyer. As might be expected, this method is used when the seller and buyer have mutual trust and a great deal of experience with each other. Despite the risks, open account transactions are widely utilized, particularly among the industrialized countries in North America and Europe.

19-1f Impact of the Credit Crisis on Payment Methods

When the credit crisis intensified in the fall of 2008, international trade transactions stalled. Commercial banks facilitate trade transactions because they are normally trusted to guarantee payment on behalf of a buyer. However, during the credit crisis, many

financial institutions experienced financial problems. Consequently, exporters lost trust in commercial banks. Furthermore, many companies did not want to make payment until they received payments on other outstanding trade contracts. The crisis illustrated how international trade is so reliant on the soundness and integrity of commercial banks.

19-2 TRADE FINANCE METHODS

As mentioned in the previous section, banks on both sides of the transaction play a critical role in financing international trade. The following are some of the more popular methods of financing international trade:

- accounts receivable financing,
- factoring,
- letters of credit (L/Cs),
- banker's acceptances,
- working capital financing,
- medium-term capital goods financing (forfaiting), and
- countertrade.

Each of these methods is described in turn.

19-2a Accounts Receivable Financing

In some cases, the exporter of goods may be willing to ship goods to the importer without an assurance of payment from a bank. This could take the form of an open account shipment or a time draft. Prior to shipment, the exporter should have conducted its own credit check on the importer to determine creditworthiness. If the exporter is willing to wait for payment, it will extend credit to the buyer.

If the exporter needs funds immediately, it may require financing from a bank. In what is referred to as **accounts receivable financing**, the bank will provide a loan to the exporter secured by an assignment of the account receivable. The bank's loan is made to the exporter based on its creditworthiness. In the event the buyer fails to pay the exporter for whatever reason, the exporter is still responsible for repaying the bank.

Accounts receivable financing involves additional risks, such as government restrictions and exchange controls that may prevent the buyer from paying the exporter. As a result, the loan rate is often higher than domestic accounts receivable financing. The length of a financing term is usually one to six months. To reduce the additional risk of a foreign receivable, exporters and banks often require export credit insurance before financing foreign receivables.

19-2b Factoring

When an exporter ships goods before receiving payment, the accounts receivable balance increases. Unless the exporter has received a loan from a bank, it is initially financing the transaction and must monitor the collections of receivables. Since there is a danger that the buyer will never pay at all, the exporting firm may consider selling the accounts receivable to a third party, known as a **factor**. In this type of financing, the exporter sells the accounts receivable without recourse. The factor then assumes all administrative responsibilities involved in collecting from the buyer and the associated credit exposure. The factor performs its own credit approval process on the foreign buyer before purchasing the receivable. For providing this service, the factor usually purchases the receivable at a discount and also receives a flat processing fee.

Factoring provides several benefits to the exporter. First, by selling the accounts receivable, the exporter does not have to worry about the administrative duties involved in maintaining and monitoring an accounts receivable accounting ledger. Second, the factor assumes the credit exposure to the buyer, so the exporter does not have to maintain personnel to assess the creditworthiness of foreign buyers. Finally, by selling the receivable to the factor, the exporter receives immediate payment and improves its cash flow.

Since it is the importer who must be creditworthy from a factor's point of view, **cross-border factoring** is often used. This involves a network of factors in various countries that assess credit risk. The exporter's factor contacts a correspondent factor in the buyer's country to assess the importer's creditworthiness and handle the collection of the receivable. Factoring services are usually provided by the factoring subsidiaries of commercial banks, commercial finance companies, and other specialized finance houses. Factors often utilize export credit insurance to mitigate the additional risk of a foreign receivable.

19-2c   Letters of Credit (L/Cs)

Introduced previously in this chapter, the letter of credit (L/C) is one of the oldest forms of trade finance still in existence. Because of the protection and benefits it provides to both exporter and importer, it is a critical component of many international trade transactions. The L/C is an undertaking by a bank to make payments on behalf of a specified party to a beneficiary under specified conditions. The beneficiary (exporter) is paid upon presentation of the required documents in compliance with the terms of the L/C. The L/C process normally involves two banks, the exporter's bank and the importer's bank. The issuing bank is substituting its credit for that of the importer. It has essentially guaranteed payment to the exporter, provided the exporter complies with the terms and conditions of the L/C.

Sometimes the exporter is uncomfortable with the issuing bank's promise to pay because the bank is located in a foreign country. Even if the issuing bank is well known worldwide, the exporter may be concerned that the foreign government will impose exchange controls or other restrictions that would prevent payment by the issuing bank. For this reason, the exporter may request that a local bank confirm the L/C and thus assure that all the responsibilities of the issuing bank will be met. The confirming bank is obligated to honor drawings made by the beneficiary in compliance with the L/C, regardless of the issuing bank's ability to make that payment. Consequently, the confirming bank is trusting that the foreign bank issuing the L/C is sound. The exporter, however, need worry only about the credibility of the confirming bank.

EXAMPLE   Nike can attribute part of its international business growth in the 1970s to the use of L/Cs. In 1971, Nike (which was then called BSR) was not well known to businesses in Japan or anywhere else. Nevertheless, by using L/Cs, it was able to subcontract the production of athletic shoes in Japan. The L/Cs assured the Japanese shoe producer that it would receive payment for the shoes it would send to the United States and thus facilitated the flow of trade without concern about credit risk. Banks served as the guarantors in the event that the Japanese shoe company was not paid in full after transporting shoes to the United States. So because of this backing by the banks, the L/Cs allowed the Japanese shoe company to do international business without having to worry that the counterparty in its agreement would not fulfill its obligation. Without such agreements, Nike (and many other firms) would not be able to order shipments of goods. ●

Types of Letters of Credit   Trade-related letters of credit are known as **commercial letters of credit** or **import/export letters of credit**. There are basically two types: revocable and irrevocable. A **revocable letter of credit** can be cancelled or revoked at any time without prior notification to the beneficiary, but it is no longer used. An **irrevocable letter of**

Exhibit 19.2   Example of an Irrevocable Letter of Credit

Name of issuing bank

Address of issuing bank

Name of exporter

Address of exporter

We establish our irrevocable letter of credit:

for the account of *(importer name),*

in the amount of *(value of exports),*

expiring *(date),*

available by your draft at *(time period)* days sight and accompanied by:

(any invoices, packing lists, bills of lading, etc., that need to be presented with the letter of credit)

Insurance provided by *(exporter or importer)*

covering shipment of *(merchandise description)*

From: *(port of shipment)*

To: *(port of arrival)*

(Authorized Signature)
_____

credit (see Exhibit 19.2) cannot be canceled or amended without the beneficiary's consent. The bank issuing the L/C is known as the **issuing bank**. The correspondent bank in the beneficiary's country to which the issuing bank sends the L/C is referred to as the **advising bank**. An irrevocable L/C obligates the issuing bank to honor all drawings presented in conformity with the terms of the L/C. Letters of credit are normally issued in accordance with the provisions contained in "Uniform Customs and Practice for Documentary Credits," which is published by the International Chamber of Commerce.

The bank issuing the L/C makes payment as soon as the required documentation has been presented in accordance with the payment terms. The importer must pay the issuing bank the amount of the L/C plus accrued fees associated with obtaining the L/C. The importer usually has established an account at the issuing bank to be drawn upon for payment so that the issuing bank does not tie up its own funds. However, if the importer does not have sufficient funds in its account, the issuing bank is still obligated to honor all valid drawings against the L/C. This is why the bank's decision to issue an L/C on behalf of an importer involves an analysis of the importer's creditworthiness and is analogous to the decision to make a loan. The documentary credit procedure is depicted in the flowchart in Exhibit 19.3. In what is called the *refinancing of a sight L/C*, the bank arranges to fund a loan to pay out the L/C instead of charging the importer's account immediately. The importer is responsible for repaying the bank both the principal and interest at maturity. This is just another method of providing extended payment terms to a buyer when the exporter insists upon payment at sight.

The bank issuing the L/C makes payment to the beneficiary (exporter) upon presentation of documents that meet the conditions stipulated in the L/C. Letters of credit are payable either at sight (upon presentation of documents) or at a specified future date. The typical documentation required under an L/C includes a draft (sight or time), a commercial invoice, and a bill of lading. Depending upon the agreement, product, or country, other

Exhibit 19.3 Documentary Credit Procedure
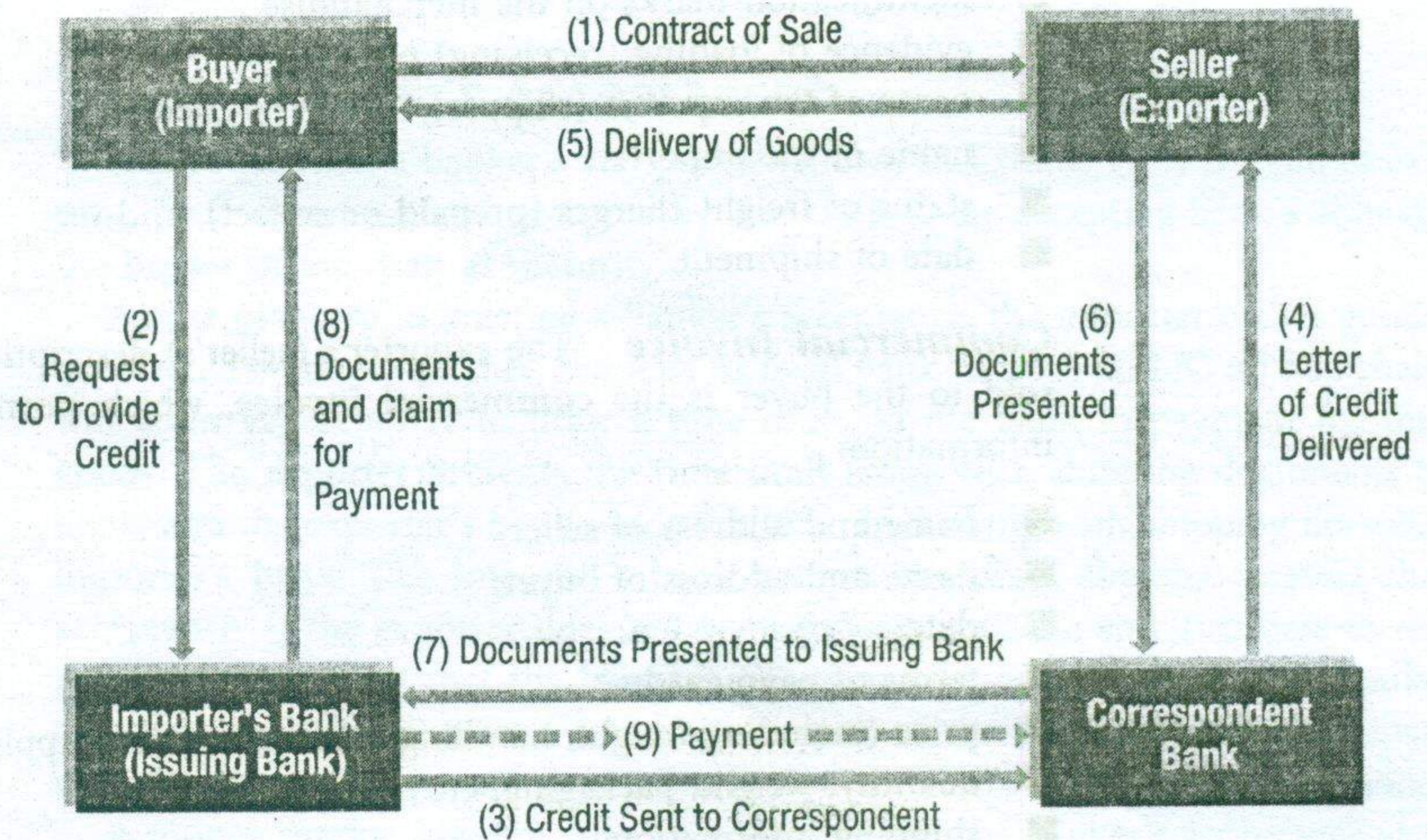
documents (such as a certificate of origin, inspection certificate, packing list, or insurance certificate) might be required. The three most common L/C documents are as follows.

Draft Also known as a **bill of exchange**, a draft (introduced earlier) is an unconditional promise drawn by one party, usually the exporter, requesting the importer to pay the face amount of the draft at sight or at a specified future date. If the draft is drawn at sight, it is payable upon presentation of documents. If it is payable at a specified future date (a time draft) and is accepted by the importer, it is known as a trade acceptance. A **banker's acceptance** is a time draft drawn on and accepted by a bank. When presented under an L/C, the draft represents the exporter's formal demand for payment. The time period, or **tenor**, of most time drafts usually ranges from 30 to 180 days.

Bill of Lading The key document in an international shipment under an L/C is the **bill of lading (B/L)**. It serves as a receipt for shipment and a summary of freight charges; most importantly, it conveys title to the merchandise. If the merchandise is to be shipped by boat, the carrier will issue what is known as an **ocean bill of lading**. When the merchandise is shipped by air, the carrier will issue an **airway bill**. The carrier presents the bill to the exporter (shipper), who in turn presents it to the bank along with the other required documents.

A significant feature of a B/L is its negotiability. A straight B/L is consigned directly to the importer. Since it does not represent title to the merchandise, the importer does not need it to pick up the merchandise. When a B/L is made out to order, however, it is said to be *in negotiable form*. The exporter normally endorses the B/L to the bank once payment is received from the bank.

The bank will not endorse the B/L over to the importer until payment has been made. The importer needs the original B/L to pick up the merchandise. With a negotiable B/L, title passes to the holder of the endorsed B/L. Because a negotiable B/L grants title to the

holder, banks can take the merchandise as collateral. A B/L usually includes the following provisions:

- a description of the merchandise,
- identification marks on the merchandise,
- evidence of loading (receiving) ports,
- name of the exporter (shipper),
- name of the importer,
- status of freight charges (prepaid or collect), and
- date of shipment.

Commercial Invoice   The exporter's (seller's) description of the merchandise being sold to the buyer is the **commercial invoice**, which normally contains the following information:

- name and address of seller;
- name and address of buyer;
- date;
- terms of payment;
- price (including freight, handling, and insurance if applicable);
- quantity, weight, packaging, etc.; and
- shipping information.

Under an L/C shipment, the description of the merchandise outlined in the invoice must correspond exactly to that contained in the L/C.

Variations of the L/C   There are several variations of the L/C that are useful in financing trade. A **standby letter of credit** can be used to guarantee invoice payments to a supplier: it promises to pay the beneficiary if the buyer fails to pay as agreed. Internationally, standby L/Cs often are used with government-related contracts and serve as bid bonds, performance bonds, or advance payment guarantees. In an international or domestic trade transaction, the seller will agree to ship to the buyer on standard, open account terms as long as the buyer provides a standby L/C for a specified amount and term. As long as the buyer pays the seller as agreed, the standby L/C is never funded. However, if the buyer fails to pay, the exporter may present documents under the L/C and request payment from the bank. The buyer's bank is essentially guaranteeing that the buyer will make payment to the seller.

A **transferable letter of credit** is a variation of the standard commercial L/C that allows the first beneficiary to transfer all or a part of the original L/C to a third party. The new beneficiary has the same rights and protection as the original beneficiary. This type of L/C is used extensively by brokers, who are not the actual suppliers.

EXAMPLE   A broker asks a foreign buyer to issue an L/C for $100,000 in the broker's favor. The L/C must contain a clause stating that the L/C is transferable. The broker has located an end supplier who will provide the product for $80,000 but requests payment in advance from the broker. With a transferable L/C, the broker can transfer $80,000 of the original L/C to the end supplier under the same terms and conditions *except* for the amount, the latest shipment date, the invoice, and the period of validity. When the end supplier ships the product, it presents its documents to the bank. When the bank pays the L/C, $80,000 is paid to the end supplier and $20,000 goes to the broker. In effect, the broker has utilized the buyer's credit to finance the entire transaction. ●

Another type of L/C is the **assignment of proceeds**. In this case, the original beneficiary of the L/C pledges (or assigns) the proceeds under an L/C to the end supplier. The end supplier has assurance from the bank that, if and when documents are presented in compliance with the terms of the L/C, the bank will pay the end supplier according to

the assignment instructions. This assignment is valid only if the beneficiary presents documents that comply with the L/C. The end supplier must recognize that the issuing bank is under no obligation to pay the end supplier if the original beneficiary never ships the goods or fails to comply with the terms of the L/C.

19-2d   Banker's Acceptances

Introduced earlier, a banker's acceptance (shown in Exhibit 19.4) is a bill of exchange, or time draft, drawn on and accepted by a bank. It is the accepting bank's obligation to pay the holder of the draft at maturity.

As the first step in creating a banker's acceptance, the importer orders goods from the exporter. The importer then requests its local bank to issue an L/C on its behalf. The L/C will allow the exporter to draw a time draft on the bank in payment for the exported goods. The exporter presents the time draft along with shipping documents to its local bank, and the exporter's bank sends the time draft along with shipping documents to the importer's bank. The importer's bank accepts the draft, thereby creating the banker's acceptance. If the exporter does not want to wait until the specified date to receive payment, it can request that the banker's acceptance be sold in the money market. In that case the exporter will receive less from the sale of the banker's acceptance than if it had waited to receive payment, where this discount reflects the time value of money.

A money market investor may be willing to buy the banker's acceptance at a discount and hold it until payment is due. This investor will then receive full payment because the banker's acceptance represents a future claim on funds of the bank represented by the acceptance. The bank will make full payment at the date specified because it expects to receive this amount plus an additional fee from the importer.

If the exporter holds the acceptance until maturity, it provides the financing for the importer much as it does with accounts receivable financing. The key difference between a banker's acceptance and accounts receivable financing is that a banker's acceptance guarantees payment to the exporter by a bank. If the exporter sells the banker's acceptance in the secondary market, however, it is no longer providing the financing for the importer. Instead, the holder of the banker's acceptance is the provider of financing.

Exhibit 19.4   Banker's Acceptance

A banker's acceptance can be beneficial to the exporter, importer, and issuing bank. The exporter does not need to worry about the credit risk of the importer and can therefore penetrate new foreign markets without concern about the credit risk of potential customers. In addition, the exporter faces little exposure to political risk or to exchange controls imposed by a government because banks normally are allowed to meet their payment commitments even if controls are imposed. In contrast, controls could prevent an importer from paying and so, without a banker's acceptance, an exporter might not receive payment even though the importer is willing to pay. Finally, the exporter can sell the banker's acceptance at a discount before payment is due and thus obtain funds up front from the issuing bank.

The importer benefits from a banker's acceptance by obtaining greater access to foreign markets when purchasing supplies and other products. Without banker's acceptances, exporters may be unwilling to accept the credit risk of importers. In addition, the documents presented along with the acceptance assure the importer that goods have been shipped. Even though the importer has not paid in advance, this assurance is valuable because it lets the importer know if and when supplies and other products will arrive. Finally, because the banker's acceptance allows the importer to pay at a later date, the importer's payment is financed until the maturity date of the banker's acceptance. Without an acceptance, the importer would likely be forced to pay in advance, thereby tying up funds.

The bank accepting the drafts benefits from the commission it earns from creating an acceptance. The commission that the bank charges the customer reflects the customer's perceived creditworthiness. The interest rate charged the customer, referred to as the **all-in rate**, consists of the discount rate plus the acceptance commission. In general, the all-in rate for acceptance financing is lower than prime-based borrowings, as shown in the following comparison:
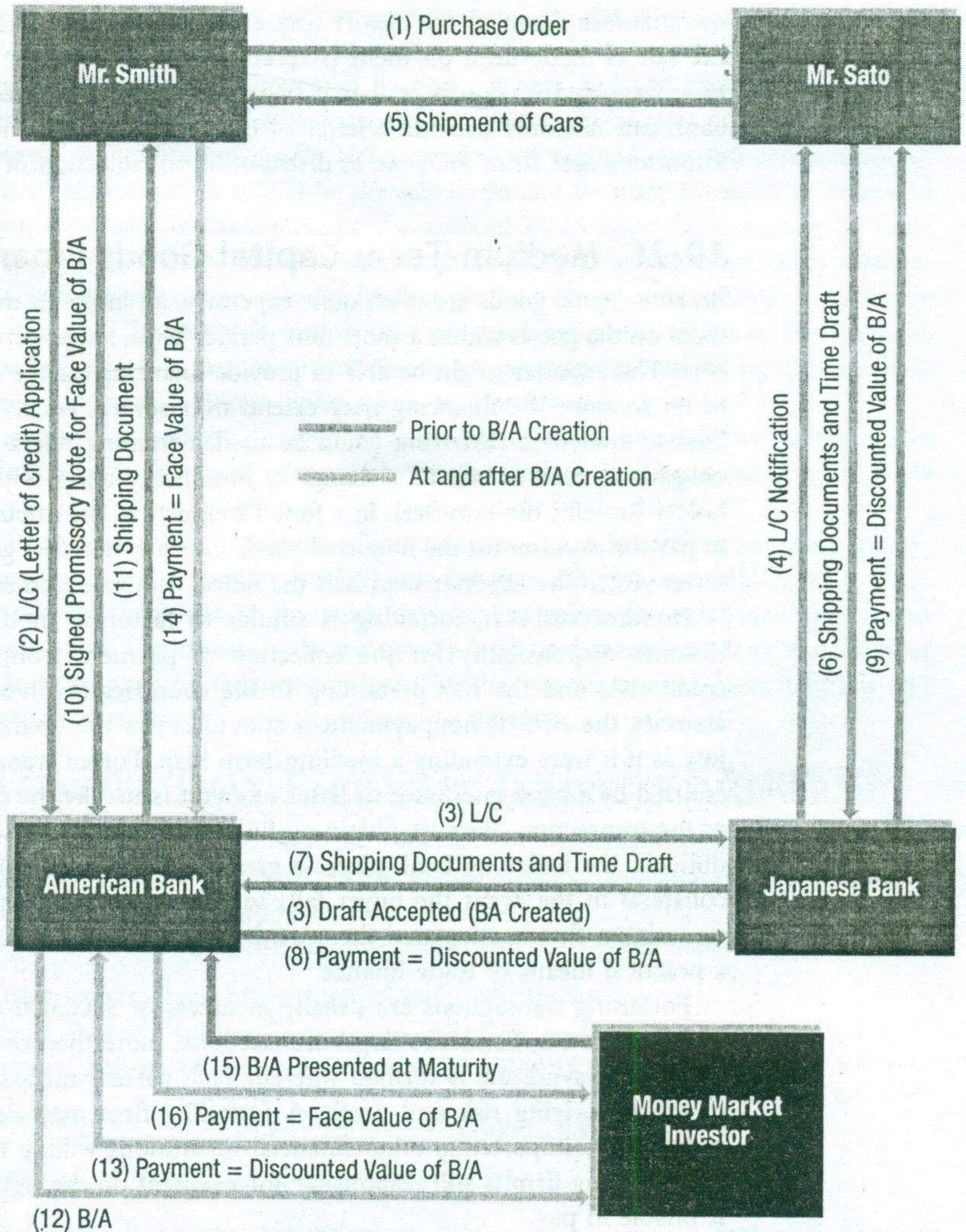
	LOAN	ACCEPTANCE
Amount	$1,000,000	$1,000,000
Term	180 days	180 days
Rate	Prime + 1.5%	BA rate + 1.5%
	10.0% + 1.5% = 11.5%	7.60% + 1.5% = 9.10%
Interest cost	$57,500	$45,500

In this case, the interest savings for a six-month period is $12,000. Since the banker's acceptance is a marketable instrument with an active secondary market, the rates on acceptances usually fall between the rates on short-term Treasury bills and the rates on commercial paper. Investors are usually willing to purchase acceptances as an investment because of their yield, safety, and liquidity. When a bank creates, accepts, and sells the acceptance, it is actually using the investor's money to finance the bank's customer. As a result, the bank has created an asset at one price, sold it at another, and retained a commission (spread) as its fee.

Banker's acceptance financing can also be arranged through the refinancing of a sight letter of credit. In this case, the beneficiary of the L/C (the exporter) may insist on payment at sight. The bank arranges to finance the payment of the sight L/C under a separate acceptance financing agreement. The importer (borrower) simply draws drafts upon the bank, which in turn accepts and discounts the drafts. The proceeds are used to pay the exporter. At maturity, the importer is responsible for repayment to the bank.

Acceptance financing can also be arranged without the use of an L/C under a separate acceptance agreement. Similar to a regular loan agreement, it stipulates the terms and conditions under which the bank is prepared to finance the borrower using acceptances instead of promissory notes. As long as the acceptances meet the underlying transaction

Exhibit 19.5   Life Cycle of a Typical Banker's Acceptance (B/A)

requirements, the bank and borrower can utilize banker's acceptances as an alternative financing mechanism. The life cycle of a banker's acceptance is illustrated in Exhibit 19.5.

19-2e Working Capital Financing

As just explained, a banker's acceptance can allow the exporter to receive funds immediately while allowing the importer to delay its payment until a future date. The bank may even provide short-term loans beyond the banker's acceptance period. In the case of an

importer, the purchase from overseas usually represents the acquisition of inventory. The loan finances the working capital cycle that begins with the purchase of inventory and continues with the sale of the goods, creation of an account receivable, and conversion to cash. With an exporter, the short-term loan might finance the manufacture of the merchandise destined for export (pre-export financing) or the time period from when the sale is made until payment is received from the buyer. For example, the firm may have imported foreign beer that it plans to distribute to grocery and liquor stores. The bank can not only provide a letter of credit for trade finance but can also finance the importer's cost from the time of distribution to collection of payment.

19-2f Medium-Term Capital Goods Financing (Forfaiting)

Because capital goods are often quite expensive, an importer may not be able to make payment on the goods within a short time period. Thus, longer-term financing may be required here. The exporter might be able to provide financing for the importer but may not desire to do so since the financing may extend over several years. In this case, a type of trade finance known as **forfaiting** could be used. Forfaiting refers to the purchase of financial obligations, such as bills of exchange or promissory notes, without recourse to the original holder (usually, the exporter). In a forfait transaction, the importer issues a promissory note to pay the exporter for the imported goods over a period that generally ranges from three to seven years. The exporter then sells the notes, without recourse, to the forfaiting bank.

In some respects, forfaiting is similar to factoring in that the forfaiter (or factor) assumes responsibility for the collection of payment from the buyer, the underlying credit risk, and the risk pertaining to the countries involved. Since the forfaiting bank assumes the risk of nonpayment, it should assess the creditworthiness of the importer just as if it were extending a medium-term loan. Forfait transactions are normally collateralized by a bank guarantee or letter of credit issued by the importer's bank for the term of the transaction. Because obtaining financial information about the importer is usually difficult, the forfaiting bank places a great deal of reliance on the bank guarantee as the collateral in the event the buyer fails to pay as agreed. It is this guarantee backing the transaction that has fostered the growth of the forfait market, particularly in Europe, as a practical means of trade finance.

Forfaiting transactions are usually in excess of $500,000 and can be denominated in most currencies. For some larger transactions, more than one bank may be involved. In this case, a syndicate is formed wherein each participant assumes a proportionate share of the underlying risk and profit. A forfaiting firm may decide to sell the promissory notes of the importer to other financial institutions willing to purchase them. However, the forfaiting firm is still responsible for payment on the notes in the event the importer is unable to pay.

19-2g Countertrade

The term **countertrade** denotes all types of foreign trade transactions in which the sale of goods to one country is linked to the purchase or exchange of goods from that same country. Some types of countertrade, such as barter, have been in existence for thousands of years. Only recently, however, has countertrade gained popularity and importance. The growth in various types of countertrade has been fueled by large balance-of-payment disequilibria, foreign currency shortages, the debt problems of less developed countries, and stagnant worldwide demand. Hence many MNCs have encountered countertrade opportunities, especially in Asia, Latin America, and Eastern Europe. The most frequently used types of countertrade include barter, compensation, and counterpurchase.

Barter is the exchange of goods between two parties without the use of any currency as a medium of exchange. Most barter arrangements are one-time transactions governed by a single contract. An example would be the exchange of 100 tons of wheat from Canada for 20 tons of shrimp from Ecuador.

In a **compensation** or clearing-account arrangement, the delivery of goods to one party is compensated for by the seller's buying back a certain amount of the product from that same party. The transaction is governed by one contract, and the value of the goods is expressed in monetary terms. The buyback arrangement could be for a fraction of the original sale (**partial compensation**) or for 100 percent of the original sale (**full compensation**). An example of compensation would be the sale of phosphate from Morocco to France in exchange for Morocco purchasing a specific amount of fertilizer from France. In some countries, this is also referred to as an industrial cooperation arrangement. Such arrangements often involve the construction of large projects, such as power plants, in exchange for the purchase of the project's output over an extended period of time. For example, Brazil sold a hydroelectric plant to Argentina and, in exchange, gained the right to purchase a percentage of the plant's output under a long-term contract.

The term **counterpurchase** denotes the exchange of goods between two parties under two distinct contracts expressed in monetary terms. Delivery and payment of both goods are technically separate transactions.

Despite the economic inefficiencies of countertrade, it has become much more important in recent years. The primary participants are governments and MNCs, with assistance provided by specialists in the field (such as attorneys, financial institutions, and trading companies). The transactions are usually large and complex. Many variations of countertrade exist, and the terminology used by the various market participants is still forming as the countertrade market continues to develop.

19-3 AGENCIES THAT FACILITATE INTERNATIONAL TRADE

Given the inherent risks of international trade, government institutions and the private sector offer various forms of export credit, export finance, and guarantee programs to reduce risk and stimulate foreign trade.

Three prominent agencies provide these services in the United States:

- the Export-Import Bank of the United States (Ex-Im Bank),
- the Private Export Funding Corporation (PEFCO), and
- the Overseas Private Investment Corporation (OPIC).

Each of these agencies will be described in this section.

19-3a Export-Import Bank of the United States

The **Export-Import Bank** was established in 1934 with the original goal of facilitating Soviet–American trade. Its missions today are to finance and facilitate the export of American goods and services and to maintain the competitiveness of American companies in overseas markets. It operates as an independent agency of the U.S. government and, as such, carries the full faith and credit of the United States.

Most of the Ex-Im Bank's programs are designed to encourage the private sector to finance export trade by assuming some of the underlying credit risk and providing direct financing to foreign importers when private lenders are unwilling to do so. To satisfy these objectives, the Ex-Im Bank offers programs that are classified as (1) guarantees, (2) loans, (3) bank insurance, and (4) export credit insurance.

Guarantee Programs The two most widely used guarantee programs are the **Working Capital Guarantee Program** and the **Medium-Term Guarantee Program**.

The Working Capital Guarantee Program encourages commercial banks to extend short-term export financing to eligible exporters by providing a comprehensive guarantee that covers 90 to 100 percent of the loan's principal and interest. This guarantee protects the lender against the risk of default by the exporter, but it does not protect the exporter against the risk of nonpayment by the foreign buyer. The loans are fully collateralized by export receivables and export inventory, and they require the payment of guarantee fees to the Ex-Im Bank. The export receivables are usually supported with export credit insurance or a letter of credit.

The Medium-Term Guarantee Program encourages commercial lenders to finance the sale of U.S. capital equipment and services to approved foreign buyers. The Ex-Im Bank guarantees 100 percent of the loan's principal and interest. The financed amount cannot exceed 85 percent of the contract price. This program is designed to finance products sold on a medium-term basis, with repayment terms of generally between one and five years. The guarantee fees paid to the Ex-Im Bank are determined by the repayment terms and the buyer's risk. The Ex-Im Bank now offers a leasing program to finance capital equipment and related services.

Loan Programs Two of the most popular loan programs are the **Direct Loan Program** and the **Project Finance Loan Program**. Under the Direct Loan Program, the Ex-Im Bank offers fixed rate loans directly to the foreign buyer to purchase U.S. capital equipment and services on a medium-term or long-term basis. The total financed amount cannot exceed 85 percent of the contract price. Repayment terms depend on the amount but are typically one to five years for medium-term transactions and seven to ten years for long-term transactions. The Ex-Im Bank's lending rates are generally below market rates.

The Project Finance Loan Program allows banks, the Ex-Im Bank, or a combination of both to extend long-term financing for capital equipment and related services for major projects. These are typically large infrastructure projects, such as power generation projects, whose repayment depends on project cash flow. Major U.S. corporations are often involved in these types of projects. The program typically requires a 15 percent cash payment by the foreign buyer and allows for guarantees of up to 85 percent of the contract amount. The fees and interest rates vary depending on the project risk.

Bank Insurance Programs The Ex-Im Bank offers several insurance policies to banks. The most widely used is the **Bank Letter of Credit Policy**. This policy enables banks to confirm letters of credit issued by foreign banks supporting a purchase of U.S. exports. Without this insurance, some banks would not be willing to assume the underlying commercial and political risk associated with confirming an L/C. The banks are insured up to 100 percent for sovereign (government) banks and 95 percent for all other banks. The insurance premium is based on the type of buyer, repayment term, and country.

The **Financial Institution Buyer Credit Policy** is issued in the name of the bank. This policy provides insurance coverage for loans by banks to foreign buyers on a short-term basis. A variety of short-term and medium-term insurance policies are available to exporters, banks, and other eligible applicants. Basically, all the policies provide insurance protection against the risk of nonpayment by foreign buyers. If the foreign buyer fails to pay the exporter because of commercial reasons such as cash flow problems or insolvency, the Ex-Im Bank will reimburse the exporter between 90 and 100 percent of the insured amount, depending on the type of policy and buyer.

If the loss is due to political factors, such as foreign exchange controls or war, the Ex-Im Bank will reimburse the exporter for 100 percent of the insured amount. Exporters can use the insurance policies as a marketing tool because the insurance enables them to offer more competitive terms while protecting them against the risk of nonpayment. An exporter can also use the insurance policy as a financing tool by assigning the

proceeds of the policy to a bank as collateral. Certain restrictions may apply to particular countries, depending on the Ex-Im Bank's experience and also on existing economic and political conditions.

Export Credit Insurance The **Small Business Policy** provides enhanced coverage to new exporters and small businesses. The policy insures short-term credit sales (under 180 days) to approved foreign buyers. In addition to providing 95 percent coverage against commercial risk defaults and 100 percent coverage against political risk, the policy offers lower premiums. The exporter can assign the policy to a bank as collateral.

The **Umbrella Policy** operates in a slightly different manner. The policy itself is issued to an "administrator," such as a bank, trading company, insurance broker, or government agency. The policyholder administers the policy for multiple exporters and relieves the exporters of the administrative responsibilities associated with the policy. The short-term insurance protection is similar to that provided by the Small Business Policy and does not have a commercial risk deductible. The proceeds of the policy may be assigned to a bank for financing purposes.

The **Multibuyer Policy** is used primarily by experienced exporters. It provides insurance coverage on short-term export sales to many different buyers. Premiums are based on an exporter's sales profile, credit history, terms of repayment, country, and other factors. Based on the exporter's experience and the buyer's creditworthiness, the Ex-Im Bank may grant the exporter authority to preapprove specific buyers up to a certain limit.

The **Single-Buyer Policy** allows an exporter to selectively insure certain short-term transactions to preapproved buyers. Premiums are based on repayment terms and transaction risk. There is also a Medium-Term Policy to cover sales to a single buyer for terms of between one and five years.

The Ex-Im Bank has also entered into partnership arrangements with more than 30 U.S. states to disseminate government trade promotion services to a broader audience. For example, the Florida Export Finance Corp. provides export credit insurance consulting, trade finance, and guarantees to exporters based in Florida.

Several private insurance carriers, such as AIG, also provide various types of insurance policies that may be used to mitigate risk. They are frequently employed when Ex-Im Bank insurance is not available or desirable.

19-3b Private Export Funding Corporation

The Private Export Funding Corporation (PEFCO) is a private corporation owned by a consortium of commercial banks and industrial companies. In cooperation with the Ex-Im Bank, PEFCO provides medium- and long-term fixed rate financing to foreign buyers. The Ex-Im Bank guarantees all export loans made by PEFCO. Most PEFCO loans are to finance large projects, such as aircraft and power generation equipment, and therefore have relatively long terms (sometimes as long as 25 years). Since commercial banks usually do not extend such long terms, PEFCO fills a void in the market while also serving as a secondary market buyer of export loans originated by U.S. banks. PEFCO raises its funds in the capital markets through the issuance of long-term bonds. These bonds are readily marketable because they are, in effect, secured by Ex-Im Bank-guaranteed loans.

19-3c Overseas Private Investment Corporation

The Overseas Private Investment Corporation (OPIC) was formed in 1971 as a self-sustaining federal agency responsible for insuring direct U.S. investments in foreign countries against the risks of currency inconvertibility, expropriation, and other political risks. Through the direct loan or guaranty program, OPIC will provide medium- to long-term

financing to U.S. investors undertaking an overseas venture. In addition to general insurance and finance programs, OPIC offers specific types of coverage for exporters bidding on or performing foreign contracts. American contractors can insure themselves against contractual disputes and even against the wrongful calling of standby letters of credit.

SUMMARY

- The common methods of payment for international trade are (1) prepayment (before goods are sent), (2) letters of credit, (3) drafts, (4) consignment, and (5) open account.
- The most popular methods of financing international trade are (1) accounts receivable financing, (2) factoring, (3) letters of credit, (4) banker's acceptances, (5) working capital financing,

- (6) medium-term capital goods financing (forfaiting), and (7) countertrade.
- The major agencies that facilitate international trade with export insurance and/or loan programs are (1) the Export-Import Bank, (2) the Private Export Funding Corporation, and (3) the Overseas Private Investment Corporation.

POINT COUNTER-POINT

Do Agencies That Facilitate International Trade Prevent Free Trade?

Point   Yes. The Export-Import Bank of the United States provides many programs to help U.S. exporters conduct international trade. The government is essentially subsidizing the exports. Governments in other countries have various programs as well. Thus, some countries may have a trade advantage because their exporters are subsidized in various ways. These subsidies distort the notion of free trade.

Counter-Point   No. It is natural for any government to facilitate exporting for relatively inexperienced exporting firms. All governments provide a variety of

services for their firms, including public services and tax breaks for producing products that are ultimately exported. There is a difference between facilitating the exporting process and protecting an industry from foreign competition. The protection of an industry violates the notion of free trade, but facilitating the exporting process does not.

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. Explain why so many international transactions require international trade credit facilitated by commercial banks.

2. Explain the difference in the risk to the exporter between accounts receivable financing and factoring.

3. Explain how the Export-Import Bank can encourage U.S. firms to export to less developed countries where there is political risk.

QUESTIONS AND APPLICATIONS

1. Banker's Acceptances

a. Describe how foreign trade would be affected if banks did not provide trade-related services.

b. How can a banker's acceptance be beneficial to an exporter, an importer, and a bank?

2. Export Financing

a. Why would an exporter provide financing for an importer?

b. Is there much risk in this activity? Explain.

3. Role of Factors What is the role of a factor in international trade transactions?

4. Export-Import Bank

a. What is the role today of the Export-Import Bank of the United States?

b. Describe the Direct Loan Program administered by the Export- Import Bank.

5. Bills of Lading What are bills of lading, and how do they facilitate international trade transactions?

6. Forfaiting What is forfaiting? Specify the type of traded goods for which forfaiting is applied.

7. PEFCO Briefly describe the role of the Private Export Funding Corporation (PEFCO).

8. Government Programs This chapter described many forms of government insurance and guarantee programs. What motivates a government to establish such programs?

9. Countertrade What is countertrade?

10. Impact of September 11 Every quarter, Bronx Co. ships computer chips to a firm in central Asia. It has not used any trade financing because the importing firm always pays its bill in a timely manner upon receipt of the computer chips. After the September 11, 2001, terrorist attack on the United States, Bronx reconsidered whether it should use some form of trade financing that would ensure that it would be paid for its exports upon delivery. Offer a suggestion to Bronx Co. on how it could achieve its goal.

11. Working Capital Guarantee Program Briefly describe the Working Capital Guarantee Program administered by the Export-Import Bank.

12. Small Business Policy Describe the Small Business Policy.

13. OPIC Describe the role of the Overseas Private Investment Corporation (OPIC).

Advanced Questions

14. Letters of Credit Ocean Traders of North America is a firm based in Mobile, Alabama, that specializes in seafood exports and commonly uses letters of credit (L/Cs) to ensure payment. It recently experienced a problem, however. Ocean Traders had an irrevocable L/C issued by a Russian bank to ensure that it would receive payment upon shipment of 16,000 tons of fish to a Russian firm. This bank backed out of its obligation, however, stating that it was not authorized to guarantee commercial transactions.

a. Explain how an irrevocable L/C would normally facilitate the business transaction between the Russian importer and Ocean Traders of North America (the U.S. exporter).

b. Explain how the cancellation of the L/C could create a trade crisis between the U.S. and Russian firms.

c. Why do you think situations like this (the cancellation of the L/C) are rare in industrialized countries?

d. Can you think of any alternative strategy that the U.S. exporter could have used to protect itself better when dealing with a Russian importer?

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 International Trade Financing in Thailand

Blades, Inc., has recently decided to establish a subsidiary in Thailand to produce Speedos, Blades' primary roller blade product. In establishing the subsidiary in Thailand, Blades was motivated by the high growth potential of the Thai roller blade market. Furthermore, Blades has decided to establish a subsidiary, as opposed to acquiring an existing Thai roller blade manufacturer for sale, in order to maintain its flexibility and control over the operations in Thailand. Moreover, Blades has

decided to issue yen-denominated notes to partially finance the cost of establishing the subsidiary. Blades has decided to issue notes denominated in yen instead of baht to avoid the high effective interest rates associated with the baht-denominated notes.

Currently, Blades plans to sell all roller blades manufactured in Thailand to retailers in Thailand. Furthermore, Blades plans to purchase all components for roller blades manufactured in Thailand from Thai suppliers.

Similarly, all of Blades' roller blades manufactured in the United States will be sold to retailers in the United States and all components needed for Blades' U.S. production will be purchased from suppliers in the United States. Consequently, Blades will have no exports and imports once the plant in Thailand is operational, which is expected to occur early next year.

Construction of the plant in Thailand has already begun, and Blades is currently in the process of purchasing the machinery necessary to produce Speedos. Besides these activities, Ben Holt, Blades' chief financial officer, has been actively lining up suppliers of the needed rubber and plastic components in Thailand and identifying Thai customers, which will consist of various sports product retailers in Thailand.

Although Holt has been successful in locating both interested suppliers and interested customers, he is discovering that he has neglected certain precautions for operating a subsidiary in Thailand. First, although Blades is relatively well known in the United States, it is not recognized internationally. Consequently, the suppliers Blades would like to use in Thailand are not familiar with the firm and have no information about its reputation. Moreover, Blades' previous activities in Thailand were restricted to the export of a fixed number of Speedos annually to one customer, a Thai retailer called Entertainment Products. Holt has little information about the potential Thai customers that would buy the roller blades produced by the new plant. He is aware, however, that although letters of credit (L/Cs) and drafts are usually employed for exporting purposes, these instruments are also used for trade within a country between relatively unknown parties.

Of the various potential customers Blades has identified in Thailand, four retailers of sports products appear particularly interested. Because Blades is not familiar with these firms and their reputations, it would like to receive payment from them as soon as possible. Ideally, Blades would like its customers to prepay for their purchases, as this would involve the least risk for Blades. Unfortunately, none of the four potential customers has agreed to a prepayment arrangement. In fact, one potential customer, Cool Runnings, Inc., insists on an open account transaction. Payment terms in Thailand for purchases of this type are typically "net 60," indicating that payment for the roller blades would be due approximately 2 months after a purchase was made. Two of the remaining three retailers, Sports Equipment, Inc., and Major Leagues, Inc., have indicated that they would also prefer an open account transaction; however, both of these retailers would have their banks act as intermediaries for a time

draft. The fourth retailer, Sports Gear, Inc., is indifferent as to the specific payment method but finds a prepayment arrangement unacceptable.

Blades also needs a suitable arrangement with its various potential suppliers of rubber and plastic components in Thailand. Because Blades' financing of the Thai subsidiary involved a U.S. bank, it has virtually no contacts in the Thai banking system. Because Blades is relatively unknown in Thailand, Thai suppliers have indicated that they would prefer prepayment or at least a guarantee from a Thai bank that Blades will be able to make payment within 30 days of purchase. Blades does not currently have accounts receivable in Thailand. It does, however, have accounts receivable in the United States resulting from its U.S. sales.

Holt would like to please Blades' Thai customers and suppliers in order to establish strong business relationships in Thailand. However, he is worried that Blades may be at a disadvantage if it accepts all of the Thai firms' demands. Consequently, he has asked you, a financial analyst for Blades, Inc., to provide him with some guidance regarding international trade financing. Specifically, Holt has asked you to answer the following questions for him:

1. Assuming that banks in Thailand issue a time draft on behalf of Sports Equipment, Inc., and Major Leagues, Inc., would Blades receive payment for its roller blades before it delivers them? Do the banks issuing the time drafts guarantee payment on behalf of the Thai retailers if they default on the payment?

2. What payment method should Blades suggest to Sports Gear, Inc.? Substantiate your answer.

3. What organization could Blades contact in order to insure its sales to the Thai retailers? What type of insurance does this organization provide?

4. How could Blades use accounts receivable financing or factoring, considering that it does not currently have accounts receivable in Thailand? If Blades uses a Thai bank to obtain this financing, how do you think the fact that Blades does not have receivables in Thailand would affect the terms of the financing?

5. Assuming that Blades is unable to locate a Thai bank that is willing to issue an L/C on Blades' behalf, can you think of a way Blades could utilize its bank in the United States to effectively obtain an L/C from a Thai bank?

6. What organizations could Blades contact to obtain working capital financing? If Blades is unable to obtain working capital financing from these organizations, what are its other options to finance its working capital needs in Thailand?

SMALL BUSINESS DILEMMA

Ensuring Payment for Products Exported by the Sports Exports Company

The Sports Exports Company produces footballs and exports them to a distributor in the United Kingdom. It typically sends footballs in bulk and then receives payment after the distributor receives the shipment. The business relationship with the distributor is based on trust. Although the relationship has worked thus far, Jim Logan (owner of the Sports Exports Company) is concerned about the possibility that the distributor will not make its payment.

1. How could Logan use a letter of credit to ensure that he will be paid for the products he exports?

2. Logan has discussed the possibility of expanding his export business through a second sporting goods distributor in the United Kingdom; this second distributor would cover a different territory than the first distributor. The second distributor is only willing to engage in a consignment arrangement when selling footballs to retail stores. Explain the risk to Logan beyond the typical types of risk he incurs when dealing with the first distributor. Should he pursue this type of business?

INTERNET/EXCEL EXERCISE

The Web site of the Export-Import Bank of the United States (www.exim.gov) offers information about trade financing. Summarize what the Ex-Im Bank does to facilitate trade by businesses.

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. international trade AND payment
2. international trade AND financing
3. company AND trade financing
4. Inc. AND trade financing
5. international AND trade financing
6. multinational AND trade financing
7. international AND letter of credit
8. multinational AND letter of credit
9. Export-Import Bank
10. export credit insurance

Internal Control over Funds   An MNC should have an internal system that consistently monitors the amount of short-term financing by all of its subsidiaries. This may allow it to recognize which subsidiaries have cash available in the same currency that another subsidiary needs to borrow. Furthermore, its internal monitoring of short-term financing can govern the extent of short-term financing by each subsidiary. Without such controls, one subsidiary may borrow excessively, which may ultimately affect the amount that other subsidiaries can borrow if all subsidiary borrowing from banks is backed by a parent guarantee. Internal controls can be used not only to monitor the level of short-term financing per subsidiary but also to impose a maximum short-term debt level at each subsidiary.

20-1b   External Short-Term Financing

Multinational corporations and their subsidiaries are not always able to access short-term funds internally. Thus, they frequently use the following external sources of short-term funds to satisfy their liquidity needs.

Short-Term Notes   One method increasingly used in recent years is the issuing of short-term notes, or unsecured debt securities. In Europe, the securities are referred to as **Euronotes**. The interest rates on these notes are based on LIBOR, the interest rate charged on interbank loans among European and other countries. Short-term notes typically have maturities of one, three, or six months. Some MNCs continually roll them over as a form of intermediate-term financing. Commercial banks underwrite the notes for MNCs, and some commercial banks purchase them for their own investment portfolios.

Commercial Paper   In addition to short-term notes, MNCs also issue commercial paper. In Europe, this is sometimes referred to as **Euro-commercial paper**. Dealers issue commercial paper for MNCs without the backing of an underwriting syndicate, so a selling price is not guaranteed to the issuers. Maturities can be tailored to the issuer's preferences. Dealers may make a secondary market by offering to repurchase commercial paper before maturity.

Bank Loans   Direct loans from banks, which are often used to maintain bank relationships, are another popular source of short-term funds for MNCs. If alternative sources of short-term funds become unavailable, MNCs rely more heavily on direct loans from banks. Most MNCs maintain credit arrangements with various banks around the world; some have credit arrangements with more than 100 foreign and domestic banks.

20-1c   Access to Funding during the Credit Crisis

During the credit crisis of 2008–2009, the markets for short-term notes, commercial paper, and bank loans were less liquid. Many financial institutions that had provided funds in these markets allocated more funds to risk-free (government) debt securities because they were more concerned about the credit risk of MNCs. Thus, MNCs had limited access to short-term funds. Some MNCs had to pay a higher risk premium in order to obtain short-term debt. Other MNCs were unable to obtain short-term debt and had to rely more on cash or retained earnings (internal financing) during the credit crisis.

20-2 FINANCING WITH A FOREIGN CURRENCY

When multinational corporations obtain short-term financing, they usually borrow the currency that matches their future cash inflows. If most of those inflows are in dollars,

then an MNC may rely on short-term financing in dollars. If it has a net receivables position in a foreign currency, then the MNC may obtain a short-term loan in that currency so that it can access short-term funds and also hedge its receivables against exchange rate risk. This strategy is especially appealing if the interest rate of the foreign currency is low.

Even when an MNC or its subsidiary is not attempting to cover foreign net receivables, it may still consider borrowing a foreign currency if the interest rate on the currency is relatively low. Since interest rates vary among currencies, the cost of borrowing can vary substantially among countries. Multinational corporations that conduct business in countries with high interest rates incur a high cost on short-term financing if they finance in the local currency. They may consider financing with another currency that has a lower interest rate. By shaving 1 percentage point off its financing rate, an MNC can save $1 million in annual interest expense on debt of $100 million. Such savings motivate MNCs to consider various currencies when financing their operations.

20-2a   Comparison of Interest Rates among Currencies

Exhibit 20.1 compares short-term interest rates among countries in May 2013. Most interest rates were unusually low at that time because global economic conditions were weak and the demand for loanable funds by firms was relatively low. The interest rates in many developing countries are usually higher than the interest rates in developed countries. For example, Exhibit 20.1 shows that interest rates in Brazil and India are much higher than the interest rates of the developed countries. The developing countries tend to have higher inflation and a low level of saving, and these factors cause interest rates to be relatively high. The interest rate in Japan is almost always low compared to other countries because the very high rate of saving by households allows a large supply of funds to be channeled to borrowers. When the interest rates in Japan or other

Exhibit 20.1   Comparison of Interest Rates among Countries (as of May 2013)
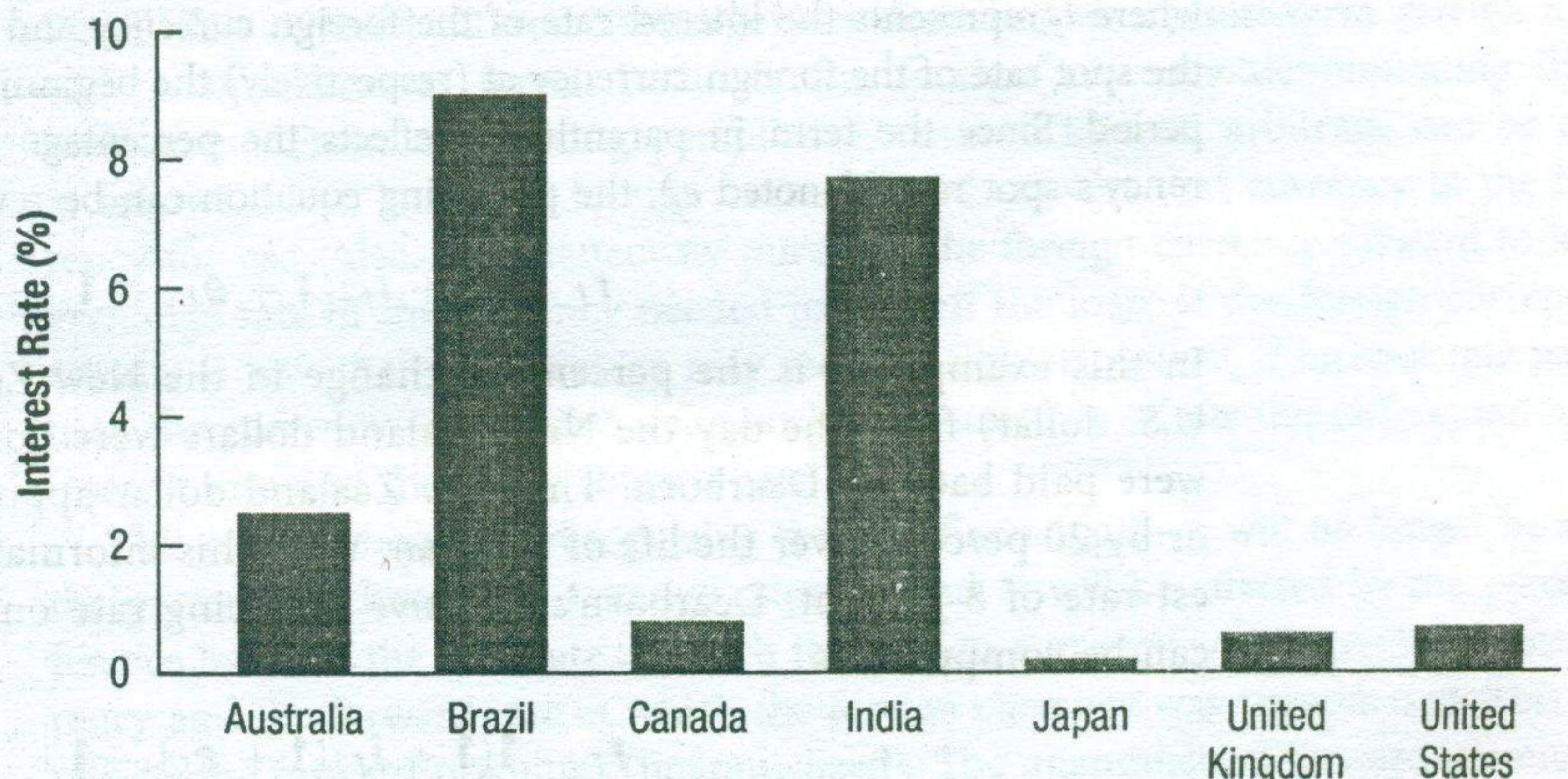
countries are below U.S. interest rates, some U.S.-based MNCs consider obtaining short-term loans in those countries.

20-3 DETERMINING THE EFFECTIVE FINANCING RATE

When an MNC borrows a currency that differs from its local currency, the actual cost of its financing will depend on (1) the interest rate charged by the bank providing the loan and (2) the movement in the borrowed currency's value over the life of the loan. Thus, the actual or "effective" financing rate may differ from the quoted interest rate. This point is illustrated in the following example.

EXAMPLE   Dearborn, Inc. (based in Michigan), obtains a one-year loan of $1 million in New Zealand dollars (NZ$) at the quoted interest rate of 8 percent. When Dearborn receives the loan, it converts the New Zealand dollars to U.S. dollars to pay a supplier for materials. The exchange rate at that time is $.50 per New Zealand dollar, so the NZ$1 million is converted to $500,000 (computed as NZ$1,000,000 × $.50 per NZ$ = $500,000). One year later, Dearborn pays back the loan of NZ$1 million plus interest of NZ$80,000 (with interest computed as 8 percent × NZ$1,000,000). Thus, the total amount in New Zealand dollars needed by Dearborn is NZ$1,000,000 + NZ$80,000 = NZ$1,080,000. Assume the New Zealand dollar appreciates from $.50 to $.60 by the time the loan is to be repaid. Dearborn will need to convert $648,000 (computed as NZ$1,080,000 × $.60 per NZ$) to have the necessary number of New Zealand dollars for loan repayment.

To compute the effective financing rate, first determine the amount in U.S. dollars paid back in excess of the amount borrowed. Then divide by the number of U.S. dollars borrowed (after converting the New Zealand dollars to U.S. dollars). Given that Dearborn borrowed the equivalent of $500,000 and paid back $648,000 for the loan, the effective financing rate in this case is $148,000/$500,000 = 29.6 percent. If the exchange rate had remained constant throughout the life of the loan then the total loan repayment would have been $540,000, representing an effective rate of $40,000/$500,000 = 8 percent. Since the New Zealand dollar appreciated substantially in this example, the effective financing rate was very high. If Dearborn, Inc., had anticipated the New Zealand dollar's substantial appreciation, it would not have borrowed the New Zealand dollars. ●

The effective financing rate (denoted r_f) is derived as follows:

$$r_f = (1 + i_f)\left[1 + \left(\frac{S_{t+1} - S}{S}\right)\right] - 1$$

where i_f represents the interest rate of the foreign currency and where S and S_{t+1} represent the spot rate of the foreign currency at (respectively) the beginning and end of the financing period. Since the term in parentheses reflects the percentage change in the foreign currency's spot rate (denoted e_f), the preceding equation can be rewritten as

$$r_f = (1 + i_f)(1 + e_f) - 1$$

In this example, e_f is the percentage change in the New Zealand dollar (against the U.S. dollar) from the day the New Zealand dollars were borrowed until the day they were paid back by Dearborn. The New Zealand dollar appreciated from $.50 to $.60, or by 20 percent, over the life of the loan. With this information and the quoted interest rate of 8 percent, Dearborn's effective financing rate on the New Zealand dollars can be computed as

$$r_f = 1(1 + i_f)(1 + e_f) - 1$$
$$= (1 + .08)(1 + .20) - 1$$
$$= .296, \text{ or } 29.6\%$$

which is the same rate determined from the alternative computational approach.

To test your understanding of financing in a foreign currency, consider a second example involving Dearborn.

EXAMPLE   Assuming that the quoted interest rate for the New Zealand dollar is 8 percent and that the New Zealand dollar depreciates from $.50 (on the day the funds were borrowed) to $.45 (on the day of loan repayment), what is the effective financing rate of a one-year loan from Dearborn's viewpoint? The answer can be determined by first computing the percentage change in the New Zealand dollar's value: ($.45 − $.50)/$.50 = −10 percent. Next, the quoted interest rate (i_f) of 8 percent and the percentage change in the New Zealand dollar (e_f) of −10 percent can be inserted into the formula for the effective financing rate (r_f):

$$r_f = (1 + .08)[1 + (−.10)] − 1$$
$$= [(1.08)(.9)] − 1$$
$$= −.028, \text{ or } −2.8\%$$

●

A *negative* effective financing rate indicates that Dearborn actually paid fewer dollars to repay the loan than it borrowed. Such a result can occur if the New Zealand dollar depreciates substantially over the life of the loan. This does not mean that a loan will basically be "free" whenever the currency borrowed depreciates over the life of the loan. Nevertheless, depreciation of any amount will cause the effective financing rate to be lower than the quoted interest rate, as can be substantiated by reviewing the formula for the effective financing rate.

The examples provided so far suggest that, when choosing which currency to borrow, a firm should consider the expected rate of appreciation or depreciation as well as the quoted interest rates of foreign currencies.

20-4 CRITERIA CONSIDERED IN THE FINANCING DECISION

An MNC must consider the following criteria when it decides which currency to borrow:

- interest rate parity,
- the forward rate as a forecast, and
- exchange rate forecasts.

20-4a Interest Rate Parity

Recall that covered interest arbitrage was described as a short-term foreign investment with a simultaneous forward sale of the foreign currency denominating the foreign investment. From a financing perspective, covered interest arbitrage can be conducted as follows. First, borrow a foreign currency and convert that currency to the home currency for use. Also, simultaneously purchase the foreign currency forward to lock in the exchange rate of the currency needed to pay off the loan. If the foreign currency's interest rate is low, then this strategy may seem feasible. However, if interest rate parity holds then the currency will exhibit a forward premium that offsets the differential between its interest rate and the home interest rate.

This can be shown by recognizing that the financing firm will no longer be affected by the percentage change in exchange rates; instead, it will be affected by the percentage difference between the spot rate at which the foreign currency was converted to the local currency and the forward rate at which the foreign currency was repurchased. This difference reflects the forward premium (unannualized). The unannualized forward premium (p) can substitute for e_f in the equation introduced earlier to determine the effective financing rate when covering in the forward market under conditions of interest rate parity:

$$r_f = (1 + i_f)(1 + p) − 1$$

If interest rate parity holds, then the forward premium is

$$p = \frac{1 + i_h}{1 + i_f} - 1$$

where i_h denotes the home currency's interest rate. When this equation is used to reflect financing rates, substitute the formula for p to determine the effective financing rate of a foreign currency under conditions of interest rate parity:

$$
\begin{aligned}
r_f &= (1 + i_f)(1 + p) - 1 \\
&= (1 + i_f)\left(1 + \frac{1 + i_h}{1 + i_f} - 1\right) - 1 \\
&= i_h
\end{aligned}
$$

So if interest rate parity exists, then the attempt of covered interest arbitrage to finance with a low–interest rate currency will result in an effective financing rate that is similar to the domestic interest rate.

Exhibit 20.2 summarizes the implications of a variety of scenarios relating to interest rate parity. Even if interest rate parity holds, financing with a foreign currency may still be feasible; however, it would have to be conducted on an uncovered basis (that is, without using a forward hedge). In other words, foreign financing may enable a lower financing cost than domestic financing, but that result cannot be guaranteed (unless the firm has receivables in that same currency).

20-4b   The Forward Rate as a Forecast

Assume the forward rate (F) of the foreign currency borrowed is used by firms as a predictor of the spot rate that will exist at the end of the financing period. Then the

Exhibit 20.2   Implications of Interest Rate Parity for Financing

SCENARIO	IMPLICATIONS
1. Interest rate parity holds.	Foreign financing and a simultaneous hedge of that position in the forward market will result in financing costs similar to those incurred in domestic financing.
2. Interest rate parity holds; and the forward rate is an accurate forecast of the future spot rate.	Uncovered foreign financing will result in financing costs similar to those incurred in domestic financing.
3. Interest rate parity holds; and the forward rate is expected to overestimate the future spot rate.	Uncovered foreign financing is expected to result in lower financing costs than those incurred in domestic financing.
4. Interest rate parity holds; and the forward rate is expected to underestimate the future spot rate.	Uncovered foreign financing is expected to result in higher financing costs than those incurred in domestic financing.
5. Interest rate parity does not hold; and the forward premium (discount) exceeds (is less than) the interest rate differential.	Foreign financing with a simultaneous hedge of that position in the forward market results in higher financing costs than those incurred in domestic financing.
6. Interest rate parity does not hold; and the forward premium (discount) is less than (exceeds) the interest rate differential.	Foreign financing with a simultaneous hedge of that position in the forward market results in lower financing costs than those incurred in domestic financing.

expected effective financing rate from borrowing a foreign currency can be forecast by substituting F for S_{t+1} in the following equation:

$$r_f = (1 + i_f)\left(1 + \frac{S_{t+1} - S}{S}\right) - 1$$

$$= (1 + i_f)\left(1 + \frac{F - S}{S}\right) - 1$$

As already shown, the right side of this equation is equal to the home currency financing rate if interest rate parity holds. If the forward rate is an accurate estimator of the future spot rate S_{t+1}, then the foreign financing rate will be similar to the home financing rate.

When interest rate parity exists here, the forward rate can be used as a break-even point to assess the financing decision. When a firm is financing with the foreign currency (and not covering the foreign currency position), the effective financing rate will be less than the domestic rate if the future spot rate of the foreign currency (spot rate at the time of loan repayment) is less than the forward rate (at the time the loan is granted). Conversely, the effective financing rate in a foreign loan will be greater than the domestic rate if the future spot rate of the foreign currency turns out to be greater than the forward rate.

If the forward rate is an unbiased predictor of the future spot rate, then the effective financing rate of a foreign currency will (on average) be equal to the domestic financing rate. In this case, firms that consistently borrow foreign currencies will not achieve lower financing costs. Although the effective financing rate may turn out to be lower than the domestic rate in some periods, it will be higher in other periods, causing an offsetting effect. Firms that believe the forward rate is an unbiased predictor of the future spot rate will prefer borrowing their home currency, where the financing rate is known with certainty and is not expected to be any higher on average than foreign financing.

20-4c Exchange Rate Forecasts

Even though the forecasting capabilities of firms are somewhat limited, some firms may make decisions based on cycles in currency movements. Firms may use the recent movements as a forecast of future movements to determine whether they should borrow a foreign currency. This strategy would have been successful on average if utilized in the past. It will be successful in the future if currency movements continue to move in one direction for long periods of time.

Once the firm develops a forecast for the exchange rate's percentage change over the financing period (e_f), it can use this forecast along with the foreign interest rate to forecast the effective financing rate of a foreign currency. The forecasted effective financing rate can then be compared to the domestic financing rate.

EXAMPLE   Sarasota, Inc., needs funds for one year and is aware that the one-year interest rate in U.S. dollars is 12 percent whereas the interest rate when borrowing Swiss francs is 8 percent. Sarasota forecasts that the Swiss franc will appreciate from its current rate of $.45 to $.459, or by 2 percent, over the next year. The expected value for e_f, denoted $E[e_f]$, will therefore be 2 percent. Thus the expected effective financing rate, $E[r_f]$, will be

$$E[r_f] = (1 + i_f)(1 + E[e_f]) - 1$$
$$= (1 + .08)(1 + .02) - 1$$
$$= .1016, \text{ or } 10.16\%$$

In this example, financing in Swiss francs is expected to be less expensive than financing in U.S. dollars. However, the value for e_f is merely forecasted and so is not known with certainty. Hence there is no guarantee that foreign financing will actually be less costly. ●

Continuing from the previous example, Sarasota, Inc., may attempt to determine what value of e_f would make the effective rate from foreign financing the same as domestic financing. To determine this value, begin with the effective financing rate formula and solve for e_f as follows:

$$r_f = (1 + i_f)(1 + e_f) - 1$$
$$1 + r_f = (1 + i_f)(1 + e_f)$$
$$\frac{1 + r_f}{1 + i_f} = 1 + e_f$$
$$\frac{1 + r_f}{1 + i_f} - 1 = e_f$$

Since the U.S. financing rate is 12 percent in the previous example, that rate is plugged in for r_f. Plug in 8 percent for i_f, in which case the break-even value of e_f is

$$e_f = \frac{1 + r_f}{1 + i_f} - 1$$
$$= \frac{1 + .12}{1 + .08} - 1$$
$$= .037037, \text{ or } 3.703\%$$

This suggests that the Swiss franc would have to appreciate by about 3.7 percent over the loan period to make the Swiss franc loan as costly as a loan in U.S. dollars. Any smaller degree of appreciation would make the Swiss franc loan less costly. Sarasota, Inc., can use this information when determining whether to borrow U.S. dollars or Swiss francs. If it expects the Swiss franc to appreciate by more than 3.7 percent over the loan life, it should prefer borrowing in U.S. dollars. If Sarasota expects the Swiss franc to appreciate by less than 3.7 percent (or to depreciate), its decision is more complex. If the potential savings from financing with the foreign currency outweigh the risk involved, then the firm should choose that route. The final decision here will be influenced by Sarasota's degree of risk aversion.

Use of Probability Distributions

To gain more insight about the financing decision, a firm may wish to develop a probability distribution for the percentage change in value for a particular foreign currency over the financing horizon. Using the probability distribution of possible percentage changes in the currency's value along with the currency's interest rate, the firm can determine the probability distribution of the possible effective financing rates for the currency. It can then compare this distribution to the known financing rate of the home currency in order to make its financing decision.

EXAMPLE   Carolina Co. is deciding whether to borrow Swiss francs for one year. It finds that the quoted interest rate for the Swiss franc is 8 percent and the quoted rate for the U.S. dollar is 15 percent. It then develops a probability distribution for the Swiss franc's possible percentage change in value over the life of the loan.

The probability distribution is displayed in Exhibit 20.3. The first row in that exhibit shows that there is a 5 percent probability of a 6 percent depreciation in the Swiss franc over the loan's life. If the Swiss franc does depreciate by 6 percent, then the effective financing rate would be 1.52 percent. Thus, there is a 5 percent probability that Carolina will incur a 1.52 percent effective financing rate on its loan. The second row shows that there is a 10 percent probability of a 4 percent depreciation in the Swiss franc over the life of the loan. If the Swiss franc does depreciate by 4 percent, then the effective financing rate would be 3.68 percent. Thus, there is a 10 percent probability that Carolina will incur a 3.68 percent effective financing rate on its loan.

Exhibit 20.3 Analysis of Financing with a Foreign Currency

POSSIBLE RATE OF CHANGE IN THE SWISS FRANC OVER THE LIFE OF THE LOAN (e_f)	PROBABILITY OF OCCURRENCE	EFFECTIVE FINANCING RATE IF THIS RATE OF CHANGE IN THE SWISS FRANC DOES OCCUR (r_f)
−6%	5%	(1.08)[1 + (−6%)] − 1 = 1.52%
−4	10	(1.08)[1 + (−4%)] − 1 = 3.68
−1	15	(1.08)[1 + (−1%)] − 1 = 6.92
+1	20	(1.08)[1 + (1%)] − 1 = 9.08
+4	20	(1.08)[1 + (4%)] − 1 = 12.32
+6	15	(1.08)[1 + (6%)] − 1 = 14.48
+8	10	(1.08)[1 + (8%)] − 1 = 16.64
+10	5	(1.08)[1 + (10%)] − 1 = 18.80
	100%	

For each possible percentage change in the Swiss franc's value, there is a corresponding effective financing rate. By multiplying each possible effective financing rate by its associated probability, an expected value for the effective financing rate of the Swiss franc. Based on the information in Exhibit 20.3, the expected value of the effective financing rate, or $E[r_f]$, is computed as

$$E[r_f] = 5\%(1.52\%) + 10\%(3.68\%) + 15\%(6.92) + 20\%(9.08\%)$$
$$+20\%(12.32\%) + 15\%(14.48\%)$$
$$+10\%(16.64\%) + 5\%(18.80\%)$$
$$= .076\% + .368\% - 1.038\% + 1.1816\%$$
$$+2.464\% + 2.172\% + 1.664\% + .94\%$$
$$= 10.538\%$$

Thus, the decision for Carolina is whether to borrow U.S. dollars (at 15 percent interest) or Swiss francs (with an expected value of 10.538 percent for the effective financing rate). Using Exhibit 20.3, the risk reflects the 5 percent chance (probability) that the effective financing rate on Swiss francs will be 18.8 percent and the 10 percent chance that the effective financing rate on Swiss francs will be 16.64 percent. Either of these possibilities represents a greater expense to Carolina than it would incur if it borrowed U.S. dollars.

To further assess the decision regarding which currency to borrow, the information in the second and third columns of Exhibit 20.3 is used to develop the probability distribution in Exhibit 20.4. This exhibit illustrates the probability of each possible effective financing rate that may occur if Carolina borrows Swiss francs. Notice that the U.S. interest rate (15 percent) is included in Exhibit 20.4 for comparison purposes. There is no distribution of possible outcomes for the U.S. rate because the rate of 15 percent is known with certainty (since there is no exchange rate risk). There is a 15 percent probability that the U.S. rate will be lower than the effective rate on Swiss francs and an 85 percent chance that the U.S. rate will be higher than the effective rate on Swiss francs. This information can assist the firm in its financing decision. Given the potential savings relative to the small degree of risk, Carolina decides to borrow Swiss francs. ●

20-5 ACTUAL RESULTS FROM FOREIGN FINANCING

The use of foreign financing by some firms suggests that they believe reduced financing costs can be achieved. To assess this issue, the effective financing rates of the Swiss franc and the U.S. dollar are compared in Exhibit 20.5 from the perspective of a U.S. firm. The data are segmented into annual periods.

In 2005 and 2008, the Swiss franc weakened against the dollar, and a U.S. firm that borrowed Swiss francs would have incurred a very low (or even a negative) effective financing rate. In the 2001–2003 period, the 2006–2007 period, and in the latter part of

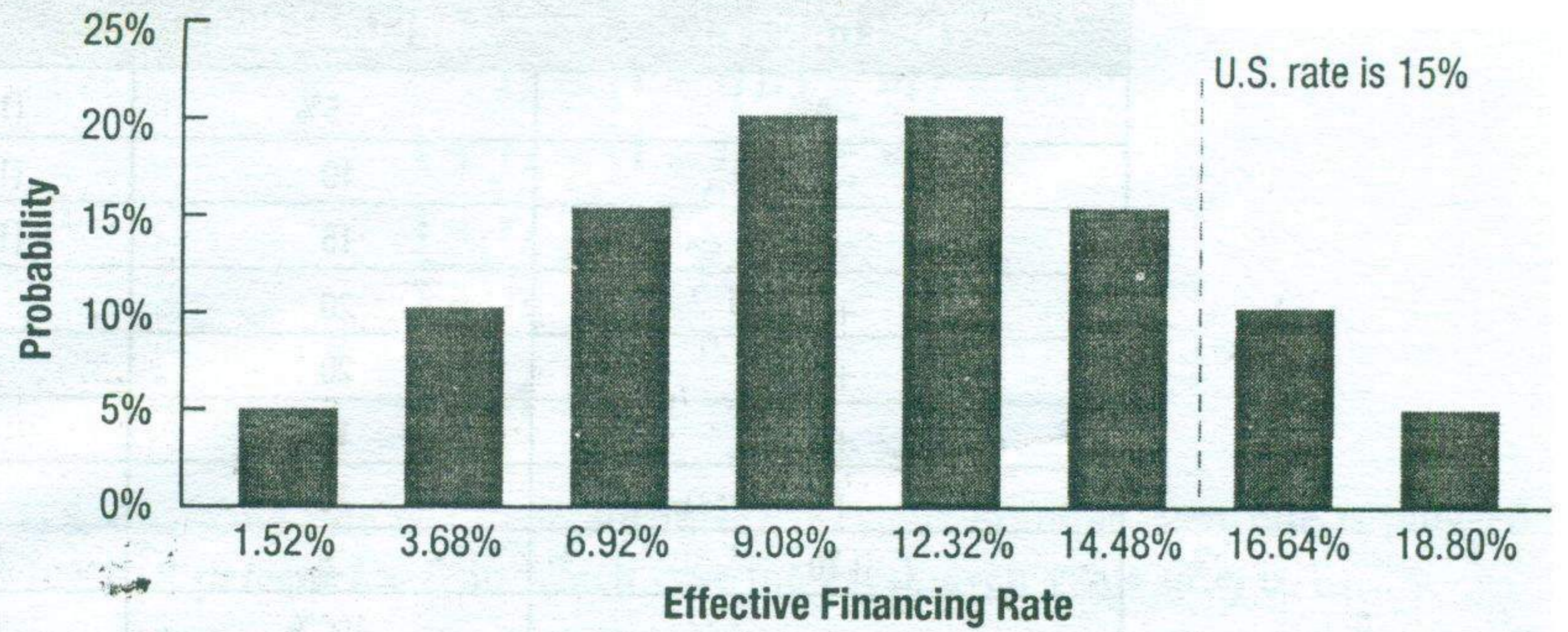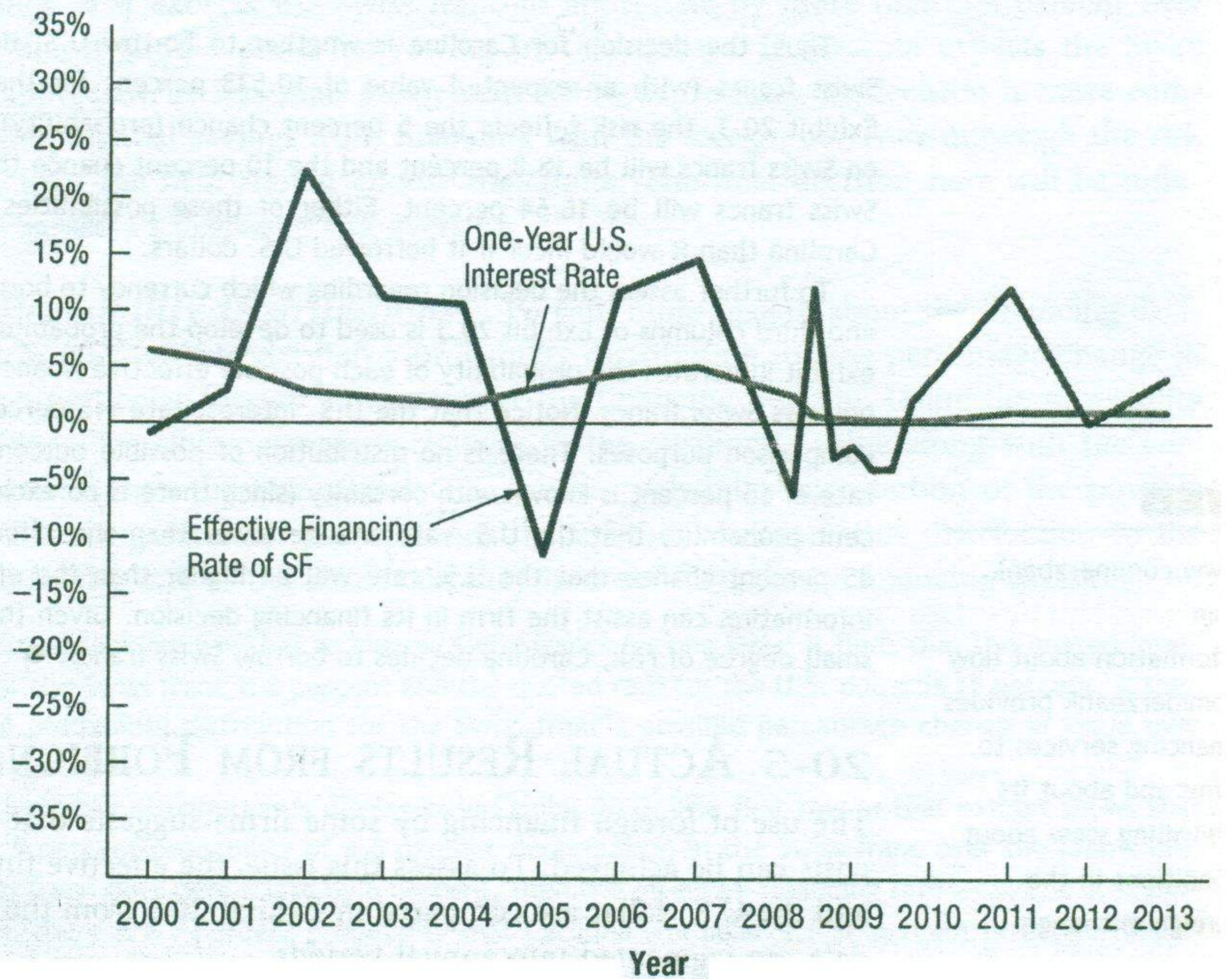**Exhibit 20.4**   Probability Distribution of Effective Financing Rates

Exhibit 20.5   Comparison of Financing with Swiss Francs versus Dollars

2010, the Swiss franc appreciated against the dollar; during these periods, a U.S. firm that borrowed Swiss francs would have incurred a very high effective financing rate.

Exhibit 20.5 demonstrates the potential savings in financing costs that can be achieved if the foreign currency depreciates against the firm's home currency. It also demonstrates how the foreign financing can backfire if the firm's expectations are incorrect and the foreign currency appreciates over the financing period.

20-6 FINANCING WITH A PORTFOLIO OF CURRENCIES

Although foreign financing can result in significantly lower financing costs, the variance in foreign financing costs over time is higher. Multinational corporations may be able to achieve lower financing costs without excessive risk by financing with a portfolio of foreign currencies, as demonstrated here.

EXAMPLE Nevada, Inc., needs to borrow $100,000 for one year and obtains the following interest rate quotes:

- interest rate for a one-year loan in U.S. dollars = 15 percent;
- interest rate for a one-year loan in Japanese yen = 9 percent;
- interest rate for a one-year loan in Swiss francs = 8 percent.

Since the quotes for a loan in Swiss francs or Japanese yen are relatively low, Nevada may desire to borrow in a foreign currency. If Nevada decides to use foreign financing, it has three choices based on the information given: (1) borrow only Swiss francs, (2) borrow only Japanese yen, or (3) borrow a portfolio of Swiss francs and Japanese yen. Assume that Nevada, Inc., has established possible percentage changes in the spot rate for both the Swiss franc and the Japanese yen from the time the loan would begin until loan repayment, as shown in the second column of Exhibit 20.6. The third column shows the probability that each possible percentage change might occur.

Based on the assumed interest rate of 8 percent for the Swiss franc, the effective financing rate is computed for each possible percentage change in the Swiss franc's spot rate over the loan life. There is a 30 percent chance that the Swiss franc will appreciate by 1 percent over the loan life. In that case, the effective financing rate will be 9.08 percent. Thus, there is a 30 percent chance that the effective financing rate will be 9.08 percent. Furthermore, there is a 50 percent chance that the effective financing rate will be 11.24 percent and a 20 percent chance that it will be 17.72 percent. Given that the U.S. loan rate is 15 percent, there is only a 20 percent chance that financing in Swiss francs will be more expensive than domestic financing.

The lower section of Exhibit 20.6 provides information on the Japanese yen. For example, the yen has a 35 percent chance of depreciating by 1 percent over the loan life, and so on. Based on the

Exhibit 20.6 Derivation of Possible Effective Financing Rates

CURRENCY	POSSIBLE PERCENTAGE CHANGE IN THE SPOT RATE OVER THE LOAN LIFE	PROBABILITY OF THAT PERCENTAGE CHANGE IN THE SPOT RATE OCCURRING	COMPUTATION OF EFFECTIVE FINANCING RATE BASED ON THAT PERCENTAGE CHANGE IN THE SPOT RATE
Swiss franc	1%	30%	(1.08)[1 + (.01)] − 1 = .0908, or 9.08%
Swiss franc	3%	50%	(1.08)[1 + (.03)] − 1 = .1124, or 11.24%
Swiss franc	9%	20%	(1.08)[1 + (.09)] − 1 = .1772, or 17.72%
		100%	
Japanese yen	−1%	35%	(1.09)[1 + (−.01)] − 1 = .0791, or 7.91%
Japanese yen	3%	40%	(1.09)[1 + (.03)] − 1 = .1227, or 12.27%
Japanese yen	7%	25%	(1.09)[1 + (.07)] − 1 = .1663, or 16.63%
		100%	

assumed 9 percent interest rate and the exchange rate fluctuation forecasts, there is a 35 percent chance that the effective financing rate with yen will be 7.91 percent, a 40 percent chance that it will be 12.27 percent, and a 25 percent chance that it will be 16.63 percent.

Given the 15 percent rate on U.S. dollar financing, there is a 25 percent chance that financing in Japanese yen will be more costly than domestic financing. Before examining the third possible foreign financing strategy (the portfolio approach), determine the expected value of the effective financing rate for each foreign currency by itself. This is accomplished by totaling the products of each possible effective financing rate and its associated probability as follows:

| CURRENCY	COMPUTATION OF EXPECTED VALUE OF EFFECTIVE FINANCING RATE
Swiss franc	30%(9.08%) + 50%(11.24%) + 20%(17.72%) = 11.888%
Japanese yen	35%(7.91%) + 40%(12.27%) + 25%(16.63%) = 11.834%

The expected financing costs of the two currencies are almost the same. The individual degree of risk (that the costs of financing will turn out to be higher than domestic financing) is about the same for each currency. If Nevada, Inc., chooses to finance with only one of these foreign currencies, it is difficult to pinpoint (based on our analysis) which currency is more appropriate. Now consider the third and final foreign financing strategy: the portfolio approach.

Based on the information in Exhibit 20.6, there are three possibilities for the Swiss franc's effective financing rate. The same holds true for the Japanese yen. If Nevada, Inc., borrows half of its needed funds in each of the foreign currencies, then there will be nine possibilities for this portfolio's effective financing rate (see Exhibit 20.7). Columns 1 and 2 of the exhibit list all possible joint effective financing rates. Column 3 computes the joint probability of that occurrence assuming that exchange rate movements of the Swiss franc and Japanese yen are independent. Finally, column 4 shows the computation of the portfolio's effective financing rate based on the possible rates shown for the individual currencies.

An examination of the top row will help to clarify the table. This row indicates that one possible outcome of borrowing both Swiss francs and Japanese yen is that they will exhibit effective financing rates of 9.08 and 7.91 percent, respectively. The probability of the Swiss franc's effective financing rate occurring is 30 percent and the probability of the Japanese yen rate occurring is 35 percent. Recall that these percentages were given in Exhibit 20.6. The joint probability that both of these rates will occur simultaneously is (30 percent)(35 percent) = 10.5 percent. Assuming

Exhibit 20.7 Analysis of Financing with Two Foreign Currencies

(1)		(2)	(3)	(4)
POSSIBLE JOINT EFFECTIVE FINANCING RATES			**COMPUTATION OF JOINT PROBABILITY**	**COMPUTATION OF EFFECTIVE FINANCING RATE OF PORTFOLIO (50% OF TOTAL FUNDS BORROWED IN EACH CURRENCY)**
SWISS FRANC	JAPANESE YEN			
9.08%	7.91%		(30%)(35%) = 10.5%	.5(9.08%) + .5(7.91%) = 8.495%
9.08	12.27		(30%)(40%) = 12.0	.5(9.08%) + .5(12.27%) = 10.675%
9.08	16.63		(30%)(25%) = 7.5	.5(9.08%) + .5(16.63%) = 12.8555%
11.24	7.91		(50%)(35%) = 17.5	.5(11.24%) + .5(7.91%) = 9.575%
11.24	12.27		(50%)(40%) = 20.0	.5(11.24%) + .5(12.27%) = 11.755%
11.24	16.63		(50%)(25%) = 12.5	.5(11.24%) + .5(16.63%) = 13.935%
17.72	7.91		(20%)(35%) = 7.0	.5(17.72%) + .5(7.91%) = 12.815%
17.72	12.27		(20%)(40%) = 8.0	.5(17.72%) + .5(12.27%) = 14.995%
17.72	16.63		(20%)(25%) = 5.0	.5(17.72%) + .5(16.63%) = 17.175%
			100%	

Exhibit 20.8   Probability Distribution of the Portfolio's Effective Financing Rate
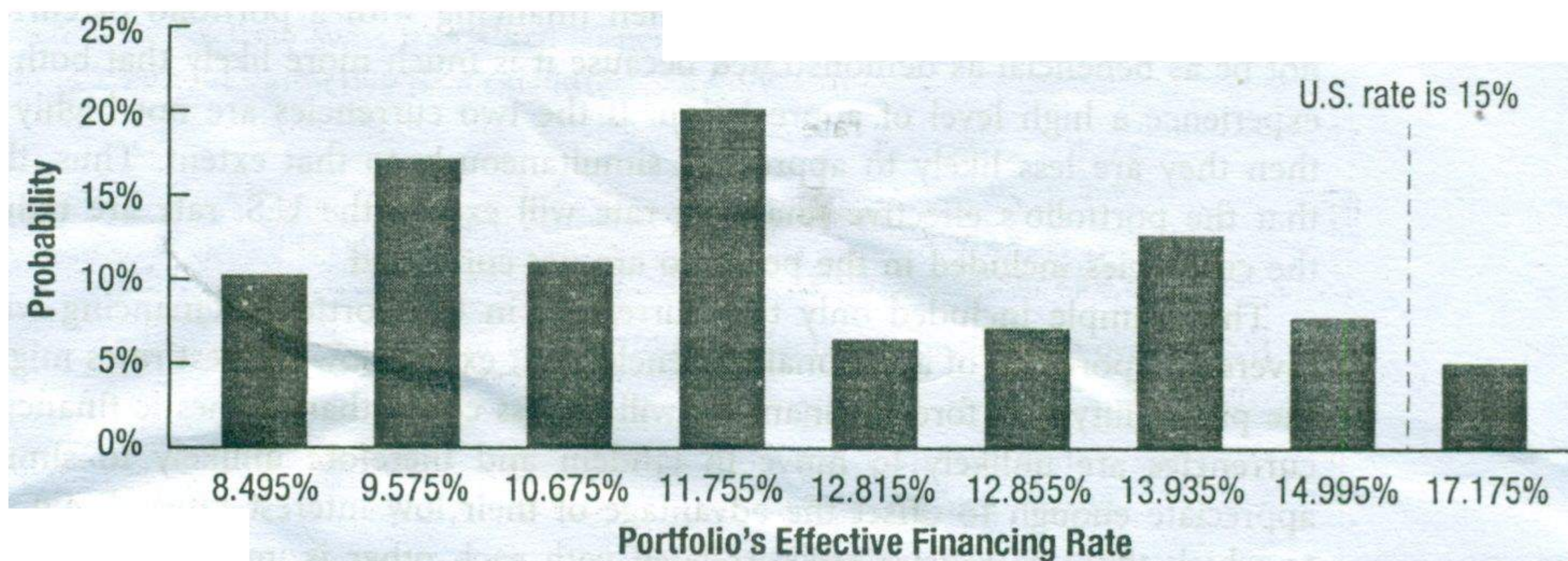
that half (50 percent) of the funds needed are to be borrowed from each currency, the portfolio's effective financing rate will be .5(9.08%) + .5(7.91%) = 8.495% (if those individual effective financing rates occur for each currency).

A similar procedure was used to develop the remaining eight rows in Exhibit 20.7. From this table, there is a 10.5 percent chance that the portfolio's effective financing rate will be 8.495 percent, a 12 percent chance that it will be 10.675 percent, and so on.

Exhibit 20.8 displays the probability distribution for the portfolio's effective financing rate that was derived in Exhibit 20.7. This exhibit shows that financing with a portfolio (50 percent financed in Swiss francs with the remaining 50 percent financed in Japanese yen) has only a 5 percent chance of being more costly than domestic financing. These results are more favorable than those of either individual foreign currency Therefore, Nevada, Inc., decides to borrow the portfolio of currencies. ●

20-6a   Portfolio Diversification Effects

When both foreign currencies are borrowed, the only way the portfolio will exhibit a higher effective financing rate than the domestic rate is if *both* currencies experience their maximum possible level of appreciation (which is 9 percent for the Swiss franc and 7 percent for the Japanese yen). If only one does, the severity of its appreciation will be somewhat offset by the other currency's not appreciating to such a large extent. The probability of maximum appreciation is 20 percent for the Swiss franc and 25 percent for the Japanese yen. so the joint probability of both of these events occurring simultaneously is (20 percent)(25 percent) = 5 percent. This is an advantage of financing in a portfolio of foreign currencies. Nevada, Inc., has a 95 percent chance of attaining lower costs with the foreign portfolio than with domestic financing.

The expected value of the effective financing rate for the portfolio can be determined by multiplying the percentage financed in each currency by the expected value of that currency's individual effective financing rate. Recall that the expected value was 11.888. percent for the Swiss franc and 11.834 percent for the Japanese yen. Thus, for a portfolio representing 50 percent of funds borrowed in each currency, the expected value of the effective financing rate is .5(11.888 percent) + .5(11.834 percent) = 11.861 percent. Based on an overall comparison, the expected value of the portfolio's effective financing rate is nearly the same as that from financing solely in either foreign currency. However,

the risk (of incurring a higher effective financing rate than the domestic rate) is substantially less when financing with the portfolio.

In the example, the computation of joint probabilities requires the assumption that the two currencies move independently. If movements of the two currencies instead exhibit a strong positive correlation, then financing with a portfolio of currencies will not be as beneficial as demonstrated because it is much more likely that both currencies experience a high level of appreciation. If the two currencies are not highly correlated then they are less likely to appreciate simultaneously to that extent. Thus, the chances that the portfolio's effective financing rate will exceed the U.S. rate are reduced when the currencies included in the portfolio are *not* correlated.

The example included only two currencies in the portfolio. Financing with a more diversified portfolio of additional currencies that exhibit low interest rates might increase the probability that foreign financing will be less costly than domestic financing; several currencies are unlikely to move in tandem and therefore unlikely to simultaneously appreciate enough to offset the advantage of their low interest rates. Again, the degree to which these currencies are correlated with each other is important. If all currencies are highly positively correlated with each other, then financing with such a portfolio would not be much different from financing with a single foreign currency.

20-6b Repeated Financing with a Currency Portfolio

A firm that repeatedly finances with a currency portfolio would normally prefer to construct a financing package that exhibits a somewhat predictable effective financing rate on a periodic basis. The more volatile a portfolio's effective financing rate over time, the more uncertainty (risk) there is about the effective financing rate that will exist in any period. The degree of volatility depends on the standard deviations and paired correlations of effective financing rates of the individual currencies within the portfolio.

We can use the portfolio variance as a measure of the degree of volatility. The variance of a two-currency portfolio's effective financing rate over time, $\mathrm{VAR}(r_p)$, is computed as

$$\mathbf{VAR}(r_p) = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2w_A w_B \sigma_A \sigma_B \mathbf{CORR}_{AB}$$

Here w_A and w_B represent the percentage of total funds financed from currencies A and B, respectively; σ_A^2 and σ_B^2 represent the individual variances of each currency's effective financing rate over time; and CORR_{AB} is the correlation coefficient of the two currencies' effective financing rates. Since the percentage change in the exchange rate plays an important role in the effective financing rate, it should not be surprising that CORR_{AB} is strongly affected by the correlation between exchange rate fluctuations in the two currencies. A low correlation between movements of the two currencies is reflected in a low CORR_{AB}.

EXAMPLE　Valparaiso, Inc., considers borrowing a portfolio of Japanese yen and Swiss francs to finance its U.S. operations. Half of the needed funding would come from each currency. To determine how the variance in this portfolio's effective financing rate is related to characteristics of the component currencies, assume the following information based on historical information for several three-month periods:

- mean effective financing rate of Swiss franc for three months = 3 percent;
- mean effective financing rate of Japanese yen for three months = 2 percent;
- standard deviation of Swiss franc's effective financing rate = .04;

- standard deviation of Japanese yen's effective financing rate = .09;
- correlation coefficient of effective financing rates of these two currencies = .10.

Given this information, the mean effective rate on a portfolio (r_p) of funds financed 50 percent by Swiss francs and 50 percent by Japanese yen is determined by totaling the weighted individual effective financing rates:

$$r_p = W_A r_A + W_B r_B$$
$$= .5(.03) + .5(.02)$$
$$= .015 + .01$$
$$= .025, \text{ or } 2.5\%$$

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

$$VAR(r_p) = .5^2(.04)^2 + .5^2(.09)^2 + 2(.5)(.5)(.04)(.09)(.10)$$
$$= .25(.0016) + .25(.0081) + .00018$$
$$= .0004 + .002025 + .00018$$
$$= .002605$$

Valparaiso can use this same process to compare various financing packages to see which package would be most appropriate. It may be more interested in estimating the mean return and variability for repeated financing in a particular portfolio in the future. There is no guarantee that past data will be indicative of the future. But if the individual variability and paired correlations are somewhat stable over time, then the historical variability of the portfolio's effective financing rate should provide a reasonable forecast.

To recognize the benefits from financing with two currencies that are not highly correlated, reconsider how the variance of the portfolio's effective financing rate would have been affected if the correlation between the two currencies was .90 (very high correlation) instead of .10. The variance would be .004045, which is more than 50 percent higher than the variance when the correlation was assumed to be .10.

The assessment of a currency portfolio's effective financing rate and variance is not restricted to just two currencies. The mean effective financing rate for a currency portfolio of any size will be determined by totaling the respective individual effective financing rates weighted by the percentage of funds financed with each currency. Estimating the variance of a portfolio's effective financing rate becomes more complex as more currencies are added to the portfolio, so computer software packages are usually applied to more easily determine the solution.

SUMMARY

- MNCs may first consider internal sources of funds for short-term financing, including foreign subsidiaries that might have excess funds. They also commonly rely on external sources such as short-term notes, commercial paper, or bank loans.

- MNCs may use foreign financing in an attempt to reduce their financing costs. They can determine whether to use foreign financing by estimating the effective financing rate for any foreign currency over the period in which financing will be needed. The expected effective financing rate is dependent on the quoted interest rate of the foreign currency and the forecasted percentage change in the currency's value over the financing period. It is typically low if the foreign interest rate is low or if the foreign currency borrowed depreciates over the financing period.

- When MNCs borrow a portfolio of currencies that have low interest rates, they can increase the probability of achieving relatively low financing costs if the currencies' values are not highly correlated.

POINT COUNTER-POINT

Do MNCs Increase Their Risk When Borrowing Foreign Currencies?

Point Yes. MNCs should borrow the currency that matches their cash inflows. If they borrow a foreign currency to finance business in a different currency, they are essentially speculating on the future exchange rate movements. The results of this strategy are uncertain, which represents risk to the MNC and its shareholders.

Counter-Point No. If MNCs expect that they can reduce the effective financing rate by borrowing a

foreign currency, they should consider borrowing that currency. This enables them to achieve lower costs and improves their ability to compete. If they take the most conservative approach by borrowing whatever currency matches their inflows, they may incur higher costs and have a greater chance of failure.

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

SELF-TEST

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

1. Assume that the interest rate in New Zealand is 9 percent. A U.S. firm plans to borrow New Zealand dollars, convert them to U.S. dollars, and repay the loan in 1 year. What will be the effective financing rate if the New Zealand dollar depreciates by 6 percent? If the New Zealand dollar appreciates by 3 percent?

2. Using the information in question 1 and assuming a 50 percent chance of either scenario occurring, determine the expected value of the effective financing rate.

3. Assume that the Japanese 1-year interest rate is 5 percent while the U.S. 1-year interest rate is 8 percent. What percentage change in the Japanese yen would cause a U.S. firm borrowing yen to incur the

same effective financing rate as it would if it borrowed dollars?

4. The spot rate of the Australian dollar is $.62. The 1-year forward rate of the Australian dollar is $.60. The Australian 1-year interest rate is 9 percent. Assume that the forward rate is used to forecast the future spot rate. Determine the expected effective financing rate for a U.S. firm that borrows Australian dollars to finance its U.S. business.

5. Cleveland, Inc., plans to finance its U.S. operations by repeatedly borrowing two currencies with low interest rates whose exchange rate movements are highly correlated. Will the variance of the two-currency portfolio's effective financing rate be much lower than the variance of either individual currency's effective financing rate? Explain.

QUESTIONS AND APPLICATIONS

1. Financing from Subsidiaries Explain why an MNC parent would consider financing from its subsidiaries.

2. Foreign Financing

a. Explain how a firm's degree of risk aversion enters into its decision of whether to finance in a foreign currency or a local currency.

b. Discuss the use of specifying a break-even point when financing in a foreign currency.

3. Probability Distribution

a. Discuss the development of a probability distribution of effective financing rates when financing in a foreign currency. How is this distribution developed?

b. Once the probability distribution of effective financing rates from financing in a foreign currency is developed, how can this distribution be used in deciding whether to finance in the foreign currency or the home currency?

4. Financing and Exchange Rate Risk How can a U.S. firm finance in euros and not necessarily be exposed to exchange rate risk?

5. Short-Term Financing Analysis Assume that Davenport, Inc., needs $3 million for a 1-year period. Within 1 year, it will generate enough U.S. dollars to pay off the loan. It is considering three options: (1) borrowing U.S. dollars at an interest rate of 6 percent, (2) borrowing Japanese yen at an interest rate of

3 percent, or (3) borrowing Canadian dollars at an interest rate of 4 percent. Davenport expects that the Japanese yen will appreciate by 1 percent over the next year and that the Canadian dollar will appreciate by 3 percent. What is the expected "effective" financing rate for each of the three options? Which option appears to be most feasible? Why might Davenport, Inc., not necessarily choose the option reflecting the lowest effective financing rate?

6. Effective Financing Rate How is it possible for a firm to incur a negative effective financing rate?

7. IRP Application to Short-Term Financing Connecticut Co. plans to finance its operations in the U.S. It can borrow euros on a short-term basis at a lower interest rate than if it borrowed dollars.

a. If interest rate parity does not hold, what strategy should Connecticut Co. consider when it needs short-term financing?

b. Assume that Connecticut Co. needs dollars. It borrows euros at a lower interest rate than that for dollars. If interest rate parity exists and if the forward rate of the euro is a reliable predictor of the future spot rate, what does this suggest about the feasibility of such a strategy?

c. If Connecticut Co. expects the current spot rate to be a more reliable predictor of the future spot rate, what does this suggest about the feasibility of such a strategy?

8. Break-Even Financing Providence Co. needs dollars. Assume that the local 1-year loan rate is 15 percent, while a 1-year loan rate on euros is 7 percent. By how much must the euro appreciate to cause the loan in euros to be more costly than a U.S. dollar loan?

9. IRP Application to Short-Term Financing Assume that interest rate parity exists. If a firm believes that the forward rate is an unbiased predictor of the future spot rate, will it expect to achieve lower financing costs by consistently borrowing a foreign currency with a low interest rate?

10. Effective Financing Rate Greensboro, Inc., needs $4 million for 1 year. It currently has no business in Japan but plans to borrow Japanese yen from a Japanese bank because the Japanese interest rate is 3 percentage points lower than the U.S. rate. Assume that interest rate parity exists; also assume that Greensboro believes that the 1-year forward rate of the Japanese yen will exceed the future spot rate 1 year from now.

Will the expected effective financing rate be higher, lower, or the same as financing with dollars? Explain.

11. IRP Application to Short-Term Financing Assume that the U.S. interest rate is 7 percent and the euro's interest rate is 4 percent. Assume that the euro's forward rate has a premium of 4 percent. Determine whether the following statement is true: "Interest rate parity does not hold; therefore, U.S. firms could lock in a lower financing cost by borrowing euros and purchasing euros forward for 1 year." Explain your answer.

12. Break-Even Financing Lakeland, Inc., is a U.S.-based MNC with a subsidiary in Mexico. Its Mexican subsidiary needs a 1-year loan of 10 million pesos for operating expenses. Since the Mexican interest rate is 70 percent, Lakeland is considering borrowing dollars, which it would convert to pesos to cover the operating expenses. By how much would the dollar have to appreciate against the peso to cause such a strategy to backfire? (The 1-year U.S. interest rate is 9 percent.)

13. Financing During a Crisis Bradenton, Inc., has a foreign subsidiary in Asia that commonly obtains short-term financing from local banks. If Asia suddenly experiences a crisis, explain why Bradenton may not be able to easily obtain funds from the local banks.

14. Impact of Credit Crisis on Risk of Financing Homewood Co. commonly finances some of its U.S. expansion by borrowing foreign currencies (such as Japanese yen) that have low interest rates. Describe how the potential return and risk of this strategy may have changed as a result of the credit crisis in 2009.

Advanced Questions

15. Probability Distribution of Financing Costs Missoula, Inc., decides to borrow Japanese yen for 1 year. The interest rate on the borrowed yen is 8 percent. Missoula has developed the following probability distribution for the yen's degree of fluctuation against the dollar:

POSSIBLE DEGREE OF FLUCTUATION OF YEN PERCENTAGE AGAINST THE DOLLAR	PROBABILITY
−4%	20%
−1	30
0	10
3	40

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

16. Analysis of Short-Term Financing Jacksonville Corp. is a U.S.-based firm that needs $600,000. It has no business in Japan but is considering 1-year financing with Japanese yen because the annual interest rate would be 5 percent versus 9 percent in the United States. Assume that interest rate parity exists.

a. Can Jacksonville benefit from borrowing Japanese yen and simultaneously purchasing yen 1 year forward to avoid exchange rate risk? Explain.

b. Assume that Jacksonville does not cover its exposure and uses the forward rate to forecast the future spot rate. Determine the expected effective financing rate. Should Jacksonville finance with Japanese yen? Explain.

c. Assume that Jacksonville does not cover its exposure and expects that the Japanese yen will appreciate by 5, 3, or 2 percent, and with equal probability of each occurrence. Use this information to determine the probability distribution of the effective financing rate. Should Jacksonville finance with Japanese yen? Explain.

17. Financing with a Portfolio Pepperdine, Inc., considers obtaining 40 percent of its 1-year financing in Canadian dollars and 60 percent in Japanese yen. The forecasts of appreciation in the Canadian dollar and Japanese yen for the next year are as follows:

CURRENCY	POSSIBLE PERCENTAGE CHANGE IN THE SPOT RATE OVER THE LOAN LIFE	PROBABILITY OF THAT PERCENTAGE CHANGE IN THE SPOT RATE OCCURRING
Canadian dollar	4%	70%
Canadian dollar	7	30
Japanese yen	6	50
Japanese yen	9	50

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

18. Financing with a Portfolio

a. Does borrowing a portfolio of currencies offer any possible advantages over the borrowing of a single foreign currency?

b. If a firm borrows a portfolio of currencies, what characteristics of the currencies will affect the potential variability of the portfolio's effective financing rate? What characteristics would be desirable from a borrowing firm's perspective?

19. Financing with a Portfolio Raleigh Corp. needs to borrow funds for 1 year to finance an expenditure in the United States. The following interest rates are available:

COUNTRY	BORROWING RATE
United States	10%
Canada	6
Japan	5

The percentage changes in the spot rates of the Canadian dollar and Japanese yen over the next year are as follows:

CANADIAN DOLLAR		JAPANESE YEN	
PROBABILITY	PERCENTAGE CHANGE IN SPOT RATE	PROBABILITY	PERCENTAGE CHANGE IN SPOT RATE
10%	5%	20%	6%
90%	2%	80%	1%

If Raleigh Corp. borrows a portfolio that has 50 percent of funds from Canadian dollars and 50 percent of funds from yen, determine the probability distribution of the effective financing rate of the portfolio.

What is the probability that Raleigh will incur a higher effective financing rate from borrowing this portfolio than from borrowing U.S. dollars?

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/ (instructors) and search using **ISBN 9781133947837**.

BLADES, INC. CASE

Use of Foreign Short-Term Financing

Blades, Inc., just received a special order for 120,000 pairs of Speedos, its primary roller blade product. Ben Holt, Blades' chief financial officer (CFO), needs short-term financing to finance this large order from the time Blades orders its supplies until the time it will receive payment. Blades will charge a price of 5,000 baht per pair of Speedos. The materials needed to manufacture these 120,000 pairs will be purchased from Thai suppliers. Blades expects the cost of the components for one pair of Speedos to be approximately 3,500 baht in its first year of operating the Thai subsidiary.

Because Blades is relatively unknown in Thailand, its suppliers have indicated that they would like to receive payment as early as possible. The customer that placed this order insists on open account transactions, which means that Blades will receive payment for the roller blades approximately 3 months subsequent to the sale. Furthermore, the production cycle necessary to produce Speedos, from purchase of the materials to the eventual sale of the product, is approximately 3 months. Because of these considerations, Blades expects to collect its revenues approximately 6 months after it has paid for the materials, such as rubber and plastic components, needed to manufacture Speedos.

Holt has identified at least two alternatives for satisfying Blades' financing needs. First, Blades could borrow Japanese yen for 6 months, convert the yen to Thai baht, and use the baht to pay the Thai suppliers. When the accounts receivable in Thailand are collected, Blades would convert the baht received to yen and repay the Japanese yen loan. Second, Blades could borrow Thai baht for 6 months in order to pay its Thai suppliers. When Blades collects its accounts receivable, it would use these receipts to repay the baht loan. Thus, Blades will use revenue generated in Thailand to repay the loan, whether it borrows the money in yen or in baht.

Holt's initial research indicates that the 180-day interest rates available to Blades in Japan and in Thailand are 4 and 6 percent, respectively. Consequently, Holt favors borrowing the Japanese yen, as he believes this loan will be cheaper than the baht-denominated loan. He is aware that he should somehow incorporate the future movements of the yen-baht exchange rate in his analysis, but he is unsure how to accomplish this.

However, he has identified the following probability distribution of the change in the value of the Japanese yen with respect to the Thai baht and of the change in the value of the Thai baht with respect to the dollar over the 6-month period of the loan:

POSSIBLE RATE OF CHANGE IN THE JAPANESE YEN RELATIVE TO THE THAI BAHT OVER THE LIFE OF THE LOAN	POSSIBLE RATE OF CHANGE IN THE THAI BAHT RELATIVE TO THE DOLLAR OVER THE LIFE OF THE LOAN	PROBABILITY OF OCCURRENCE
2%	−3%	30%
1	−2	30
0	−1	20
1	0	15
2	1	5

Holt has also informed you that the current spot rate of the yen (in Thai baht) is THB.347826, while the current spot rate of the baht (in dollars) is $.023.

As a financial analyst for Blades, you have been asked to answer the following questions for Holt:

1. What is the amount, in baht, that Blades needs to borrow to cover the payments due to the Thai suppliers? What is the amount, in yen, that Blades needs to borrow to cover the payments due to the Thai suppliers?

2. Given that Blades will use the receipts from the receivables in Thailand to repay the loan and that the subsidiary plans to remit all baht-denominated cash flows to the U.S. parent whether it borrows in baht or yen, does the future value of the yen with respect to the baht affect the cost of the loan if Blades borrows in yen?

3. Using a spreadsheet, compute the expected amount (in U.S. dollars) that will be remitted to the United States in 6 months if Blades finances its working capital requirements by borrowing baht versus borrowing yen. Based on your analysis, should Blades obtain a yen- or baht-denominated loan?

SMALL BUSINESS DILEMMA

Short-Term Financing by the Sports Exports Company

At the current time, the Sports Exports Company focuses on producing footballs and exporting them to a distributor in the United Kingdom. The exports are denominated in British pounds. Jim Logan, the owner, plans to develop other sporting goods products besides the footballs that he produces. His entire expansion will be focused on the United Kingdom, where he is trying to make a name for his firm. He remains concerned about his firm's exposure to exchange rate risk but does not plan to let that get in the way of his expansion plans because he believes that his firm can continue to penetrate the British sporting goods market. He has just negotiated a joint venture with a British firm that will produce other sporting goods products that are more popular in the United States (such as basketballs) but will be sold in the United Kingdom. Logan will pay the British manufacturer in British pounds. These products will be delivered directly to the British distributor rather than to Jim, and the distributor will pay Logan with British pounds.

Logan's expansion plans will result in the need for additional funding. Logan would prefer to borrow on a short-term basis now. He has an excellent credit rating and collateral and therefore should be able to obtain short-term financing. The British interest rate is one-fourth of a percentage point above the U.S. interest rate.

1. Should Logan borrow dollars or pounds to finance his joint venture business? Why?
2. Logan could also borrow euros at an interest rate that is lower than the U.S. or British rate. The values of the euro and pound tend to move in the same direction against the dollar but not always by the same degree. Would borrowing euros to support the British joint venture result in more exposure to exchange rate risk than borrowing pounds? Would it result in more exposure to exchange rate risk than borrowing dollars?

INTERNET/EXCEL EXERCISES

The Bloomberg website (www.bloomberg.com) provides interest rate data for many different foreign currencies over various maturities.

1. Go to the Market Data section and then to Rates & Bonds and notice the listing of countries for which yields of different foreign currencies are shown. Review the 3-month yields of currencies. Assume that you could borrow at a rate 1 percentage point above the quoted yield for each currency. Which currency would offer you the lowest quoted yield?
2. As a cash manager of a U.S.-based MNC that needs dollars to support U.S. operations, where would you borrow funds for the next 3 months? Explain.

3. Assume that at the beginning of each of the last 7 years, you had the choice of a 1-year loan in U.S. dollars or Japanese yen. Your business is in the United States, but you considered borrowing yen because the yen annual interest rate was 2 percent versus a dollar annual interest rate of 7 percent. Go to www.oanda.com/convert/fxhistory and obtain the annual percentage change in the yen's exchange rate for each of the last 7 years. Determine the effective financing rate of the yen in each of the last 7 years. Based on your results, was the annual effective financing rate lower for the yen or dollar on average over the 7 years? In how many of the years would you have been better off financing in yen rather than in dollars? Explain.

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. [name of an MNC] AND short-term financing
2. multinational AND short-term financing
3. parent AND short-term financing
4. subsidiary AND short-term financing
5. short-term financing AND exchange rate risk
6. foreign financing
7. multinational financing
8. multinational AND funding
9. subsidiary AND funding
10. international AND short-term financing

21

International Cash Management

The specific
objectives of this
chapter are to:

■ explain working
  capital management
  from a subsidiary
  perspective versus a
  parent perspective,

■ explain how cash
  management can be
  centralized in order
  to ensure that cash
  is used more
  efficiently,

■ explain the various
  techniques used to
  optimize cash
  flows, and

■ explain the decision
  to invest cash
  internationally.

Cash management can be broadly defined to mean optimization of cash flows and investment of excess cash. From an international perspective, cash management is very complex. In addition, exchange rate fluctuations can affect the value of cross-border cash transfers. Financial managers need to understand the advantages and disadvantages of investing cash in foreign markets so that they can make international cash management decisions that maximize the value of the MNC.

21-1 MULTINATIONAL WORKING CAPITAL MANAGEMENT

Multinational corporations tie up funds when investing in their working capital, which includes short-term assets such as inventory, accounts receivable, and cash. They attempt working capital management by maintaining sufficient short-term assets to support their operations. However, they do not want to invest excessively in short-term assets because these funds might be put to better use.

The management of working capital is more complex for MNCs that have foreign subsidiaries because each subsidiary must have adequate working capital to support its operations. If a subsidiary experiences a deficiency in inventory, its production may be delayed. If it is short of cash, it may be unable to purchase supplies or materials. If the MNC is aware of the working capital situation at every subsidiary, then it may be able to transfer working capital from one subsidiary to another in order to solve temporary deficiencies at any subsidiary.

21-1a Subsidiary Expenses

Begin with outflow payments by the subsidiary to purchase raw materials or supplies. The subsidiary will normally have a more difficult time forecasting future outflow payments if its purchases are international rather than domestic because of exchange rate fluctuations. In addition, there is a possibility that payments will be substantially higher due to appreciation of the invoice currency. Hence the firm may wish to maintain a large inventory of supplies and raw materials so that it can draw from its inventory and cut down on purchases if the invoice currency appreciates. Still another possibility is that imported goods from another country could be restricted by the host government (through quotas, etc.). In this event, a larger inventory would give a firm more time to search for alternative sources of supplies or raw materials. A subsidiary with domestic supply sources would not experience such a problem and so would not need such a large inventory.

Outflow payments for supplies will be influenced by future sales. If sales volume is substantially influenced by exchange rate fluctuations then its future level becomes more uncertain, which makes its need for supplies more uncertain. Such uncertainty may force the subsidiary to maintain larger cash balances to cover any unexpected increase in supply requirements.

21-1b Subsidiary Revenue

If subsidiaries export their products, their sales volume may be more volatile than if the goods were only sold domestically. This volatility could be due to the fluctuating exchange rate of the invoice currency. Importers' demand for finished goods will most likely decrease if the invoice currency appreciates. The sales volume of exports is also susceptible to business cycles of the importing countries. If the goods were sold domestically then the exchange rate fluctuations would not have a direct impact on sales, although they would still have an indirect impact because the fluctuations would influence prices paid by local customers for imports from foreign competitors.

Sales can often be increased when credit standards are relaxed. However, it is important to focus on cash inflows due to sales rather than on sales themselves. Looser credit standards may cause a slowdown in cash inflows from sales, which could offset the benefits of increased sales. Accounts receivable management is an important part of the subsidiary's working capital management because of its potential impact on cash inflows.

21-1c Subsidiary Dividend Payments

The subsidiary may be expected to periodically send dividend payments and other fees to the parent. These fees could represent royalties or charges for overhead costs incurred by the parent that benefit the subsidiary. An example is research and development costs incurred by the parent, which improve the quality of goods produced by the subsidiary. Whatever the reason, payments by the subsidiary to the parent are often necessary. When dividend payments and fees are known in advance and denominated in the subsidiary's currency, forecasting cash flows is easier for the subsidiary. The level of dividends paid by subsidiaries to the parent depends on the liquidity needs of each subsidiary, potential uses of funds at various subsidiary locations, expected movements in the currencies of the subsidiaries, and regulations of the host country government.

21-1d Subsidiary Liquidity Management

After accounting for all outflow and inflow payments, the subsidiary may have either excess or deficient cash. It uses liquidity management to either invest its excess cash or borrow to cover its cash deficiencies. If it anticipates a cash deficiency then short-term financing is necessary, as described in the previous chapter. If it anticipates excess cash, it must determine how the excess cash should be used. Investing in foreign currencies can sometimes be attractive, but exchange rate risk makes the effective yield uncertain. This issue is discussed later in the chapter.

Liquidity management is a crucial component of a subsidiary's working capital management. Most subsidiaries have access to numerous lines of credit and overdraft facilities in various currencies. Therefore, they may maintain adequate liquidity without substantial cash balances. Although liquidity is important for the overall MNC, it cannot be properly measured by liquidity ratios. Potential access to funds is more relevant than cash on hand.

21-2 CENTRALIZED CASH MANAGEMENT

A key component of working capital management is cash management. Multinational corporations have large cash inflows and outflows in various currencies, and the cash inflows and outflows will not balance in any currency in any given month. Each subsidiary's management may naturally focus on managing its own cash positions. However, such decentralized management is not optimal because it will force the MNC overall to maintain a larger investment in cash than is necessary. Thus, MNCs normally use **centralized cash management** to monitor and manage the parent–subsidiary and inter-subsidiary cash flows.

Exhibit 21.1 illustrates how funds might flow between the parent and its subsidiaries. The subsidiaries may periodically send loan repayments and dividends to the parent or send excess cash to the parent (where the centralized cash management process is assumed to take place). The parent's cash outflows to the subsidiaries can include loans and the return of cash previously invested by the subsidiaries. The subsidiaries may also have cash flows between themselves because they purchase supplies from each other.

Exhibit 21.1   Cash Flow of the Overall MNC
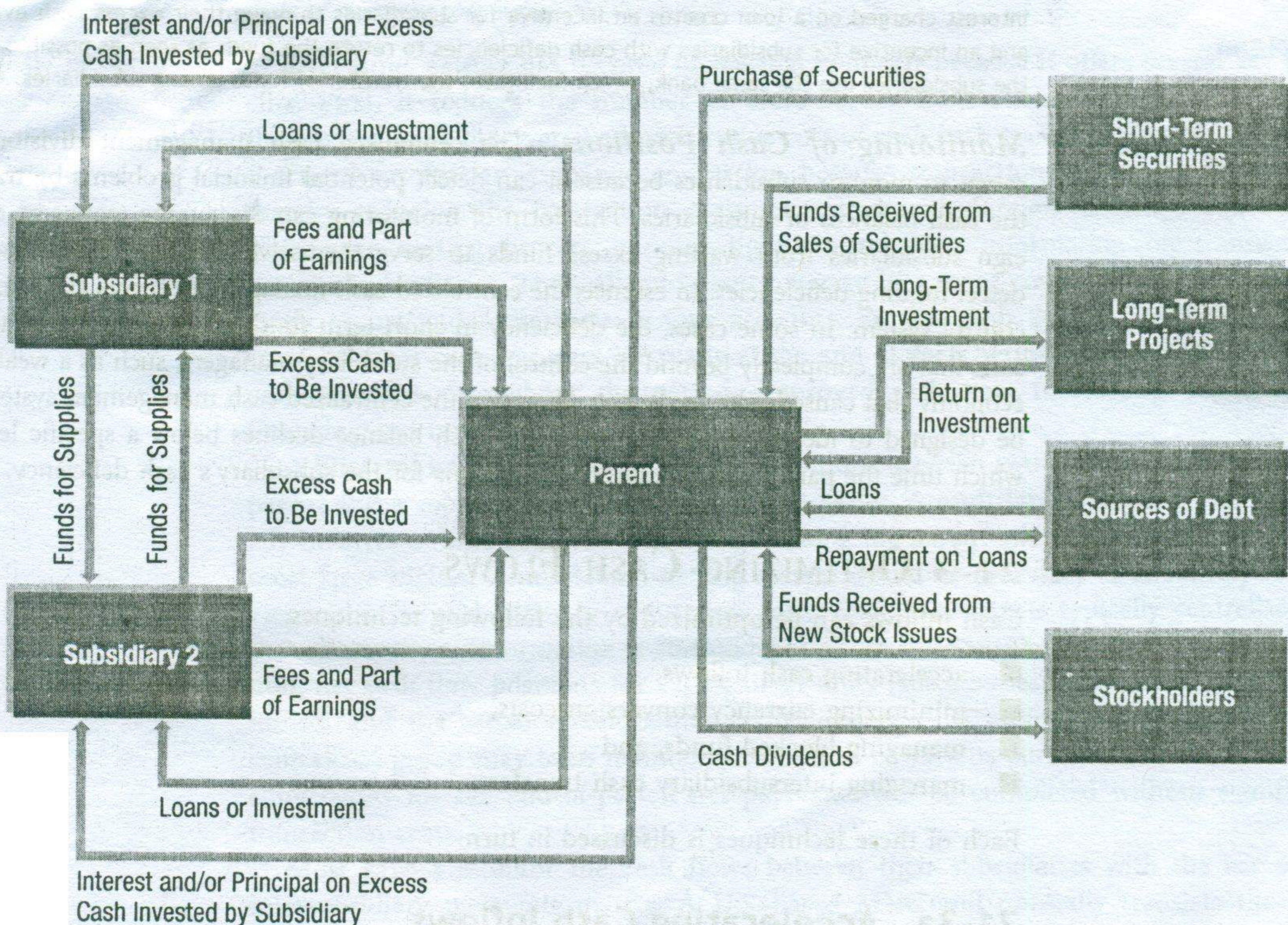
21-2a Accommodating Cash Shortages

The centralized cash management division of an MNC cannot always accurately forecast cash flows of the parent or each subsidiary. It should, however, be ready to react whenever the parent or a subsidiary has a shortage of funds by considering whether any subsidiary has excess funds that can be transferred to cover the shortage. A key role of the centralized cash management division is to facilitate the transfer of funds from subsidiaries with excess funds to those that need funds. This requires updated information on the cash situation at each subsidiary as well as the power to instruct one subsidiary to provide loans to another. Because a subsidiary that experiences a cash shortage may not be able to rely on other subsidiaries for funding, it needs to have other sources of funds (credit lines) available.

Technology Used to Facilitate Fund Transfers A centralized cash management system needs a continual flow of information about currency positions so that it can determine whether one subsidiary's shortage of cash can be covered by another subsidiary's excess of cash in that currency.

EXAMPLE Jax Co. created a cash balances Web site that specifies the cash balance of every currency for each subsidiary. Near the end of each day, each subsidiary revises the Web site to provide the latest update of its cash balance for each currency. Each subsidiary also specifies the period of time in which the excess or deficiency will persist. The parent's treasury department monitors the updated data and determines whether any cash needs identified by a subsidiary in a particular currency can be accommodated by another subsidiary that has excess cash in that same currency. The treasury department then e-mails instructions to the subsidiaries about fund transfers. The fund transfers are essentially short-term loans, so a subsidiary that borrows funds will repay them with interest. The interest charged on a loan creates an incentive for subsidiaries to make their excess cash available and an incentive for subsidiaries with cash deficiencies to return the funds as soon as possible. All of the subsidiaries use the same bank, which facilitates the transfer of funds among subsidiaries. ●

Monitoring of Cash Positions The centralized cash management division also serves to monitor subsidiaries because it can detect potential financial problems by tracking the cash balances of subsidiaries. This form of monitoring can discourage managers of foreign subsidiaries from wasting excess funds to serve themselves because the system will detect funding deficiencies. In essence, the centralized cash management serves as an internal control system. In some cases, the deficiency in short-term funds may be attributed to reasons that are completely beyond the control of the subsidiary managers, such as a weak local economy that caused sales to decline. However, the centralized cash management system can be designed to identify when the subsidiary cash balance declines below a specific level, at which time the parent can investigate the reasons for the subsidiary's cash deficiency.

21-3 OPTIMIZING CASH FLOWS

Cash inflows can be optimized by the following techniques:

- accelerating cash inflows,
- minimizing currency conversion costs,
- managing blocked funds, and
- managing intersubsidiary cash transfers.

Each of these techniques is discussed in turn.

21-3a Accelerating Cash Inflows

The first goal in international cash management is to accelerate cash inflows: the more quickly inflows are received, the more quickly they can be invested or used for other

purposes. Several managerial practices are advocated for this endeavor, some of which may be implemented by the individual subsidiaries. First, a corporation may establish **lockboxes** around the world, which are post office boxes to which customers are instructed to send payment. When set up in appropriate locations, lockboxes can help reduce mailing time (**mail float**). A bank usually processes incoming checks at a lockbox on a daily basis. Second, cash inflows can be accelerated by using **preauthorized payments**, which allow a corporation to charge a customer's bank account up to some limit. Both preauthorized payments and lockboxes are also used in a domestic setting. Because international transactions may have a relatively long mailing time, these methods of accelerating cash inflows can be quite valuable for an MNC.

21-3b Minimizing Currency Conversion Costs

Another technique for optimizing cash flow movements, **netting**, can be implemented with the joint effort of subsidiaries or by the centralized cash management group. This technique optimizes cash flows by reducing the administrative and transaction costs that result from currency conversion.

EXAMPLE   Montana, Inc., has subsidiaries located in France and in Hungary. Whenever the French subsidiary needs to purchase supplies from the Hungarian subsidiary, it needs to convert euros into Hungary's currency (the forint) to make payment. Hungary's subsidiary must convert its forints into euros when purchasing supplies from the French subsidiary. Montana, Inc., has instructed both subsidiaries to net their transactions on a monthly basis so that only one net payment is made at the end of each month. By using this approach, both subsidiaries avoid (or at least reduce) the transaction costs of currency conversion. ●

Over time, netting has become increasingly popular because it offers several key benefits. First, it reduces the number of cross-border transactions between subsidiaries, thereby reducing the overall administrative cost of such cash transfers. Second, it reduces the need for foreign exchange conversion because transactions occur less frequently, thereby reducing the transaction costs associated with foreign exchange conversion. Third, the netting process imposes tight control over information on transactions between subsidiaries. Thus, all subsidiaries engage in a more coordinated effort to accurately report and settle their various accounts. Finally, cash flow forecasting is easier since only net cash transfers are made at the end of each period, rather than individual cash transfers throughout the period. Improved cash flow forecasting can enhance financing and investment decisions.

A **bilateral netting system** involves transactions between two units either between the parent and a subsidiary or between two subsidiaries. A **multilateral netting system** usually involves a more complex interchange among the parent and several subsidiaries. For most large MNCs, a multilateral netting system would be necessary to effectively reduce administrative and currency conversion costs. Such a system is typically centralized so that all necessary information is consolidated. From the consolidated cash flow information, net cash flow positions for each pair of units (subsidiaries, or whatever) are determined, and the actual reconciliation at the end of each period can be dictated. The centralized group may even maintain inventories of various currencies so that currency conversions for the end-of-period net payments can be completed without significant transaction costs.

Most MNCs monitor the cash flows between their subsidiaries with the use of an intersubsidiary payments matrix. A U.S.-based MNC will normally translate the payments into dollars (based on the prevailing spot rate) so that the net payments can be easily determined. If the Canadian subsidiary of the MNC normally makes payments to the French subsidiary in euros but the French subsidiary normally makes payments

to the Canadian subsidiary in Canadian dollars, then the payments need to be translated into a common currency so that the net payment owed can be determined. Translating the amounts into dollars allows a U.S.-based MNC to assess the relative size of each net payment owed between subsidiaries, as illustrated below.

EXAMPLE

Exhibit 21.2 is an example of an intersubsidiary payments matrix that totals each subsidiary's individual payments to each of the other subsidiaries. The first row indicates that the Canadian subsidiary owes the equivalent of $40,000 to the French subsidiary, the equivalent of $90,000 to the Japanese subsidiary, and so on. During this same period, these subsidiaries have also received goods from the Canadian subsidiary, for which payment is due. The second column (under Canada) shows that the Canadian subsidiary is owed the equivalent of $60,000 by the French subsidiary, the equivalent of $100,000 by the Japanese subsidiary, and so on.

Since subsidiaries owe each other, currency conversion costs can be reduced by requiring that only the net payment be extended. Using the intersubsidiary table, the schedule of net payments is determined as shown in Exhibit 21.3. Since the Canadian subsidiary owes the French subsidiary the equivalent of $40,000 but is owed the equivalent of $60,000 by the French subsidiary, the net payment required is the equivalent of $20,000 from the French subsidiary to the Canadian subsidiary. Exhibits 21.2 and 21.3 convert all figures to U.S. dollar equivalents to allow for consolidating payments in both directions so the net payment can be determined.

The net amount owed by each subsidiary to all other subsidiaries is shown in the last column in Exhibit 21.3, while the net amount to be received by each subsidiary from all other subsidiaries is shown in the bottom row. The Canadian subsidiary owes net payments totaling $40,000, while it will receive net payments totaling $30,000. Therefore, its overall balance of net cash flows based on payments to and from subsidiaries is a net outflow of $10,000 for this period. The Canadian subsidiary may use this information along with its expectations of other cash flows not related to other subsidiaries to determine whether it will have sufficient cash during this period. ●

There can be some limitations to multilateral netting due to foreign exchange controls. Although the major industrialized countries typically do not impose such controls,

Exhibit 21.2 Intersubsidiary Payments Matrix

PAYMENTS OWED BY SUBSIDIARY LOCATED IN	U.S. DOLLAR VALUE (IN THOUSANDS) OWED TO SUBSIDIARY LOCATED IN				
	CANADA	FRANCE	JAPAN	SWITZERLAND	U.S.
Canada	—	40	90	20	40
France	60	—	30	60	50
Japan	100	30	—	20	30
Switzerland	10	50	10	—	50
U.S.	10	60	20	20	—

Exhibit 21.3 Netting Schedule

NET PAYMENTS TO BE MADE BY SUBSIDIARY LOCATED IN	NET U.S. DOLLAR VALUE (IN THOUSANDS) OWED TO SUBSIDIARY LOCATED IN					
	CANADA	FRANCE	JAPAN	SWITZERLAND	U.S.	TOTAL
Canada	—	0	0	10	30	40
France	20	—	0	10	0	30
Japan	10	0	—	10	10	30
Switzerland	0	0	0	—	30	30
U.S.	0	10	0	0	—	10
Total	30	10	0	30	70	

some other countries do, and some countries prohibit netting altogether. Thus, an MNC with subsidiaries around the world may not be able to include all of its subsidiaries in its multilateral netting system. Obviously, this will limit the degree to which the netting system can reduce administration and transaction costs.

21-3c Managing Blocked Funds

Cash flows can also be affected by a host government's blockage of funds, which might occur if the government requires all funds to remain within the country in order to create jobs and reduce unemployment. To deal with funds blockage, the MNC may implement the same strategies used when a host country government imposes high taxes. To make efficient use of these funds, the MNC may instruct the subsidiary to set up a research and development division, which incurs costs and possibly generates revenues for other subsidiaries.

Another strategy is to use transfer pricing in a manner that will increase the expenses incurred by the subsidiary. A host country government is likely to be more lenient on funds sent to cover expenses than on earnings remitted to the parent.

When subsidiaries are restricted from transferring funds to the parent, the parent may instruct the subsidiary to obtain financing from a local bank rather than from the parent. By borrowing through a local intermediary, the subsidiary is assured that its earnings can be distributed to pay off previous financing. Overall, most methods of managing blocked funds are intended to make efficient use of the funds by using them to cover expenses that are transferred to that country.

EXAMPLE   Wittenberg, Inc., a U.S.-based MNC, has a subsidiary in the Philippines. During a turbulent period, the subsidiary was prevented from exchanging its Philippine pesos into U.S. dollars to be sent home. Wittenberg held its corporate meeting in Manila so that it could use the pesos to pay the expenses of the meeting (hotel, food, etc.) in pesos. In this way, it was able to use local funds to cover an expense that it would have incurred anyway. Ordinarily, the corporate meeting would have been held in the parent's country, and the parent would have paid the expenses. ●

21-3d Managing Intersubsidiary Cash Transfers

Proper management of cash flows can also be beneficial to a subsidiary in need of funds.

EXAMPLE   Texas, Inc., has two foreign subsidiaries called Short Sub and Long Sub. Short Sub needs funds while Long Sub has excess funds. If Long Sub purchases supplies from Short Sub, then it can provide financing by paying for its supplies earlier than necessary. This technique is often called **leading**. Alternatively, if Long Sub sells supplies to Short Sub, it can provide financing by allowing Short Sub to lag its payments; This technique is called **lagging**. ●

The leading or lagging strategy can make efficient use of cash and thereby reduce debt. Some host governments prohibit the practice by requiring that a payment between subsidiaries occur at the time the goods are transferred. Thus, an MNC needs to be aware of any laws that restrict the use of this strategy.

21-3e Complications in Optimizing Cash Flow

Most complications encountered when optimizing cash flow can be classified into three categories:

- company-related characteristics,
- government restrictions, or
- limitations of banking systems.

Each complication will be discussed in this section.

Company-Related Characteristics In some cases, optimizing cash flow can become complicated because of the MNC's characteristics. If one of the subsidiaries delays payments to other subsidiaries for supplies received, then the other subsidiaries may be forced to borrow until the payments arrive. A centralized approach that monitors all intersubsidiary payments should be able to minimize such problems.

Government Restrictions The existence of government restrictions can disrupt a cash flow optimization policy. Some governments prohibit the use of a netting system, as noted earlier. In addition, some countries periodically prevent cash from leaving the country, thereby preventing net payments from being made. These problems can arise even for MNCs that do not experience any company-related problems. Countries in Latin America often impose restrictions that affect an MNC's cash flows.

Limitations of Banking Systems The abilities of banks to facilitate cash transfers for MNCs vary among countries. Banks in the United States are advanced in this field, but banks in some other countries do not offer these services. Multinational corporations prefer some form of a zero-balance account, where excess funds can be used to make payments but earn interest until they are used. Most MNCs can benefit from the use of lockboxes, but such services are not available in some countries.

In addition, a bank may not update the MNC's bank account information sufficiently or provide a detailed breakdown of fees for banking services. Without full use of banking resources and information, the effectiveness of international cash management is limited. Moreover, an MNC with subsidiaries in, say, eight different countries will typically be dealing with eight different banking systems. Much progress has been made in foreign banking systems in recent years. As time passes and a more uniform global banking system emerges, such problems may be alleviated.

21-4 Investing Excess Cash

Many MNCs have at least $100 million in cash balances across banks in various countries. If they can find a way to earn an extra 1 percent on those funds, they will generate an extra $1 million each year on cash balances of $100 million. Thus, their short-term investment decisions affect the amount of their cash inflows. Multinational corporations typically invest in large deposits at commercial banks. They also purchase foreign Treasury bills and commercial paper.

An MNC can usually earn a higher interest rate on short-term investments that are in larger amounts. If two subsidiaries have excess cash of $50,000 each for one month, the rates on their individual bank deposits may be lower than the rate they could obtain if they pooled their cash into a single $100,000 bank deposit. For this reason, MNCs commonly pool excess cash among subsidiaries to generate a higher rate of return on their short-term investments.

An MNC's excess funds can be invested in domestic or foreign short-term securities. In some periods the foreign short-term securities will have higher interest rates than domestic interest rates, which leads to their purchase by MNCs.

21-4a Determining the Effective Yield

A U.S.-based MNC may invest in a deposit that is denominated in a currency with a high interest rate and then convert the funds back to dollars when the deposit matures. However, if the currency denominating the deposit depreciates over the life of the deposit, the advantage of a higher interest rate may be more than offset by the depreciation in the currency representing the deposit. Hence it is the deposit's effective yield, not

its interest rate, that is most important to the cash manager. The effective yield of a bank deposit considers both the interest rate and the rate of appreciation (or depreciation) of the currency denominating the deposit and can therefore be very different from the quoted interest rate on a deposit denominated in a foreign currency. An example follows to illustrate this point.

EXAMPLE   Quant Co., a large U.S. corporation with $1 million in excess cash, could invest in a one-year deposit at 6 percent but is attracted to higher interest rates in Australia. It creates a one-year deposit denominated in Australian dollars (A$) at 9 percent. The exchange rate of the Australian dollar at the time of the deposit is $.68. The U.S. dollars are first converted to A$1,470,588 (since $1,000,000/$.68 = $1,470,588) and then deposited in a bank.

One year later, Quant Co. receives A$1,602,941, which is equal to the initial deposit plus 9 percent interest on the deposit. At this time, Quant Co. has no use for Australian dollars and converts them into U.S. dollars. Assume that the exchange rate at this time is $.72. The funds will convert to $1,154,118 (computed as A$1,602,941 × $.72 per A$). Thus, the yield on this investment to the U.S. corporation is

$$\frac{\$1,154,118 - \$1,000,000}{\$1,000,000} = .1541, \text{ or } 15.41\%$$

The high yield is attributed to the relatively high interest rate earned on the deposit plus the appreciation in the currency denominating the deposit over the investment period.

If the currency had depreciated over the investment period, however, then the effective yield to Quant Co. would have been less than the interest rate on the deposit and could even have been lower than the interest rate available on U.S. investments. For example, if the Australian dollar had depreciated from $.68 at the beginning of the investment period to $.65 by the end of the investment period, Quant Co. would have received $1,041,912 (computed as A$1,602,941 × $.65 per A$). In this case, the yield on the investment to the U.S. corporation would have been

$$\frac{\$1,041,912 - \$1,000,000}{\$1,000,000} = .0419, \text{ or } 4.19\%$$

The preceding example illustrates how appreciation of the currency denominating a foreign deposit over the deposit period will force the effective yield to be higher than the quoted interest rate. Conversely, depreciation will create the opposite effect.

The previous computation of the effective yield on foreign deposits was conducted in a logical manner. A quicker method is shown here:

$$r = (1 + i_f)(1 + e_f) - 1$$

In this equation, r denotes the effective yield on the foreign deposit, i_f is the quoted interest rate, and e_f is the percentage change (from the day of deposit to the day of withdrawal) in the value of the currency representing the foreign deposit. The term i_f was used in Chapter 20 to represent the interest rate when borrowing a foreign currency. In this chapter, the interest rate of concern is the deposit rate on the foreign currency.

EXAMPLE   Given the information for Quant Co., the effective yield on the Australian deposit can be estimated. The term e_f represents the percentage change in the Australian dollar (against the U.S. dollar) from the date Australian dollars are purchased (and deposited) until the day they are withdrawn (and converted back to U.S. dollars). The Australian dollar appreciated from $.68 to $.72, or by 5.88 percent over the life of the deposit. Using this information as well as the quoted deposit rate of 9 percent, the effective yield to the U.S. firm on this deposit denominated in Australian dollars is

$$r = (1 + i_f)(1 + e_f) - 1$$
$$= (1 + .09)[1 + (.0588)] - 1$$
$$= .1541, \text{ or } 15.41\%$$

This estimate of the effective yield corresponds with the return on investment determined earlier for Quant Co. ●

If the currency had depreciated, Quant Co. would have earned an effective yield that was less than the interest rate.

EXAMPLE   In the revised example for Quant Co., the Australian dollar depreciated from $.68 to $.65, or by 4.41 percent. Based on the quoted interest rate of 9 percent and the depreciation of 4.41 percent, the effective yield is

$$r = (1 + i_f)(1 + e_f) - 1$$
$$= (1 + .09)[1 + (-.0441)] - 1$$
$$= .0419, \text{ or } 4.19\%$$

which is the same rate computed earlier for this revised example. ●

The effective yield can be negative if the currency denominating the deposit depreciates to an extent that more than offsets the interest accrued from the deposit.

EXAMPLE   Gatlinburg, Inc., invests in a bank deposit denominated in euros that provides a yield of 9 percent. The euro depreciates against the dollar by 12 percent over a one-year period. The effective yield is

$$r = (1 + .09)[1 + (-.12)] - 1$$
$$= -.0408, \text{ or } -4.08\%$$

This result indicates that Gatlinburg, Inc., will end up with 4.08 percent less in funds than it initially deposited. ●

As with bank deposits, the effective yield on all other securities denominated in a foreign currency is influenced by the fluctuation of that currency's exchange rate. Our discussion will continue to focus on bank deposits for short-term foreign investment, but the implications of the discussion can be applied to other short-term securities as well.

21-4b   Implications of Interest Rate Parity

Recall that covered interest arbitrage is described as a short-term foreign investment with a simultaneous forward sale of the foreign currency denominating the foreign investment. One might think that a foreign currency with a high interest rate would be an ideal candidate for covered interest arbitrage. However, such a currency will normally exhibit a forward discount that already reflects the difference between its interest rate and the investor's home interest rate. This relationship is based on the theory of interest rate parity. Investors cannot lock in a higher return when attempting covered interest arbitrage if interest rate parity holds.

Even if interest rate parity does hold, short-term foreign investing may still be feasible; however, it would have to be conducted on an uncovered basis (that is, without using the forward market). So even though short-term foreign investing may result in a higher effective yield than domestic investing, a higher yield is not guaranteed.

21-4c   Using the Forward Rate as a Forecast

If interest rate parity holds, then the forward rate serves as a break-even point for assessing the short-term investment decision. When investing in the foreign currency (and not covering the foreign currency position), the effective yield will be more than the domestic yield if the spot rate of the foreign currency after one year is more than the forward rate at the time the investment is undertaken. Conversely, the yield of a foreign investment will be lower than the domestic yield if the spot rate of the foreign currency after one year turns out to be less than the forward rate at the time the investment is undertaken.

Relationship with the International Fisher Effect   When there is interest rate parity, MNCs that use the forward rate as a predictor of the future spot rate expect the yield on foreign deposits to equal that on U.S. deposits. Although the forward rate is not necessarily an accurate predictor, it may provide unbiased forecasts of the future spot rate. A forward rate that is *unbiased* will underestimate and overestimate the future spot rate with nearly equal frequency, in which case the effective yield on foreign deposits is (on average) equal to the domestic yield. Therefore, MNCs that consistently invest in foreign short-term securities would earn a yield similar to what they could earn on domestic securities.

The discussion here is closely related to the international Fisher effect (IFE). Recall that the IFE suggests that the exchange rate of a foreign currency is expected to change by an amount reflecting the difference between its interest rate and the U.S. interest rate. The rationale behind this theory is that a high nominal interest rate reflects an expectation of high inflation, which could weaken the currency (according to purchasing power parity).

If interest rate parity holds, then the forward premium or discount reflects that interest rate difference and so represents the expected percentage change in the currency's value when the forward rate is used as a predictor of the future spot rate. The IFE suggests that firms cannot consistently earn short-term yields on foreign securities that are higher than those on domestic securities because the exchange rate is expected to adjust, on average, to the interest rate difference. If interest rate parity holds and if the forward rate is an unbiased predictor of the future spot rate, then we can expect the IFE to hold.

A look back in time reveals that the IFE is supported for some currencies in some periods. However, it may be difficult for an MNC to anticipate when the IFE will hold and when it will not. For virtually any currency, it is possible to identify previous periods when the forward rate substantially underestimated the future spot rate, and an MNC would have earned very high returns from investing short-term funds in a foreign money market security. Yet it is also possible to identify other periods when the forward rate substantially overestimated the future spot rate; in that event, an MNC would have earned low (or even negative) returns from investing in that same foreign money market security.

Conclusions about the Forward Rate   The key implications of interest rate parity and the forward rate as a predictor of future spot rates for foreign investing are summarized in Exhibit 21.4. This exhibit explains the conditions under which investment in foreign short-term securities is feasible.

Exhibit 21.4   Considerations When Investing Excess Cash

SCENARIO	IMPLICATIONS FOR INVESTING IN FOREIGN MONEY MARKETS
1. Interest rate parity exists.	Covered interest arbitrage is not worthwhile.
2. Interest rate parity exists; and the forward rate is an accurate forecast of the future spot rate.	An uncovered investment in a foreign security is not worthwhile.
3. Interest rate parity exists; and the forward rate is an unbiased forecast of the future spot rate.	An uncovered investment in a foreign security will on average earn an effective yield similar to an investment in a domestic security.
4. Interest rate parity exists; and the forward rate is expected to overestimate the future spot rate.	An uncovered investment in a foreign security is expected to earn a lower effective yield than an investment in a domestic security.
5. Interest rate parity exists; and the forward rate is expected to underestimate the future spot rate.	An uncovered investment in a foreign security is expected to earn a higher effective yield than an investment in a domestic security.
6. Interest rate parity does not exist; and the forward premium (discount) exceeds (is less than) the interest rate differential.	Covered interest arbitrage is feasible for investors residing in the home country.
7. Interest rate parity does not exist; and the forward premium (discount) is less than (exceeds) the interest rate differential.	Covered interest arbitrage is feasible for foreign investors but not for investors residing in the home country.

21-4d Using Exchange Rate Forecasts

Although MNCs do not know how a currency's value will change over the investment horizon, they can use the formula for the effective yield provided earlier in this chapter and plug in their forecast for the percentage change in the foreign currency's exchange rate (e_f). Since the interest rate of the foreign currency deposit (i_f) is known, the effective yield can be forecast given a forecast of e_f. This projected effective yield on a foreign deposit can then be compared with the yield when investing in the firm's local currency.

EXAMPLE   Latrobe, Inc., is a U.S. firm with funds available to invest for one year. It is aware that the one-year interest rate on a U.S. dollar deposit is 11 percent and that the interest rate on an Australian deposit is 14 percent. Assume that the U.S. firm forecasts the Australian dollar to depreciate from its current rate of $.1600 to $.1584, a 1 percent decrease. The expected value of e_f, or $E[e_f]$, will therefore be −1 percent. Thus, the expected effective yield, $E[r]$, on an Australian dollar-denominated deposit is

$$E[r] = (1 + i_f)[1 + E(e_f)] - 1$$
$$= (1 + 14\%)[1 + (-1\%)] - 1$$
$$= 12.86\%$$

So in this example, investing in an Australian dollar deposit is expected to be more rewarding than investing in a U.S. dollar deposit. ●

Keep in mind that the value of e_f is only a forecast and is therefore not known with certainty. Thus, there is no guarantee that foreign investing will actually be beneficial.

Deriving an e_f That Equates Foreign and Domestic Yields   From the preceding example, Latrobe may at least want to determine what value of e_f would make the effective yield from foreign investing the same as that from investing in a U.S. dollar deposit. In order to determine this value, begin with the effective yield formula and solve for e_f as follows:

$$r = (1 + i_f)(1 + e_f) - 1$$
$$1 + r = (1 + i_f)(1 + e_f)$$
$$\frac{1 + r}{1 + i_f} = 1 + e_f$$
$$\frac{1 + r}{1 + i_f} - 1 = e_f$$

Since the U.S. deposit rate was 11 percent in our previous example, that is the rate to be plugged in for r. We can also plug in 14 percent for i_f, in which case the break-even value of e_f would be

$$e_f = \frac{1 + r}{1 + i_f} - 1$$
$$= \frac{1 + 11\%}{1 + 14\%} - 1$$
$$= -2.63\%$$

This calculation indicates that the Australian dollar must depreciate by about 2.63 percent to make the Australian dollar deposit generate the same effective yield as a deposit in U.S. dollars. With any smaller degree of depreciation, the Australian dollar deposit would be more rewarding. Latrobe, Inc., can use this information when determining whether to invest in a U.S. dollar or Australian dollar deposit. If it expects the Australian dollar to depreciate by more than 2.63 percent over the deposit period, it will prefer investing in U.S. dollars.

If Latrobe expects the Australian dollar to depreciate by less than 2.63 percent (or to appreciate), then its decision is more complex. If the potential reward from investing in the foreign currency outweighs the risk involved, then the firm should choose that route. The final decision here will be influenced by Latrobe's degree of risk aversion.

Using Probability Distributions   Since even expert forecasts are not always accurate, it is sometimes useful to develop a probability distribution instead of relying on a single prediction. An example of how a probability distribution is applied follows.

EXAMPLE   Ohio, Inc., is deciding whether to invest in Australian dollars for one year. It finds that the quoted interest rate for the Australian dollar is 14 percent and the quoted interest rate for a U.S. dollar deposit is 11 percent. The company then develops a probability distribution for the Australian dollar's possible percentage change in value over the life of the deposit.

The probability distribution is displayed in Exhibit 21.5. From the first row in the exhibit, we see that there is a 5 percent probability of a 10 percent depreciation in the Australian dollar over the deposit's life. If the Australian dollar does depreciate by 10 percent, then the effective yield will be 2.60 percent. This indicates that there is a 5 percent probability that Ohio, Inc., will earn a 2.60 percent effective yield on its funds. From the second row in the exhibit, there is a 10 percent probability of an 8 percent depreciation in the Australian dollar over the deposit period. If the Australian dollar does depreciate by 8 percent then the effective yield will be 4.88 percent, which means there is a 10 percent probability that Ohio will generate a 4.88 percent effective yield on this deposit.

For each possible percentage change in the Australian dollar's value, there is a corresponding effective yield. Each possible effective yield (third column) is associated with a probability of that yield occurring (second column). An *expected value* of the effective yield of the Australian dollar is derived by multiplying each possible effective yield by its corresponding probability. The information in Exhibit 21.5 shows that the expected value of the effective yield, $E[r_f]$, is computed as follows:

$$
\begin{aligned}
E[r_f] &= 5\%(2.60\%) + 10\%(4.88\%) + 15\%(9.44\%) + 20\%(11.72\%) \\
&\quad + 20\%(15.14\%) + 15\%(16.28\%) + 10\%(17.42\%) \\
&\quad + 5\%(18.56\%) \\
&= .13\% + .488\% + 1.416\% + 2.344\% + 3.028\% + 2.442\% \\
&\quad + 1.742\% + .928\% \\
&= 12.518\%
\end{aligned}
$$

Thus, the expected value of the effective yield when investing in Australian dollars is approximately 12.5 percent.

To further assess the question of which currency to invest in, the information in the second and third columns from Exhibit 21.6 is used to develop a probability distribution in Exhibit 21.6, which illustrates the probability of each possible effective yield that may occur if Ohio, Inc., invests in

Exhibit 21.5   Analysis of Investing in a Foreign Currency

POSSIBLE RATE OF CHANGE IN THE AUSTRALIAN DOLLAR OVER THE LIFE OF THE INVESTMENT (e_f)	PROBABILITY OF OCCURRENCE	EFFECTIVE YIELD IF THIS RATE OF CHANGE IN THE AUSTRALIAN DOLLAR DOES OCCUR
−10%	5%	(1.14) [1 + (−.10)] − 1 = .0260, or 2.60%
−8	10	(1.14) [1 + (−.08)] − 1 = .0488, or 4.88%
−4	15	(1.14) [1 + (−.04)] − 1 = .0944, or 9.44%
−2	20	(1.14) [1 + (−.02)] − 1 = .1172, or 11.72%
+1	20	(1.14) [1 + (.01)] − 1 = .1514, or 15.14%
+2	15	(1.14) [1 + (.02)] − 1 = .1628, or 16.28%
+3	10	(1.14) [1 + (.03)] − 1 = .1742, or 17.42%
+4	5	(1.14) [1 + (.04)] − 1 = .1856, or 18.56%
	100%	

Exhibit 21.6   Probability Distribution of Effective Yields
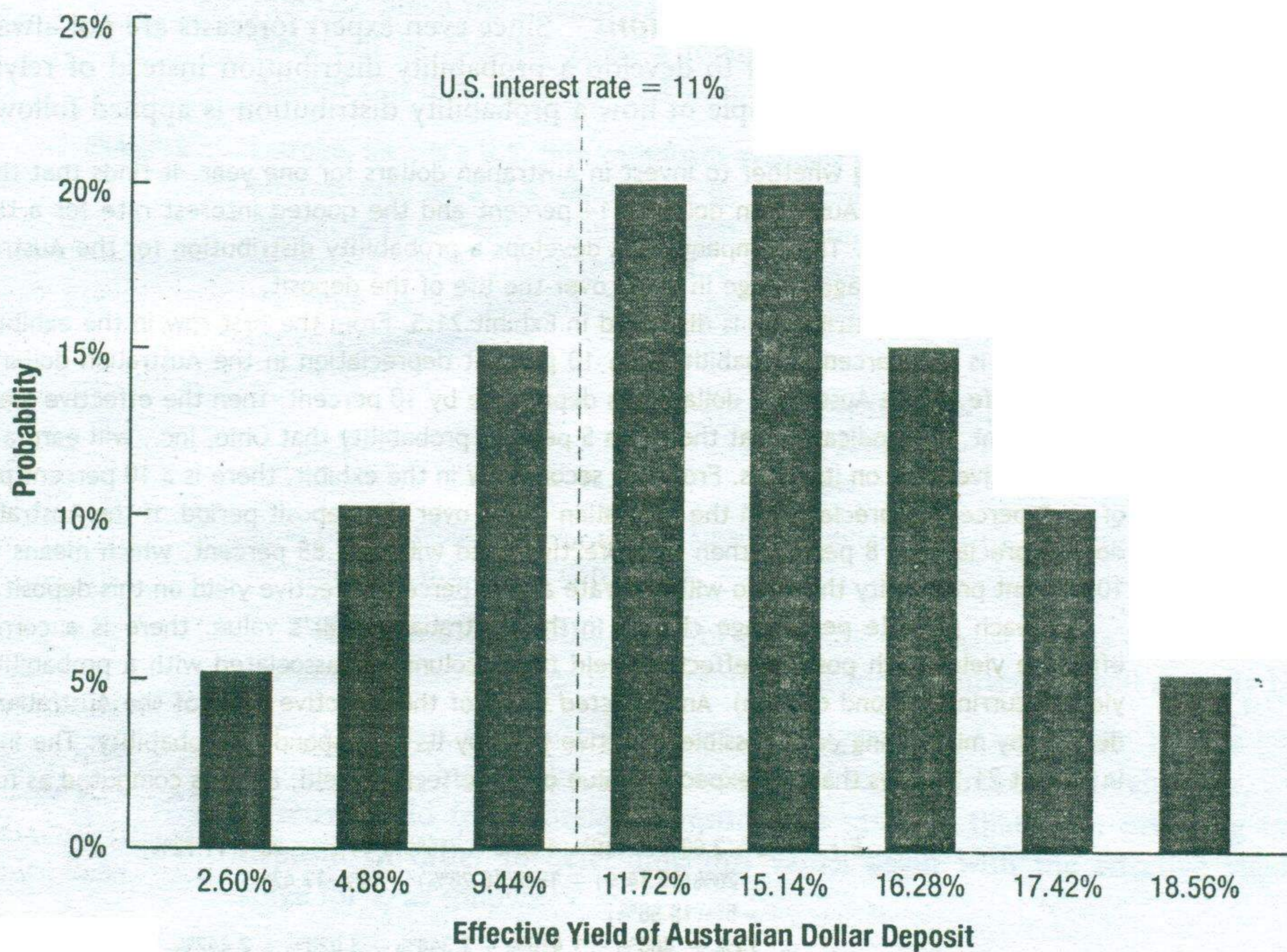
Australian dollars. Observe that the U.S. interest rate of 11 percent is known with certainty and is included in the exhibit for comparison purposes. A comparison of the Australian dollar's probability distribution against the U.S. interest rate suggests that there is a 30 percent probability that the U.S. rate will be more than the effective yield from investing in Australian dollars and a 70 percent chance that it will be less.

If Ohio, Inc., invests in a U.S. dollar deposit, then it knows with certainty the yield it will earn from that investment. If the company invests in Australian dollars, its risk is the 5 percent chance (probability) that the effective yield on the Australian dollar deposit will be 2.60 percent, or the 10 percent chance that the effective yield on the Australian dollar deposit will be 4.88 percent, or the 15 percent chance that the effective yield on Australian dollars will be 9.44 percent. Each of these possibilities represents a lower return to the firm than what it would have earned had it invested in a U.S. dollar deposit. Ohio, Inc., concludes that the potential return on the Australian deposit is not high enough to compensate for the risk and decides to invest in the U.S. deposit. ●

21-4e   Diversifying Cash across Currencies

Because an MNC is not sure how exchange rates will change over time, it may prefer to diversify cash among securities denominated in different currencies. Limiting the percentage of excess cash invested in each currency will reduce the MNC's exposure to exchange rate risk.

The extent to which a portfolio of investments denominated in various currencies will reduce risk depends on the currency correlations. Ideally, the currencies represented within the portfolio will exhibit low or negative correlations with each other. When currencies are likely to be affected by the same underlying event, their movements tend to be more highly correlated; hence diversifying among these types of currencies does not substantially reduce exposure to exchange rate risk.

21-4f   Dynamic Hedging

Some MNCs continually adjust their short-term positions in currencies in response to revised expectations of each currency's future movement. This is the strategy of **dynamic hedging**, which involves applying a hedge when the currencies held are expected to depreciate and removing any hedge when the currencies held are expected to appreciate. In essence, the objective is to protect against downside risk while still benefitting from the favorable movement of exchange rates.

For example, consider a treasurer of a U.S. firm who plans to invest in British money market securities. If the British pound begins to decline and is expected to depreciate further, then the treasurer may sell pounds forward in the foreign exchange market for a future date at which the pound's value is expected to turn upward. If the treasurer can be confident that the pound will depreciate in the short run, then most or all of the position will be hedged.

Now assume that the pound begins to appreciate before the forward contract date. Since the contract will preclude the potential benefits from the pound's appreciation, the treasurer may buy pounds forward to offset the existing forward sale contracts. In this way, the treasurer has removed the existing hedge. Of course, if the forward rate at the time of the forward purchase exceeds the forward rate that existed at the time of the forward sale, a cost is incurred to offset the hedge.

The treasurer may decide to remove only part of the hedge, offsetting only some of the existing forward sales with forward purchases. With this approach, the position is still partially protected if the pound depreciates further. Overall, the performance from using dynamic hedging depends on the treasurer's ability to forecast the direction of exchange rate movements.

SUMMARY

- MNCs manage their working capital, which includes short-term assets such as inventory, accounts receivable, and cash. Multinational management of working capital is complex for MNCs that have foreign subsidiaries because each subsidiary must have adequate working capital to support its operations. The MNC may use a centralized perspective in order to monitor cash positions and to ensure that funds can be transferred among subsidiaries to accommodate cash deficiencies.

- An MNC's centralized cash management can monitor cash flows between subsidiaries and between each subsidiary and the parent. It can facilitate the transfer of funds from subsidiaries with excess funds to those that need funds so that the MNC uses its funds efficiently.

- The common techniques to optimize cash flows are (1) accelerating cash inflows, (2) minimizing currency conversion costs, (3) managing blocked funds, and (4) implementing intersubsidiary cash transfers. The efforts by MNCs to optimize cash flows are complicated by company-related characteristics, government restrictions, and characteristics of banking systems.

- MNCs can possibly achieve higher returns when investing excess cash in foreign currencies that either have relatively high interest rates or may appreciate over the investment period. If the foreign currency depreciates over the investment period, however, this may offset any interest rate advantage of that currency.

POINT COUNTER-POINT

Should Interest Rate Parity Prevent MNCs from Investing in Foreign Currencies?

Point   Yes. Currencies with high interest rates have large forward discounts according to interest rate parity. To the extent that the forward rate is a reasonable forecast of the future spot rate, investing in a foreign country is not feasible.

Counter-Point   No. Even if interest rate parity holds, MNCs should still consider investing in a foreign currency. The key is their expectations of the future spot rate. If their expectations of the future spot rate are higher than the forward rate, the MNCs would benefit from investing in a foreign currency.

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. Country X typically has a high interest rate, and its currency is expected to strengthen against the dollar over time. Country Y typically has a low interest rate, and its currency is expected to weaken against the dollar over time. Both countries have imposed a "blocked funds" restriction over the next 4 years on the two subsidiaries owned by a U.S. firm. Which subsidiary will be more adversely affected by the blocked funds, assuming that there are limited opportunities for corporate expansion in both countries?

2. Assume that the Australian 1-year interest rate is 14 percent. Also assume that the Australian dollar is expected to appreciate by 8 percent over the next year against the U.S. dollar. What is the expected effective yield on a 1-year deposit in Australia by a U.S. firm?

3. Assume that the 1-year forward rate is used as the forecast of the future spot rate. The Malaysian ringgit's spot rate is $.20 while its 1-year forward rate is $.19. The Malaysian 1-year interest rate is 11 percent. What is the expected effective yield on a 1-year deposit in Malaysia by a U.S. firm?

4. Assume that the Venezuelan 1-year interest rate is 90 percent while the U.S. 1-year interest rate is 6 percent. Determine the break-even value for the percentage change in Venezuela's currency (the bolivar) that would cause the effective yield to be the same for a 1-year deposit in Venezuela as for a 1-year deposit in the United States.

5. Assume interest rate parity exists. Would U.S. firms possibly consider placing deposits in countries with high interest rates? Explain.

QUESTIONS AND APPLICATIONS

1. **International Cash Management** Discuss the general functions involved in international cash management. Explain how the MNC's optimization of cash flow can distort the profits of each subsidiary.

2. **Netting** Explain the benefits of netting. How can a centralized cash management system be beneficial to the MNC?

3. **Leading and Lagging** How can an MNC implement leading and lagging techniques to help subsidiaries in need of funds?

4. **International Fisher Effect** If a U.S. firm believes that the international Fisher effect holds, what are the implications regarding a strategy of continually attempting to generate high returns from investing in currencies with high interest rates?

5. **Investing Strategy** Tallahassee Co. has $2 million in excess cash that it has invested in Mexico at an annual interest rate of 60 percent. The U.S. interest rate is 9 percent. By how much would the Mexican peso have to depreciate to cause such a strategy to backfire?

6. **Investing Strategy** Why would a U.S. firm consider investing short-term funds in euros even when it does not have any future cash outflows in euros?

7. **Covered Interest Arbitrage** Evansville, Inc., has $2 million in cash available for 90 days. It is considering the use of covered interest arbitrage since the euro's 90-day interest rate is higher than the U.S. interest rate. What will determine whether this strategy is feasible?

8. Effective Yield Fort Collins, Inc., has $1 million in cash available for 30 days. It can earn 1 percent on a 30-day investment in the United States. Alternatively, if it converts the dollars to Mexican pesos, it can earn 1.5 percent on a Mexican deposit. The spot rate of the Mexican peso is $.12. The spot rate 30 days from now is expected to be $.10. Should Fort Collins invest its cash in the United States or in Mexico? Substantiate your answer.

9. Effective Yield Rollins, Inc., has $3 million in cash available for 180 days. It can earn 7 percent on a U.S. Treasury bill or 9 percent on a British Treasury bill. The British investment does require conversion of dollars to British pounds. Assume that interest rate parity holds and that Rollins believes the 180-day forward rate is a reliable predictor of the spot rate to be realized 180 days from now. Would the British investment provide an effective yield that is below, above, or equal to the yield on the U.S. investment? Explain your answer.

10. Effective Yield Repeat question 9, but this time assume that Rollins, Inc., expects the 180-day forward rate of the pound to substantially overestimate the spot rate to be realized in 180 days.

11. Effective Yield Repeat question 9, but this time assume that Rollins, Inc., expects the 180-day forward rate of the pound to substantially underestimate the spot rate to be realized in 180 days.

12. Effective Yield Assume that the 1-year U.S. interest rate is 10 percent and the 1-year Canadian interest rate is 3 percent. If a U.S. firm invests its funds in Canada, by what percentage will the Canadian dollar have to depreciate to make its effective yield the same as the U. S. interest rate from the U.S. firm's perspective?

13. Investing in a Currency Portfolio Why would a firm consider investing in a portfolio of foreign currencies instead of just a single foreign currency?

14. Interest Rate Parity Dallas Co. has determined that the interest rate on euros is 16 percent while the U.S. interest rate is 11 percent for 1-year Treasury bills. The 1-year forward rate of the euro has a discount of 7 percent. Does interest rate parity exist? Can Dallas achieve a higher effective yield by using covered interest arbitrage than by investing in U.S. Treasury bills? Explain.

15. Diversified Investments Hofstra, Inc., has no European business and has cash invested in six European countries, each of which uses the euro as its local currency. Are Hofstra's short-term investments well diversified and subject to a low degree of exchange rate risk? Explain.

16. Investing Strategy Should McNeese Co. consider investing funds in Latin American countries where it may expand facilities? The interest rates are high, and the proceeds from the investments could be used to help support the expansion. When would this strategy backfire?

17. Impact of September 11 Palos Co. commonly invests some of its excess dollars in foreign government short-term securities in order to earn a higher short-term interest rate on its cash. Describe how the potential return and risk of this strategy may have changed after the September 11, 2001, terrorist attack on the United States.

Advanced Questions

18. Investing in a Portfolio Pittsburgh Co. plans to invest its excess cash in Mexican pesos for 1 year. The 1-year Mexican interest rate is 19 percent. The probability of the peso's percentage change in value during the next year is shown next:

POSSIBLE RATE OF CHANGE IN THE MEXICAN PESO OVER THE LIFE OF THE INVESTMENT	PROBABILITY OF OCCURRENCE
−15%	20%
−4	50
0	30

What is the expected value of the effective yield based on this information? Given that the U.S. interest rate for 1 year is 7 percent, what is the probability that a 1-year investment in pesos will generate a lower effective yield than could be generated if Pittsburgh Co. simply invested domestically?

19. Effective Yield of Portfolio Ithaca Co. considers placing 30 percent of its excess funds in a 1-year Singapore dollar deposit and the remaining 70 percent of its funds in a 1-year Canadian dollar deposit. The Singapore 1-year interest rate is 15 percent, while the Canadian 1-year interest rate is 13 percent. The

possible percentage changes in the two currencies for the next year are forecasted as follows:

CURRENCY	HORIZON	PROBABILITY OF THAT CHANGE IN THE SPOT RATE OCCURRING
Singapore dollar	−2%	20%
Singapore dollar	1	60
Singapore dollar	3	20
Canadian dollar	1	50
Canadian dollar	4	40
Canadian dollar	6	10

Given this information, determine the possible effective yields of the portfolio and the probability

associated with each possible portfolio yield. Given a 1-year U.S. interest rate of 8 percent, what is the probability that the portfolio's effective yield will be lower than the yield achieved from investing in the United States? (See Appendix 21.)

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

International Cash Management

Recall from Chapter 20 that the new Thailand subsidiary of Blades, Inc., received a one-time order from a customer for 120,000 pairs of Speedos, Blades' primary product. There is a 6-month lag between the time when Blades needs funds to purchase material for the production of the Speedos and the time when it will be paid by the customer. Ben Holt, Blades' chief financial officer (CFO), has decided to finance the cost by borrowing Thai baht at an interest rate of 6 percent over a 6-month period. Since the average cost per pair of Speedos is approximately 3,500 baht, Blades will borrow 420 million baht. The payment for the order will be used to repay the loan's principal and interest.

Holt is currently planning to instruct the Thai subsidiary to remit any remaining baht-denominated cash flows back to the United States. Just before Blades receives payment for the large order, however, Holt notices that interest rates in Thailand have increased substantially. Blades would be able to invest funds in Thailand at a relatively high interest rate compared to the U.S. rate. Specifically, Blades could invest the remaining baht-denominated funds for 1 year in Thailand at an interest rate of 15 percent.

If the funds are remitted back to the U.S. parent, the excess dollar volume resulting from the conversion of baht will either be used to support the U.S. production of Speedos, if needed, or be invested in the United States. Specifically, the funds will be used to cover cost of goods sold in the U.S. manufacturing plant, located in Omaha, Nebraska. Since Blades used a significant amount of cash

to finance the initial investment to build the plant in Thailand and purchase the necessary equipment, its U.S. operations are strapped for cash. Consequently, if the subsidiary's earnings are not remitted back to the United States, Blades will have to borrow funds at an interest rate of 10 percent to support its U.S. operations. Any funds remitted by the subsidiary that are not used to support U.S. operations will be invested in the United States at an interest rate of 8 percent. Holt estimates that approximately 60 percent of the remitted funds will be needed to support U.S. operations and that the remaining 40 percent will be invested in the United States.

Consequently, Holt must choose between two alternative plans. First, he could instruct the Thai subsidiary to repay the baht loan (with interest) and invest any remaining funds in Thailand at an interest rate of 15 percent. Second, he could instruct the Thai subsidiary to repay the baht loan and remit any remaining funds back to the United States, where 60 percent of the funds would be used to support U.S. operations and 40 percent would be invested at an interest rate of 8 percent. Assume no income or withholding taxes on the earnings generated in Thailand.

Holt has contacted you, a financial analyst at Blades, Inc., to help him analyze these two options. He has informed you that the current spot rate of the Thai baht is .0225 and that the baht is expected to depreciate by 5 percent over the coming year. He has provided you with the following list of questions he would like you to answer.

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. [name of an MNC] AND cash management
2. multinational AND cash
3. parent AND liquidity
4. subsidiary AND liquidity
5. cash AND exchange rate risk
6. cash AND foreign
7. parent AND cash
8. subsidiary AND cash
9. intersubsidiary AND cash
10. subsidiary AND liquidity

Investing in a Portfolio of Currencies

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

Assume that MacFarland Co., a U.S. firm, needs to invest $100,000 for 1 year and obtains these interest rate quotes:

- interest rate for a one-year deposit in U.S. dollars = 11 percent;
- interest rate for a one-year deposit in Singapore dollars = 14 percent;
- interest rate for a one-year deposit in British pounds = 13 percent.

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

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

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

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

Exhibit 21A.1   Development of Possible Effective Yields

CURRENCY	POSSIBLE PERCENTAGE CHANGE IN THE SPOT RATE OVER THE DEPOSIT LIFE	PROBABILITY OF THAT PERCENTAGE CHANGE IN THE SPOT RATE OCCURRING	COMPUTATION OF EFFECTIVE YIELD BASED ON THAT PERCENTAGE CHANGE IN THE SPOT RATE
Singapore dollar	−4%	20%	(1.14) [1 + (−4%)] − 1 = 9.44%
Singapore dollar	−1	50	(1.14) [1 + (−1%)] − 1 = 12.86%
Singapore dollar	+2	30	(1.14) [1 + (2%)] − 1 = 16.28%
		100%	
British pound	−3	30	(1.13) [1 + (−3%)] − 1 = 9.61%
British pound	0	30	(1.13) [1 + (0%)] − 1 = 13.00%
British pound	+2	40	(1.13) [1 + (2%)] − 1 = 15.26%
		100%	

11 percent rate on a U.S. dollar deposit, there is a 30 percent chance that investing in British pounds will be less rewarding than investing in a U.S. dollar deposit.

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

CURRENCY	COMPUTATION OF EXPECTED VALUE OF EFFECTIVE YIELD
Singapore dollar	(20%)(9.44%) + 50%(12.86%) + 30%(16.28%) = 13.202%
British pound	(30%)(9.61%) + 30%(13.00%) + 40%(15.26%) = 12.887%

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

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

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

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

POSSIBLE JOINT EFFECTIVE YIELD			COMPUTATION OF EFFECTIVE YIELD OF PORTFOLIO (50% OF TOTAL FUNDS INVESTED IN EACH CURRENCY)
SINGAPORE DOLLAR	BRITISH POUND	COMPUTATION OF JOINT PROBABILITY	
9.44%	9.61%	(20%)(30%) = 6%	.5(9.44%) + .5(9.61%) = 9.525%
9.44	13.00	(20%)(30%) = 6	.5(9.44%) + .5(13.00%) = 11.22%
9.44	15.26	(20%)(40%) = 8	.5(9.44%) + .5(15.26%) = 12.35%
12.86	9.61	(50%)(30%) = 15	.5(12.86%) + .5(9.61%) = 11.235%
12.86	13.00	(50%)(30%) = 15	.5(12.86%) + .5(13.00%) = 12.93%
12.86	15.26	(50%)(40%) = 20	.5(12.86%) + .5(15.26%) = 14.06%
16.28	9.61	(30%)(30%) = 9	.5(16.28%) + .5(9.61%) = 12.945%
16.28	13.00	(30%)(30%) = 9	.5(16.28%) + .5(13.00%) = 14.64%
16.28	15.26	(30%)(40%) = 12	.5(16.28%) + .5(15.26%) = 15.77%
		100%	

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

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

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

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

The current example includes two currencies in the portfolio. Investing in a more diversified portfolio of additional currencies that exhibit high interest rates can increase the probability that foreign investing will be more rewarding than the U.S. deposit. This is because of the low probability that all currencies will move in tandem and therefore simultaneously depreciate to offset their high interest rate advantages. Again, the degree to which these currencies are correlated with each other is important. If all currencies are highly positively correlated with each other, then investing in such a portfolio will not be very different from investing in a single foreign currency.

Repeated Investing in a Currency Portfolio

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

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

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

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

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

■ mean effective yield of British pound over three months = 4 percent;
■ mean effective yield of Singapore dollar over three months = 5 percent;
■ standard deviation of British pound's effective yield = .06;
■ standard deviation of Singapore dollar's effective yield = .10;
■ correlation coefficient of effective yields of these two currencies = .20.

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

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

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

$$\sigma_p^2 = .5^2(.06)^2 + .5^2(.10)^2 + 2(.5)(.5)(.06)(.10)(.20)$$
$$= .25(.0036) + .25(.01) + .5(.0012)$$
$$= .0009 + .0025 + .0006$$
$$= .004$$

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

Short-Term Asset and Liability Management

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

The western branch needs to borrow $15 million over 1 year to support its U.S. operations. It can borrow funds in any of these same currencies (although any foreign funds borrowed would need to be converted to dollars to finance the U.S. operations). The only restriction enforced by the parent is that a maximum equivalent of $5 million can be borrowed in any single currency. A large bank serving the international money market has offered Kent Co. the following terms:

CURRENCY	ANNUAL INTEREST RATE ON DEPOSITS	ANNUAL INTEREST RATE CHARGED ON LOANS
U.S. dollar	6%	9%
Australian dollar	11	14
Canadian dollar	7	10
New Zealand dollar	9	12
Japanese yen	8	11

Kent Co. has created 1-year forecasts of each currency for the branches to use in making their investing or financing decisions:

CURRENCY	TODAY'S SPOT EXCHANGE RATE	FORECASTED ANNUAL PERCENTAGE CHANGE IN EXCHANGE RATE
Australian dollar	$.70	−4%
Canadian dollar	.80	−2
New Zealand dollar	.60	+3
Japanese yen	.008	0

Questions

1. Determine the investment portfolio composition for Kent's eastern branch that would maximize the expected effective yield while satisfying the restriction imposed by the parent.

2. What is the expected effective yield of the investment portfolio?

3. Based on the expected effective yield for the portfolio and the initial investment amount of $15 million, determine the annual interest to be earned on the portfolio.

4. Determine the financing portfolio composition for Kent's western branch that would minimize the expected effective financing rate while satisfying the restriction imposed by the parent.

5. What is the expected effective financing rate of the total amount borrowed?

6. Based on the expected effective financing rate for the portfolio and the total amount of $15 million borrowed, determine the expected loan repayment amount beyond the principal borrowed.

7. When the expected interest received by the eastern branch and paid by the western branch of Kent Co. are consolidated, what is the net amount of interest received?

8. If the eastern branch and the western branch worked together, the eastern branch could loan its $15 million to the western branch. Nevertheless, one could argue that the branches could not take advantage of interest rate differentials or expected exchange rate effects among currencies. Given the data provided in this example, would you recommend that the two branches make their short-term investment and financing decisions independently, or should the eastern branch lend its excess cash to the western branch? Explain.

Final Self-Exam

FINAL REVIEW

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

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

Chapter 18 explains how the cost of long-term financing with foreign currency–denominated debt is subject to exchange rate movements. When the debt payments are

not offset by cash inflows in the same currency, the cost of financing increases if the foreign currency denominating the debt increases over time.

Chapter 19 explains how international trade can be facilitated by various forms of payment and financing. Chapter 20 explains how an MNC's short-term financing in foreign currencies can reduce exchange rate risk if it is offset by foreign currency inflows at the end of the financing period. When there are not offsetting currency inflows, the effective financing rate of a foreign currency is more favorable (lower) when its interest rate is low and when the currency depreciates over the financing period.

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

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

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

FINAL SELF-EXAM

1. New Hampshire Co. expects that monthly capital flows between the United States and Japan will be the major factor that affects the monthly exchange rate movements of the Japanese yen in the future, as money will flow to whichever country has the higher nominal interest rate. At the beginning of each month, New Hampshire Co. will use either the spot rate or the forward rate to forecast the future spot rate that will exist at the end of the month. Will the spot rate result in smaller, larger, or the same mean absolute forecast error as the forward rate when forecasting the future spot rate of the yen on a monthly basis? Explain.

2. California Co. will need 1 million Polish zloty in 2 years to purchase imports. Assume interest rate parity holds. Assume that the spot rate of the Polish zloty is $.30. The 2-year annualized interest rate in the United States is 5 percent, and the 2-year annualized interest rate in Poland is 11 percent. If California Co. uses a forward contract to hedge its payables, how many dollars will it need in 2 years?

3. Minnesota Co. uses regression analysis to assess its economic exposure to fluctuations in the Canadian dollar. The dependent variable in the regressions is the monthly percentage change in the company's stock price, and the independent variable is the monthly percentage change in the Canadian dollar. The analysis estimated the intercept to be zero and the coefficient of the monthly percentage change in the Canadian dollar to be −0.6. Assume the interest rate in Canada is consistently higher than the interest rate in the United States. Assume that interest rate parity exists. You use the forward rate to forecast future exchange rates of the Canadian dollar. Do you think Minnesota's stock price will be (a) favorably affected, (b) adversely affected, or (c) not affected by the expected movement in the Canadian dollar? Explain the logic behind your answer.

4. Iowa Co. has most of its business in the United States, except that it exports to Portugal. Its exports were invoiced in euros (Portugal's currency) last year. It has no other economic exposure to exchange rate risk. Its main competition when selling to Portugal's customers is a company in Portugal that sells similar products, denominated in euros. Starting today, Iowa Co. plans to adjust its pricing strategy to invoice its exports in U.S. dollars instead of euros. Based on the new strategy, will the company be exposed to exchange rate risk in the future? Briefly explain.

5. Maine Co. has a facility that produces basic clothing in Indonesia (where labor costs are very low), and the clothes produced there are sold in the United States. Its facility is subject to a tax in Indonesia because it is not owned by local citizens. This tax increases its cost of production by 20 percent, but its cost is still 40 percent less than what it would be if it produced the clothing in the United States (because of Indonesia's low cost of labor). Maine wants to achieve geographical diversification and decides to sell its clothing in Indonesia. Its competition would be from several existing local firms in Indonesia. Briefly explain whether you think Maine's strategy for direct foreign investment is feasible.

6. Assume that interest rate parity exists and will continue to exist in the future. The U.S. and Mexican interest rates are the same regardless of the maturity of the interest rate, and they will continue to be the same in the future. Tucson Co. and Phoenix Co. will each receive 1 million Mexican pesos in 1 year and will receive 1 million Mexican pesos in 2 years. Today, Tucson uses a 1-year forward contract to hedge its receivables that will arrive in 1 year. Today it also uses a 2-year forward contract to hedge its receivables that will arrive in 2 years.

Phoenix uses a 1-year forward contract to hedge the receivables that will arrive in 1 year. A year from today, Phoenix will use a 1-year forward contract to hedge the receivables that will arrive 2 years from today. The Mexican peso is expected to consistently depreciate substantially over the next 2 years.

Will Tucson receive more, less, or the same amount of dollars as Phoenix? Explain.

7. Assume that Jarret Co. (a U.S. firm) expects to receive 1 million euros in 1 year. The existing spot rate of the euro is $1.20. The 1-year forward rate of the euro is $1.21. Jarret expects the spot rate of the euro to be $1.22 in 1 year.

Assume that 1-year put options on euros are available, with an exercise price of $1.23 and a premium of $.04 per unit. Assume the following money market rates:

	UNITED STATES	EUROZONE
Deposit rate	8%	5%
Borrowing rate	9%	6%

a. Determine the dollar cash flows to be received if Jarret uses a money market hedge. (Assume Jarret does not have any cash on hand.)

b. Determine the dollar cash flows to be received if Jarret uses a put option hedge.

8. a. Portland Co. is a U.S. firm with no foreign subsidiaries. In addition to much business in the United States, its exporting business results in annual cash inflows of 20 million euros. Briefly explain how Portland Co. is subject to translation exposure (if at all).

b. Topeka Co. is a U.S. firm with no exports or imports. It has a subsidiary in Germany that typically generates earnings of 10 million euros each year, and none of the earnings are remitted to the United States. Briefly explain how Topeka Co. is subject to translation exposure (if at all).

9. Lexington Co. is a U.S. firm. It has a subsidiary in India that produces computer chips and sells them to European countries. The chips are invoiced in dollars. The subsidiary pays wages, rent, and other operating costs in India's currency (rupee). Every month, the subsidiary remits a large amount of earnings to the U.S. parent. This is the only international business that Lexington Co. has. The subsidiary wants to borrow funds to expand its facilities, and it can borrow dollars at 9 percent annually or borrow rupee at 9 percent annually. Which currency should the parent tell the subsidiary to borrow if the parent's main goal is to minimize exchange rate risk? Explain.

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

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

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

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

12. Everhart, Inc., is a U.S. firm with no international business. It issues debt in the United States at an interest rate of 10 percent per year. The risk-free rate in the United States is 8 percent. The stock market return in the United States is expected to be 14 percent annually. Everhart's beta is 1.2. Its target capital structure is 30 percent debt and 70 percent equity. It is subject to a 25 percent corporate tax rate. Everhart plans a project in the Philippines in which it would receive net cash flows in Philippine pesos on an annual basis. The risk of the project would be similar to the risk of its other businesses. The existing risk-free rate in the Philippines is 21 percent and the stock market return there is expected to be 28 percent annually. Everhart plans to finance this project with either its existing equity or by borrowing Philippine pesos.

    a. Estimate the cost to Everhart if it uses dollar-denominated equity. Show your work.

    b. Assume that Everhart believes that the Philippine peso will appreciate substantially each year against the dollar. Do you think it should finance this project with its dollar-denominated debt or by borrowing Philippine pesos? Explain.

    c. Assume that Everhart receives an offer from a Philippine investor who is willing to provide equity financing in Philippine pesos. Do you think this form of financing would be preferable to Everhart than financing with debt denominated in Philippine pesos? Explain.

13. Assume that a euro is equal to $1.00 today. A U.S. firm could engage in a parallel loan today in which it borrows 1 million euros from a firm in Belgium and provides a $1 million

loan to the Belgian firm. The loans will be repaid in 1 year with interest. Which of the following U.S. firms could most effectively use this parallel loan in order to reduce its exposure to exchange rate risk? (Assume that these U.S. firms have no other international business than what is described here.) Explain.

Sacramento Co. will receive a payment of 1 million euros from a French company in 1 year.

Stanislaus Co. needs to make a payment of 1 million euros to a German supplier in 1 year.

Los Angele Co. will receive 1 million euros from the Netherlands government in 1 year. It just engaged in a forward contract in which it sold 1 million euros 1 year forward.

San Mateo Co. will receive a payment of 1 million euros today and will owe a supplier 1 million euros in 1 year.

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

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

BEGINNING OF YEAR	SWISS FRANC (SF)	ARGENTINE PESO (AP)
1	$.60	$.35
2	$.64	$.36
3	$.60	$.38
4	$.66	$.40
5	$.68	$.39
6	$.72	$.37
7	$.76	$.36

a. Suppose you forecast that the Swiss franc will appreciate by 3 percent over the next year, but you realize that there is much uncertainty surrounding your forecast. Use the value-at-risk method to estimate (based on a 95 percent confidence level) the maximum level of depreciation in the Swiss franc over the next year, based on the data you were provided.

b. Assume that you forecast that the Argentine peso will depreciate by 2 percent over the next year but realize there is much uncertainty surrounding your forecast. Use the value-at-risk method to estimate (based on a 95 percent confidence level) the maximum level of depreciation in the Argentine peso over the next year, based on the data you were provided.

15. Brooks Co. (a U.S. firm) considers a project in which it will have computer software developed. It would sell the software to Razon Co., an Australian company, and would receive payment of 10 million Australian dollars (A$) at the end of 1 year. To obtain the software, Brooks would have to pay a local software producer $4 million today.

Brooks Co. might also receive an order for the same software from Zug Co. in Australia. It would receive A$4 million at the end of this year if it receives this order, and it would not incur any additional costs because it is the same software that would be created for Razon Co.

The spot rate of the Australian dollar is $.50, and the spot rate is expected to depreciate by 8 percent over the next year. The 1-year forward rate of the Australian dollar is $.47.

If Brooks decides to pursue this project (have the software developed), it would hedge the expected receivables due to the order from Razon Co. with a 1-year forward contract, but it would not hedge the order from Zug Co. Brooks would require a 24 percent rate of return in order to accept the project.

a forecast of depreciation for a currency that appreciates. The spot rate forecast results in a smaller mean absolute forecast error.

2. The 2-year forward premium is $1.1025/1.2321 - 1 = -.10518$. The 2-year forward rate is $\$.30 \times (1 - .10518) = \$.26844$. The amount of dollars needed is $\$.26844 \times 1,000,000$ zloty $= \$268,440$.

3. Minnesota's stock price will be favorably affected. When the Canadian interest rate is higher, the forward rate of the Canadian dollar will exhibit a discount, which implies expected depreciation of the C$ if the forward rate is used to predict the future spot rate. The negative coefficient in the regression model suggests that the firm's stock price will be inversely related to the forecast. Thus, the expected depreciation of the C$ will result in a higher stock price.

4. Iowa will still be subject to economic exposure because Portugal's demand for its products would decline if the euro weakens against the dollar. Thus, Iowa's cash flows are still affected by exchange rate movements.

5. Maine Co. does not have an advantage over the other producers in Indonesia because the competitors also capitalize on cheap land and labor.

6. Tucson will receive more cash flows. The 1-year and 2-year forward rates today are equal to today's spot rate. Thus, it hedges receivables at the same exchange rate as today's spot rate. Phoenix also hedges the receivables 1 year from now at that same exchange rate. But 1 year from now, it will hedge the receivables in the following year. In 1 year, the spot rate will be lower, so the 1-year forward rate at that time will be lower than today's forward rate. Thus, the receivables in 2 years will convert to a smaller amount of dollars for Phoenix than for Tucson.

7. a. Money market hedge:

Borrow euros:

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

Convert the euros to dollars:

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

Invest the dollars:

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

b. Put option: Pay premium of

$$\$.04 \times 1,000,000 = \$40,000$$

If the spot rate in 1 year is $1.22 as expected, then the put option would be exercised at the strike price of $1.23. The cash flows would then be

$$1,000,000 \times (1.23 - \$.04 \text{ premium}) = \$1,190,000$$

Thus, the money market hedge would be most appropriate.

8. a. Portland Co. is not subject to translation exposure since it has no foreign subsidiaries.

b. Topeka's consolidated earnings will increase if the euro appreciates against the dollar over the reporting period.

9. The subsidiary should borrow dollars because it already has a new cash outflow position in rupee so borrowing rupee would increase its exposure.

10. Franco Co. will offer a higher bid because its existing valuation of Podansk should be higher (since its risk-free rate is much lower).

11. As of today, the NPV from selling the project is
Proceeds received from selling the project − Present value of the forgone cash flows.
Proceeds = $1.25 million.
PV of forgone cash flows = $(1,000,000 \times \$1.30)/1.2 = \$1,083,333$.
The NPV from selling the project is $\$1,250,000 - \$1,083,333 = \$166,667$. Therefore, selling the project is feasible.

12. a. Based on the CAPM, Everhart's cost of equity = $8\% + 1.2(14\% - 8\%) = 15.2\%$.

    b. Philippine debt has a high interest rate. Also, the peso will appreciate so the debt is even more expensive. Everhart should finance with dollar-denominated debt.

    c. Philippine debt is cheaper than Philippine equity. The Philippine investor would require a higher return than if Everhart uses debt. Also, there is no tax advantage if Everhart accepted an equity investment.

13. Sacramento could benefit from the parallel loan because its receivables in 1 year could be used to pay off the loan principal in euros.

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

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

    b. The standard deviation of the annual movements in the Argentine peso is .0458, or 4.58 percent.
The maximum level of annual depreciation of the Argentine peso is:

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

15. a. Order from Razon:

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

Order from Zug:

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

    b. Order from Zug is $1,840,000 as just calculated.

The expected cost of offsetting the hedged cash flows is $100,000 as explained next.

Brooks sold A$1 million forward. It will purchase them in the spot market and then will fulfill its forward contract. The expected future spot rate in 1 year is $.46, so it would be expected to pay $.46 and sell A$ at the forward rate of $.47 for a $.01 profit per unit. For A$10 million, the profit is $.01 × 10 million = $100,000.

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

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

16. a. Austin should not consider financing with yen and simultaneously purchasing yen 1 year forward because the effective financing rate would be 7 percent, the same as the financing rate in the United States.

  b. If Austin finances with yen without covering this position, then its effective financing rate is expected to exceed the interest rate on the yen because of the expected appreciation of the yen over the financing period. However, the effective financing rate is not expected to be as high as the interest rate on the dollar.

  c. If the yen's spot rate in 1 year is higher than today's forward rate, then the effective financing rate will be higher than the U.S. interest rate of 7 percent.

17. a. Provo should not consider investing in NZ$ and simultaneously selling NZ$ 1 year forward because the effective yield would be 6 percent, the same as the yield in the United States.

  b. If Provo invests in NZ$, then its yield is expected to exceed the U.S. interest rate but be less than the NZ$ interest rate.

  c. If the NZ$ spot rate in 1 year is lower than today's forward rate, the effective yield will be lower than the U.S. interest rate of 6 percent.